The Role of ICT Solutions in the Intelligent Enterprise Performance

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Abstract. During the last years the number of innovative ICT systems, applications and tools has been growing still to support business performance. However, advanced ICT solutions are only means to the end of better process performance, not a substitute for it. Intelligent enterprises that are knowledge – driven organizations running their activity in increasingly dynamic, complex and uncertain environment. The aim of paper is the discussion about the wide spectrum of ICT solutions used by the intelligent enterprise and their meaning in the management of intelligent organization. The study results show that ICT drivers empowering the intelligent enterprise are: mobile workforce integration and management, smart virtual workplace, e- collaboration tools, business flexibility and prediction, scalability and customization, learning machines and systems, business continuity management, converting data into business intelligence. This is one of the first approach in this case that the author is going to continue in the advanced research.

Keywords: Intelligent enterprise · ICT · Enterprise management · Intelligent enterprise business model

1 Introduction

Undoubtedly, an intelligent enterprise has a high abilities to learn from experience, adapt to new situations, understand and handle abstract concepts, and use knowledge to impact on the business environment. Problem solving, comprehending complex ideas, learning quickly, and learning from experience are crucial for the intelligent enterprise. Companies today are looking to boost operational productivity and performance while addressing the full range of information requirements throughout the extended enterprise. In this case, the intelligence in the enterprise management is more than just delivering reports only from a data warehouse. It's about providing large numbers of people – executives, analysts, customers, business partners, and everyone else – secure and simple access to the right information, just in time so they can satisfy their unique reporting or analysis requirements to create a high added value.

The intelligent enterprise provides information for service-oriented purposes and for optimizing operational systems. It can be intelligent in two ways:

- it can behave intelligently or/and can "utilize" intelligence;
- it needs to maximize the extend and utility of its intellectual capital.

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The intelligent enterprise is an organization which acts effectively in the present and is capable of dealing effectively with the challenges of the future. It meets its objectives both of the enterprise itself and those of its stakeholders and makes trade – offs between them.

Because, today it is difficult to run the business performance without the use of advanced IT systems, applications, tools – the question concerning the differences between intelligent and traditional enterprise appears.

The aim of paper is the discussion about the wide spectrum of ICT solutions used in the intelligent enterprise and their meaning in the management of intelligent organization. This is one of the first approach in this case that the author is going to continue in the advanced research.

The paper is structured as follows. Section 1 is an introduction to the subject. Section 2 explains a theoretical background of an intelligent enterprise. Section 3 presents a research review of the intelligent enterprise. Section 4 is a review of intelligent enterprise business models and presents its results as the conception of an intelligent enterprise integrated model. Section 5 presents a discussion of findings.

2 Intelligent Enterprise in the Literature Review

The concept of an intelligent enterprise has its source particularly in a few ideas: an organisation based on knowledge and information management, a self - learning organization, an organisation based on the intellectual capital.

The ideal intelligent enterprise is able to self-organizing, dynamically interacting with a distributed network of stakeholders within and external to business partners. In this organization, the intelligence is measured by the scale of innovation, knowledge creation, and the ability to generate high flexible structures, learning from the collective intelligence of the enterprise as network [1].

On the other hand, Haeckel and Nolan present the another approach defining an intelligent enterprise as an organization based on the enterprise intelligence that means "the ability to deal with complexity, that is, its ability to capture, share, and extract meaning from marketplace signals" [2]. An organization's complexity is in turn a function of how many information sources it needs, how many business elements it must coordinate, and the number and type of relationships binding these elements. According to their analysis, the organization's 'intelligence quotient' is determined by three critical attributes: the ability to access knowledge and information (connecting); the ability to integrate and share information (sharing); and the ability to extract meaning from data (structuring). Connecting means that information sources and users are linked in such a way that accurate information can be captured and made available to the right users at the right time and place. Sharing means that people in the organization can share data, interpretations of the data, as well as their understanding of the core processes of the organization. Structuring means that insight or meaning is obtained by matching and relating information from multiple sources so that some form of pattern or trend emerges. Structuring is achieved by creating information about information, for instance, how data are organized, related and used.

The results of a literature surveys conduct that from the ICT point of view, the intelligent enterprise is correlated with following terms: business intelligence, artificial intelligence, enterprise intelligence systems. The concept of the 'intelligent enterprise' was first presented by Quinn as the enterprise depending more on the development and deployment of intellectual resources than on the management of physical and fiscal assets. Its functions are disaggregated into manageable intellectual clusters that Quinn calls 'service activities'. Information technology has made it possible to delegate and outsource many of these service activities to other organizations. Instead of focusing on products, the intelligent enterprise excels in a few core knowledge-based service activities critical to its customers and surrounds these with other activities necessary to defend the core. Then it uses advanced information, management, and intelligent systems to coordinate the many other diverse and often dispersed activity centers needed to fulfill customer needs that now it has a special meaning because of the use of advanced ICT solutions [3].

