

## Chapter 2

# The Architecture of Sustainability-oriented Enterprise and Civilization

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**Abstract** The evolution of the Classic Enterprise Information Infrastructure into Sustainability and Global Enterprise Information Infrastructure is defined. However, it is not the end of evolution. Since the SE operates within larger entities, such as Local, National, Global Information Infrastructures, these ones create the Civilization Information Infrastructure. The latter is the foundation for modern civilizations and furthermore is the foundation for the emerging Global Civilization with its repercussions for lower-level infrastructures as well as for the World Civilization. If such civilization wants to survive, it must be able to monitor and predict its sustainability in relationship with enterprises. In conclusion some recommendations will be addressed for the pathways to a sustainable future.

**Keywords** Enterprise information infrastructure • Enterprise systems • Business intelligence • Sustainability intelligence • Global intelligence • Civilization intelligence • Sustainability key performance indicators • Management dashboard • Civilization monitoring systems

## Introduction

The purpose of this study is to define a concept how to transform a classic enterprise into sustainability and global-oriented enterprise, which will be economically vital, environmentally accountable, and socially responsible. Furthermore, such enterprise's intelligence system should be integrated with national and civilizational levels of the Monitoring and Predicting Systems. The approach to solve these issues is based on graphic modeling the mentioned systems. As a result of this study, the pathways to a sustainable future of an enterprise and civilization are offered.

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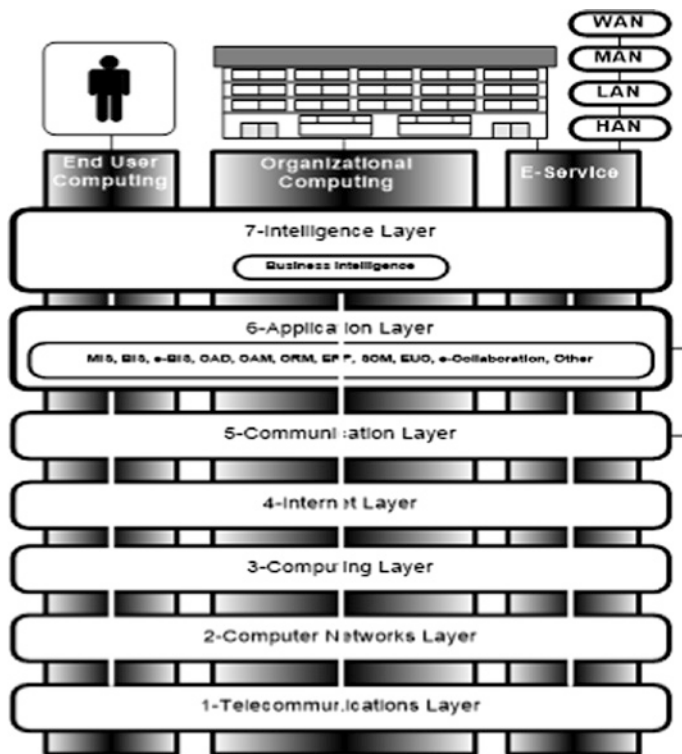


Fig. 2.1 Classic Enterprise Information Infrastructure architecture

## Classic Enterprise Information Infrastructure

The Classic Enterprise Information Infrastructure (CEII) is illustrated in Fig. 2.1. It contains 7 specialized layers, where the 6th and 7th Layer is the most visible for the end users. A set of applications is evolving along with the development of IT concepts and business needs. In the 2000, it is based upon work from the office via in building, local, metropolitan, and national networks/infrastructures (LAN, LII, MII, NII) and from a home via a home network/infrastructure (HII) for telework. The 7th Intelligence Layer is also an application layer, which specializes in managing of the whole enterprise with the support of Knowledge Management System, composed of Enterprise Data warehouse, Data Mining, Knowledge Database, and Management Dashboard, also known as business intelligence.