Ming and Feng [4], Hopkins, Lavalle, Balboni [5], Kruschwitz and Shockley [6], Dayani [7], Quinn [8], Stubbs [9], Tan and Cao [10, 11] note that the knowledge management, wireless networking technologies, mobile devices has prompted many modern enterprises to look for management information systems to remotely monitor and control of their company operations in order to increase their flexibility and competitiveness in the market. In other words, the intelligent enterprise operates with knowledge based technologies, especially on-line systems for remote work and activities improving the effectiveness of business processes and has important role in creating competitive advantage. Szczerbicki [12] notices that a modern intelligent enterprise is able to convert intellectual resources using ICT solutions to the end product with a high level of added value.

One should be pointed that now intelligent enterprises use in their business a hybrid approach rather than using a single intelligent system or application to do activities and to make decisions. Modern IT environment includes various interfaces and components completely Web-based and uses XML extensively which can work like shared platform to be accessed by multiple users and decision makers [13]. Enterprises operate on B2B platforms with'in built' EDI technologies that integrate ERP systems and special applications of business partners, use the workflow, CRM. All of them provide a lot of data and information in the integrated way. Thus, they act like knowledge management systems [14, 15]. Nowadays the main problem for the intelligent enterprise is not be the access to information but the ability to verify it and then to transform it into a useful operational and strategic resource, necessary to create a unique added value.

Enterprise management in the uncertain 'information-rich' environment requires great understanding of the role of information and human potential. To gain this understanding, the knowledge is required [16]. In the intelligent enterprise, employees know that ICT tools enable the knowledge sharing, not only fosters collaboration but also facilitates experience and knowledge discovery. Thannhuber [17] emphasizes that IT systems supported by knowledge and intelligence paired together allow to adapt dynamically the enterprise to its environment, provide the framework for making optimal decision. Moreover, the intelligent enterprise applies automated analytics on data generated by systems and applications to better understand what resources are being used, how well they should be used to support the business processes.

The intelligent enterprises create the high ability to measure past performance for the future purposes. ICT solutions deliver knowledge to the right people when and where it is needed, and keep in mind that timeliness is an issue.

According to Dayal [18] the intelligent enterprise is characterized by being able to adapt quickly to changes in its operating environment. It monitors not only its own business processes but its interactions with customers, partners, suppliers and collaborators, as well. The intelligent enterprise understands how the exchange of information among all business participants relates to its business objectives and it acts to control and optimize its operations to meet its business objectives. In this enterprise decisions are made quickly and accurately to modify business processes on the fly, dynamically allocate resources, or change business partners (e.g., suppliers, service providers) and partnerships (e.g., establish new service level agreements).

March and Olsen [19] believes that the intelligent enterprise is built on two fundamental processes: 'rational calculation,' and 'learning from experience'. Rational calculation is the choice of alternatives based on an evaluation of their expected consequences according to preferences. It looks ahead into the future to anticipate outcomes. Learning from experience is the choice of alternatives based on rules developed from an accumulation of past experience. It looks backwards at history to find guidance for future action.

To sum up, an intelligent company integrates "what's going on out there" with "how we do things around here", "present time" with "future time" using a power of knowledge and the intellectual capital supported by integrated tools based on ICT.

3 Research Review of the Intelligent Enterprise

The study show that there is a lack of advanced surveys devoted to the intelligent enterprises. Up to date, in Poland the only research concerning intelligent enterprises was carried out by Polish Agency for Enterprise Development (PARP) in 2010 on a group of 300 small and medium-sized enterprises [23]. One of the purpose of the research was finding an answer to a question what are the characteristics of the intelligent enterprise in Poland and whether they use ICT solutions more effectively than other organisations.

In the research carried out by PARP it was assumed that an intelligent organisation has following features:

- it has a long term strategy of development to achieve goals;
- it has an advanced human resources management (HRM) policy;
- it has a company website and intra network as well as it uses specialised ICT business management tools;
- it uses the knowledge management.

Surveys have shown that 26.5% of SMEs had a long term strategy, 31.6% had the HRM policy, 47% used developed ICT tools and 38% used the knowledge management. In contrast, 63% of big companies had both the strategy and the personnel management policy well developed. Therefore, the bigger organizations meet the criteria of intelligent organization to a larger extent than SMEs.

In Poland, intelligent organizations do not have a clear innovative profile yet established. Now, when the Operational Programme Intelligent Development 2014–2020 started, it is known that a type of innovation is not a factor differentiating companies in terms of their willingness to implement solutions typical for intelligent organizations. More often are process innovations (28%), organizational innovations (24%) and product innovations (21%). The tendency to introduce the solutions adequate for intelligent organizations to the business practice increases with the size of company turnover. From the business sector point of view, intelligent organisations have the biggest share among industrial companies (14%), as well as trade and service companies.

The research indicate then a stronger focus on technological development among intelligent organizations, their better adaptation to the challenges of the knowledge based economy, the speed of access to knowledge and the possibility of its use are key competitive factors.

Intelligent organizations in Poland more often use ICT solutions to support management processes in comparison with other organizations. The most popular are e-workflow, databases and data warehouses management (83%), as well as Intranet (76%). The further are Customer Relationship Management (twice more often than organizations that do not meet criteria for intelligent organizations) and solutions supporting a team working, every fifth - HRM and every sixth - Business Intelligence (three times more often than other organizations).

The last problem concerning ICT solutions that support the management of intelligent organizations is their effectiveness assessment. The few critical comments were focused on low efficiency of databases and data warehouses. Very positively were evaluated Supply Chain Management (78%) and Customer Relationship Management (70%). As far as the effectiveness of various ICT tools by intelligent organizations is concerned, it is worth to emphasize that generally ICT tools are assessed as less effective by small businesses than by middle sized and large. This is due to the specific nature of these tools, which do not necessarily have to be effective in organizations with a low developed organizational structure and not very complicated business processes.

In 2010 MIT Sloan Management Review and the IBM Institute for Business Value conducted a research among nearly 3,000 executives, managers and analysts working across more than 30 industries and involved intelligent organizations of various sizes in more than 100 countries. There were also interviewed academic experts and subject matter experts from a number of industries and disciplines to understand the practical issues facing intelligent organizations [24]. As a result, there are following results:

- Intelligent enterprise is focused on the highest value using each business opportunity, starting with questions, not data opposite to ‘traditional’ organizations. It should first define the insights and questions needed to meet the big business objective and then identify data needed for targets. They can target specific subject areas, and use readily available data in the initial analytic models;
- Intelligent enterprise drives actions and delivers value. This means that new methods and tools to embed information into business processes, ICT analytics solutions, optimization, workflows and simulations are making insights more understandable and actionable;

- Intelligent enterprise develops existing capabilities adding new ones. To do this, they use sophisticated modelling and visualization tools based on ICT, but that does not mean that spreadsheets and charts should go away. On the contrary, new tools should supplement earlier ones, or continue to be used side by side, as needed;
- Intelligent enterprise uses an information agenda to do plan for the future. Big data is getting bigger. Information is coming from interconnected supply chains today;
- In the intelligent enterprise strategic information arrives through unstructured digital channels: social media, smart phone applications and an ever-increasing stream of emerging Internet-based gadgets. The information agenda identifies foundational information practices and tools while aligning IT and business goals through enterprise information plans and financially justified deployment road maps. This agenda helps establish necessary links between those who drive the priorities of the organization by line of business and set the strategy, and those who manage data and information. A comprehensive agenda also enables managers to keep pace with changing business goals. It provides a vision and high-level road map for information that aligns business needs to growth.

In 2011 MIT Sloan Management Review and the IBM Institute for Business Value conducted the next edition of the research among nearly 4,000 executives [6]. The aim of the research was the inquiry how intelligent organizations turning data and analytics into competitive advantage. As a result, there are following conclusions:

- Access to data requires improvement. Only 10% of managers have access to a good quality of data and information. The majority are not satisfied with their information access or they have limited or no access to the data they need to do good their work;
- Intelligent enterprises are looking at the analytics as a tool of strategic decision making, not as the tactical activity. Employees are starting understand the value of using analytics for strategic decision making;
- Data consistency is a key in decision making. It is more important for managers to have uniformly consistent data quality across the organization, rather than perfect data from one business unit and poor quality from another;
- Leaders behaviours should be trustworthy. They should make fact-based decisions compatible with long-term strategy, share data across ‘silos’;
- Enterprises are still struggling to understand how to use analytics to improve business and processes. The problem is who owns the data and who has access to it;
- There are two challenges in using analytics effectively in the enterprise: integrating data across ‘silos’ and their right interpretation;
- Not only the innovation is important for intelligent enterprises but the growing revenue, penetrating new markets, acquiring new customers, as well. Therefore, primary business objectives have not changed despite of macro and microeconomic changes;
- Organizational and cultural challenges are twice more difficult as technological items. In a result, leaders have their work cut out of them and underscores the need to practice what they promise before the organization is able to use analytics most effectively.

Summing up, intelligent enterprises are combining the new systems and tools based on ICT with expertise in business process management. They are still learning how to extract the precise information they need – highly relevant and contextualized – and predict the most likely outcomes of key decisions and events. They are learning to shape their own futures.

4 Business Models Conceptions of the Intelligent Enterprise

4.1 A Review of Intelligent Enterprise Business Models

An enterprise model is a high-level map of a business that guides the conception of its activities. It is clear that managers should design a business which extends beyond procedural design. It includes making strategic decisions about what market signals should be sensed, what data should be used to interpret those signals, and how an appropriate response should be executed. As Haeckel and Nolan [2] emphasize, the enterprise model should be expressed in business language, not IT terminology that can be used a support tool. Management should select and use one business design language and insist on its use throughout the organization. In order to create a unified understanding of how we do things around here, and, if it makes strategic sense, to facilitate future integration of presently autonomous organizational units, a common business language is required.

The results of literature surveys conduct that there are very little discussion about business models of the intelligent enterprise. Most of the conceptions are related to business intelligence or knowledge management models. There are a few concepts presented as white papers or presentations exposed at IT conferences.

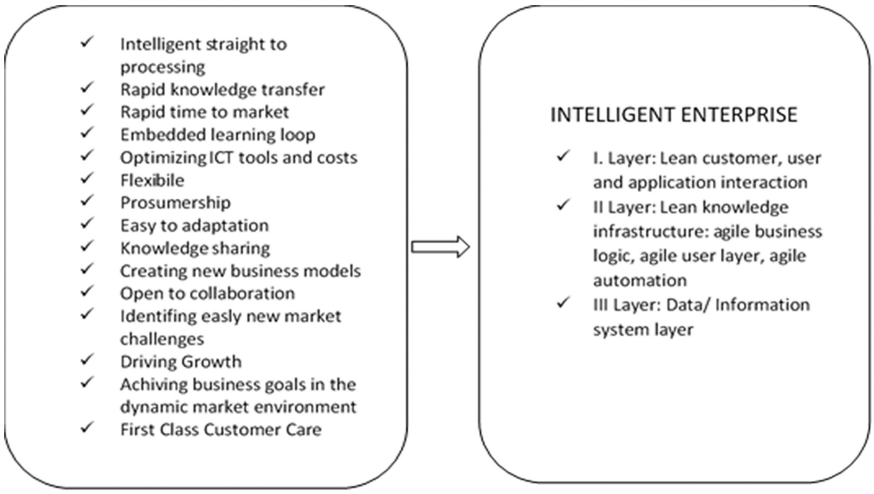

Fig. 1. Intelligent enterprise optimizing the knowledge driven organisation (Source: http://knowledge-values.com/learning/#knowledge-academy/)

Professor Larry Lucardie [20] from Knowledge Value Institute defines the intelligent enterprise as lean, agile and learning, which a business model is based on the knowledge value (Fig. 1).

Andrew Coleman from IBM [21] notices that the business model of intelligent enterprise is based on prediction. The intelligent organisation is able to compare what is happening right now with past experience to predict the future so that it can anticipate the changes needed to proactively optimize the business. Therefore, the intelligent enterprise is a market game changer (Fig. 2).

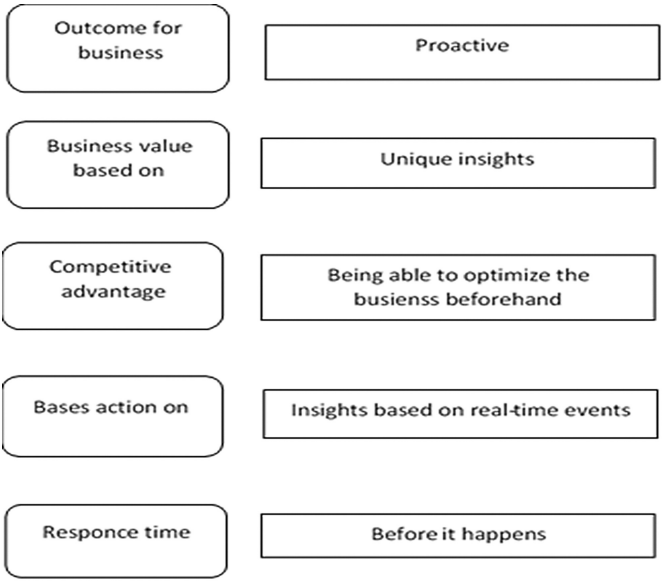

Fig. 2. Predictive intelligent enterprise model (Source: IBM Global Business Services, p. 2)

The research conducted by IBM in a group of 225 business leaders worldwide, show that enterprises are operating with bigger blind spots and that they are making important decisions without access to the right information. They recognize that new analytics, coupled with advanced business process management capabilities, signal a major opportunity to close gaps and create new business advantage. Those who have the vision to apply new approaches are building intelligent enterprises and will be ready to outperform their peers [21]. IBM have pointed the essential characteristics that describe an enterprise ready to exploit advanced analytics and optimized performance (Fig. 3).

In the digital world, success comes from speed, agility and integration. As the different sources present, the intelligent enterprise is digital- based oriented that finding entirely new ways to increase the value of every customer experience and business interaction (Fig. 4).

As Accenture Consulting research show for most companies in most industries, despite the level of their intelligence, cloud has created nearly as many complications as

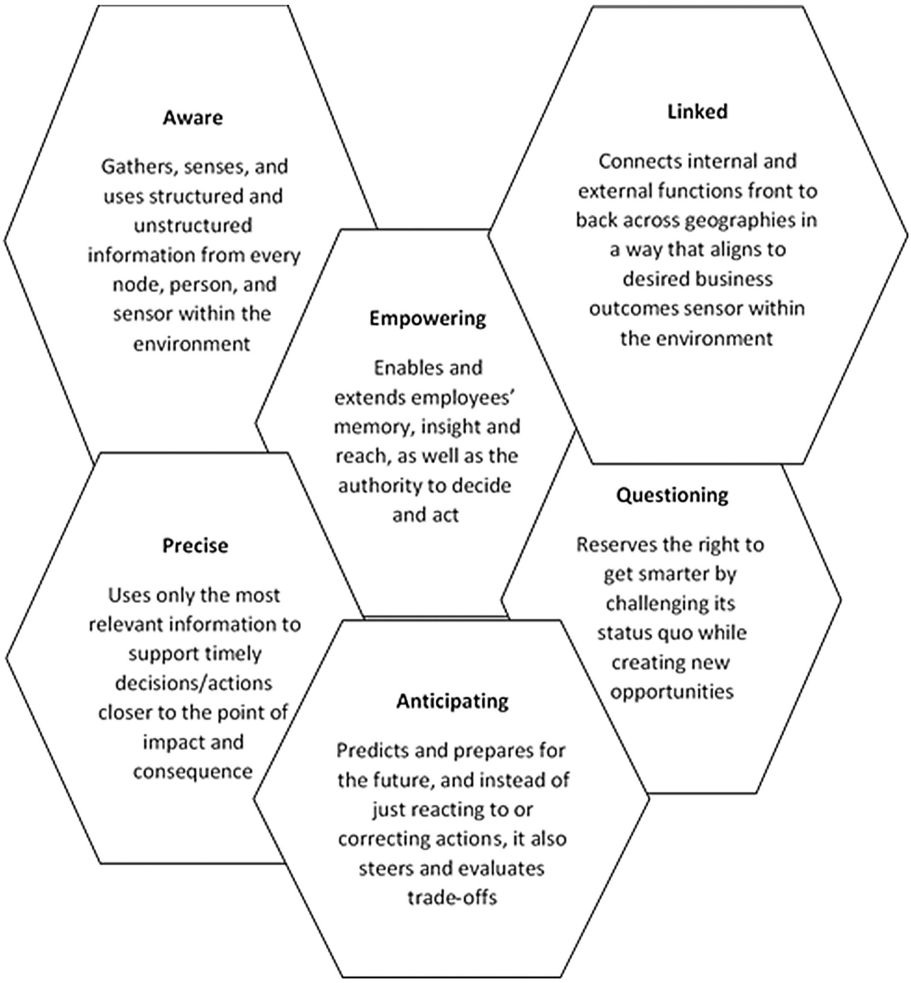

Fig. 3. Characteristics of the intelligent enterprise in IBM conception (Source: IBM Global Business Services, p. 7)

it has provided solutions. Many companies, including intelligent enterprises, are afraid of their data security. There are no automated processes to move application workloads easily among those instances of cloud. Moreover, the enterprises struggle to cope with the myriad security and privacy issues that continue to complicate cloud [22].

4.2 Conception of Integrated Intelligent Enterprise Model

As a result of the business models of intelligent enterprise analysis, one should be noticed that intelligent enterprises opposite to traditional organizations are able to

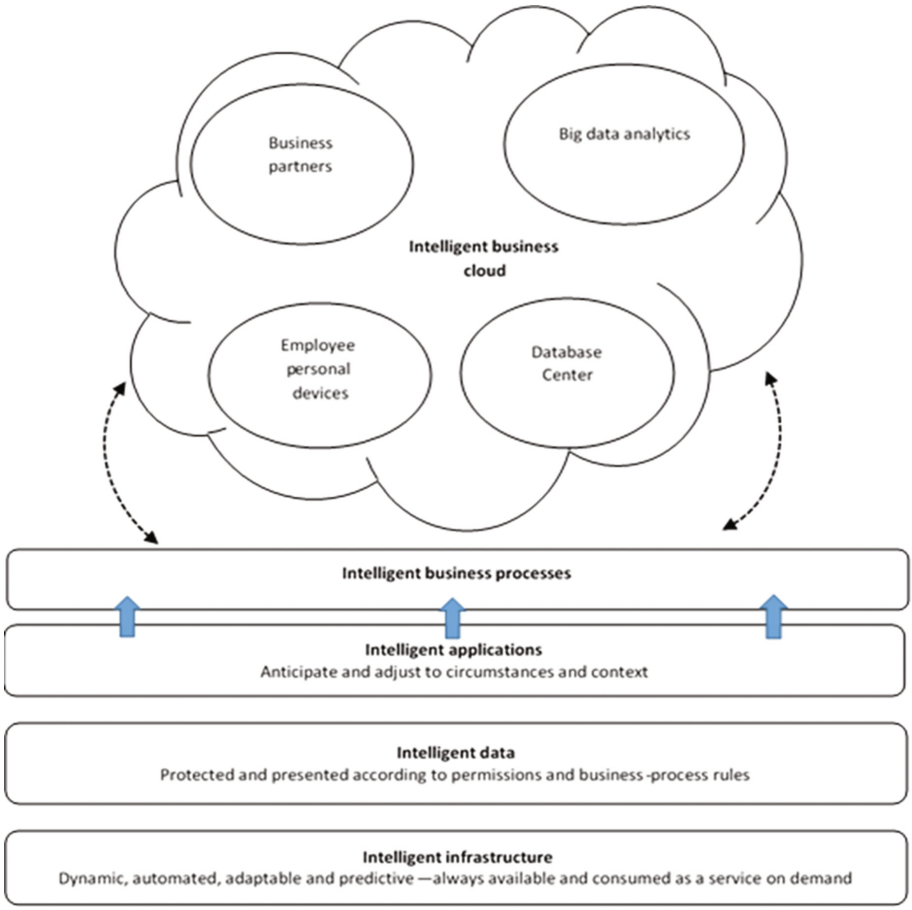

Fig. 4. Intelligent digital business (Source: Accenture Realizing the potential of the intelligent business cloud, 2015. https://www.accenture.com/us-en/insight-intelligent-business-cloud)

integrate their strategy and the knowledge management with IT systems, applications and tools (Fig. 5).

Intelligent enterprises operate in increasingly complex IT systems what is the result of business processes complexity. Autonomous subsystems are still be interrelated and embedded in larger systems.

Building the business model of the intelligent enterprise provides for a strategy and technology infrastructure that ensures that accurate and timely information is effectively incorporated into the decision making process so that the organizations can exploit this information through process, knowledge and visualization based technologies to manage their business effectively. Intelligent enterprises require an intelligent workforce and intelligent ICT tools and vice versa. The challenge is the ability to integrate them to achieve the strategic market position and to create the high added value for all groups of interests.

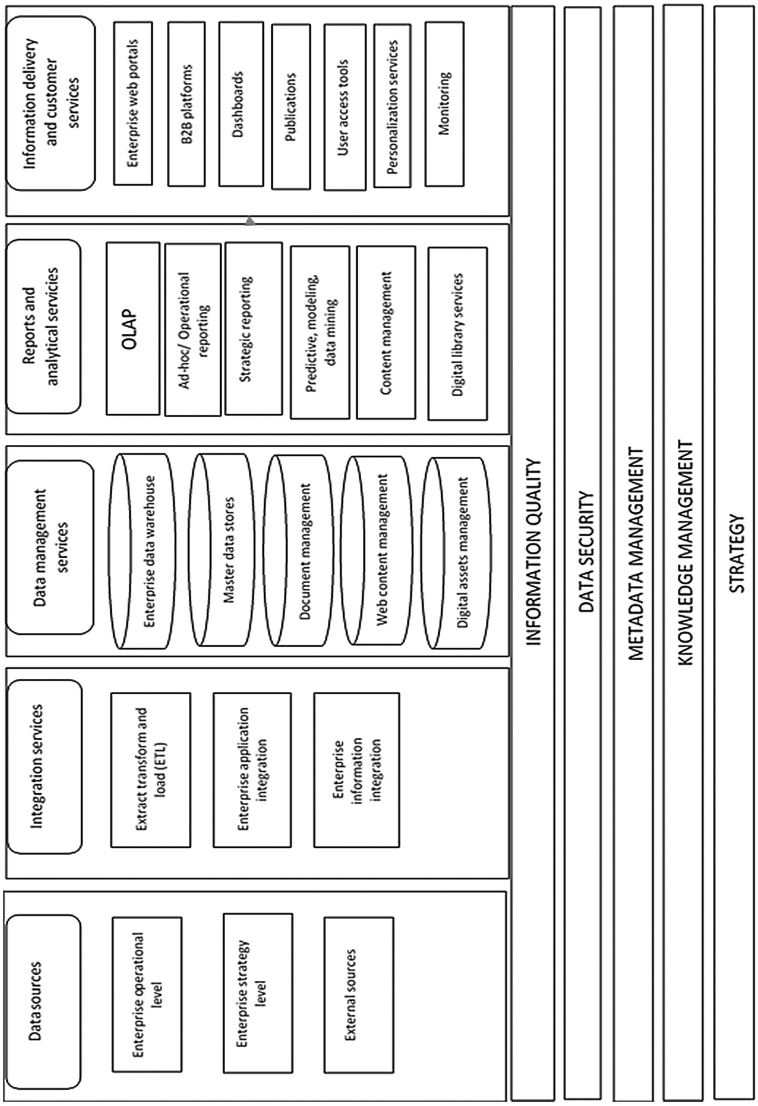

Fig. 5. Integrated intelligent enterprise model

5 ICT Drivers Empowering the Intelligent Enterprise Performance

The results of theoretical study and the research conducted by PARP, MIT Sloan Management Review, IBM Institute for Business Value and Accenture Corporate became the background to develop a scientific discussion about the intelligent

enterprise and the role of ICT in this organization. Taking into account the wide spectrum of ICT solutions used in the intelligent enterprise management, there are some ICT drivers.

Mobile Workforce Integration and Management The access to professional knowledge is critical in the intelligent enterprises and mobile connections to operating systems, applications, platforms are important, especially in the fast – paced business environment. Mobile technologies drive technical innovation to improve networks, ensure employees remain fully integrated with their company and clients wherever they are. Thus, in the intelligent organization its coherency is determined by the intelligence of its network that becomes the organization with wireless tentacles spreading from it to embrace location-aware services.

The next aspect is mobile workforce management software that helps standardize tasks, it guides employees through each step in business processes, it supports a remote supervision. Decreasing the time it takes employees to become more productive. It is also an opportunity to implement new technologies that capture the best of the past while building value for the future. When different work groups have different mobile workforce management solutions, it is virtually impossible to optimize resources and processes across the enterprise.

Smart Virtual Workplace Gartner [25] notes the top 12 emerging digital workplace technologies:

- Ambient knowledge: natural language processing and machine learning will help organizations extract information from a wide array of employee sources to gather valuable knowledge;
- Read analytics: the democratization of big data analytics where dashboards and analytics functions are pushed down into the employee community to drive better, data-driven decisions;
- Production studio: organizations can seize the opportunity to create multimedia tools and production hubs for employees to bring these rich media types to their work environments;
- Immersive technology: enterprises can use technology that blurs the line between the physical world and digital world to create a sense of immersion such as video conferencing with gesture control or use of augmented reality or virtual reality technologies for simulated training situations;
- Office landscape: as more employees work remotely, enterprises can develop complex scheduling software to manage office hoteling and develop a physical environment that is optimized for employee engagement, such as advantageous collaboration spaces;
- Personal IoT: workplaces can take advantage of their employees' personal networks of beacons and sensors for scenarios such as smart badges, that show contextual digital signs; or the ability to identify people when they approach a building to schedule meeting rooms, assign desks, and order meals;
- 'Silo buster': organizations should take advantage of collaborative tools to drive ideation, crowdsourcing, etc. beyond traditional teams and organizations structures;

- Virtual personal assistants (VPA): it will perform a variety of personal tasks, eventually learning from individuals to act on their behalf;
- Personal cloud: employees in the future may bring their own personal collections of internet apps and services to use for both personal and professional purposes;
- Hackers bench: with new codeless programming tools, employees can develop and integrate their own applications. IT can lead this effort by creating a sandbox, base guidelines and communities, and provide lightweight support;
- Omni-Comms: employees will benefit from a fully mobile suite of communication and collaboration services that will be embedded in business processes;
- Organization digital university: this type of educational program will help employees acquire a wide variety of digital literacies with alternative learning methods.

As the approaches to virtualization of IT infrastructure, networks and storage devices continue to mature, infrastructures become software-driven. Smart virtual workplace provides end to end desktop virtualization allowing employees to access applications, data safely over any network from the device of any choice. New trends show that business will increasingly turn to hybrid cloud solutions to enable scalable business processes. Hybrid clouds can quickly scale to a company's needs and services can be paid for as needed. They combine the best of two worlds, offering true benefits to intelligent enterprises aiming to stay ahead in their markets.

E- Collaboration Tools E-collaboration is the standard for business communication today, nearly eliminating the need to meet face to face. While knowledge sharing increases, formal and informal groups become e- collaborative communities to reach organizational goals. Intelligent enterprises continue to integrate these into their business processes and reinvent their customer engagement models.

In the intelligent enterprise ICT tools as B2B, B2C platforms, virtual clouds allow disparate teams to work together in real-time, enabling multiple individuals to interact as efficiently and effectively with co-workers, clients, and suppliers.

Business Flexibility and Prediction The intelligent enterprise can be called as the visionary, the designer of changes where the business flexibility and prediction are crucial. They must now be highly flexible and resilient in order to seamlessly communicate and interoperate with disparate technologies and systems. ICT solutions are very helpful in this case. Now, software is becoming increasingly predictive and cognitive. It can apply learnings from data to future situations. In essence, it is capable of experience. To capture the power and potential of software intelligence, intelligent companies will find new ways to get smart software out of the lab and into as many practical scenarios as possible. Only then will their software be able to spur innovation and raise the operating-performance bar across the organization.

Scalability and Customization Intelligent enterprises align their IT infrastructure capabilities with business requirements. Modularity of systems, applications allow companies to have only what is needed at present, trimming up-front costs and leaving open the possibility of expanding or incorporating new technologies in the future. With

the increase of consolidation, intensive virtualization, the traditional data center will transform to the 'hyperscale' data center. It requires a fundamentally different approach than that taken with typical enterprise IT systems. Rather than building 'monolithic' platforms, distributed architecture design is implemented around distributed processing frameworks. That requires software and ICT tools that automate node deployment, recover from failure (rerouting of workloads), and other management and monitoring tools.

Learning Machines and Systems The intelligent enterprise is making its machines smarter, embedding software intelligence into every aspect of its business to drive new levels of operational efficiency, evolution, and innovation. For the intelligent enterprise a software intelligence is not a one-off project, but as an across-the-board functionality. One that will drive new levels of evolution and discovery, propelling innovation throughout the enterprise. Apttus' Louis Columbus from Microsoft [26] notes that one of the best ways to do that is through 'app-driven' intelligence and cognitive, predictive analytics. For example, Microsoft is going to bridge these divides by blending its Cognitive Services platform with the Cortana Intelligence Suite that combines information management and scale-out storage with machine-learning analytics and dashboard visualization to turn raw data into actionable intelligence. Columbus points on applying intelligent cloud techniques to automated Quote-to-Price service to provide more proactive support to contract lifecycle management.

Business Continuity Management It is obvious that intelligent companies need to have 24 h a day access to their data. Data digitalization and rapidity of their processing require more accurate, reliable and sophisticated ICT tools converting all data into intelligence for better business outcomes. On the other hand, managers need them to be not complicated in their use. Moreover, for a high level of operational uptime, infrastructure components must be fault tolerant with the ability to recover from complex failures and data storage must be secure. To ensure the effective business continuity management ISO 22301 standard can be very useful for the intelligent enterprise because it requires to:

- Identify and manage current and future threats to business;
- Take a proactive approach to minimizing the impact of incidents;
- Keep critical functions up and running during times of crises;
- Minimize downtime during incidents and improve recovery time;
- Demonstrate resilience to customers, suppliers and for tender requests.

Converting Data into Business Intelligence Advanced ICT solutions enable extracting from huge amounts of data collected from the real cyberspace. Intelligent enterprises are able to manage Big Data to drive better business processes, product development, and customer service. The important is the fact that they enable to use effectively unstructured data captured from different systems, mobile devices, social media, log files, emails to perform real-time context analytics to understand received information, its content to make right decisions in the right time.

Business intelligence helps enterprises to answer critical questions that drive performance. In an increasingly competitive market it is vital to have intelligent information, immediately available such as financial results, market analysis, and human resource costs and to also be able to identify obstructions in productivity and to pin-point opportunities. However, as businesses grow, this information becomes increasingly difficult to extract and the processes become more complex. Enterprises generate and store more data and there is a greater need for more specialized infrastructures using a variety of technology platforms.

Therefore, intelligent enterprises are not only the users of advanced tools based on ICT technologies to optimize business practices, drive workforce engagement and create a competitive edge, but they are also able to leverage and to create value from the date and information generating by ICT solutions.

6 Conclusions

Undoubtedly, the future ready business must develop the capacity to anticipate and address emergent employee, vendor, and customer needs proactively, and eliminate problems. Thus, the discussion about intelligent enterprise is at up to date in the digital world. There are more theoretical disputes then extended and deepened surveys in this case. There are no in depth research devoted business models of these organizations or effectiveness, strategy or management in this organizations, especially with use of ICT solutions.

In the paper, there were presented a few business models and surveys that can be the good start for the future research about intelligent enterprises. Poland is at the stage of an intensive investing in the research and development, therefore Polish companies are still learning how to create the intelligence and how to be intelligent organizations. This is especially a challenge for companies from the SMEs sector. The research conducted by MIT Sloan Management Review and the IBM Institute for Business Value show that for the intelligent enterprise, the new reality is this: personal experience and insight are no longer sufficient. New analytics capabilities are needed to make better decisions. Then, Accenture Consulting research present that the intelligent enterprise is digitally–based oriented.

On the base of the literature review and surveys conducted by global IT companies there were the conception of integrated intelligent enterprise model and ICT drivers empowering the intelligent enterprise presented. These are: mobile workforce integration and management, smart virtual workplace, e- collaboration tools, business flexibility and prediction, scalability and customization, learning machines and systems, business continuity management, converting data into business intelligence.

The above premises encourage the author to continue the scientific discussion about intelligent enterprise with a special attention to ICT solutions. The advanced research will be continued that the aim will be the creation of an intelligent enterprise model operating in the intelligent development based economy.

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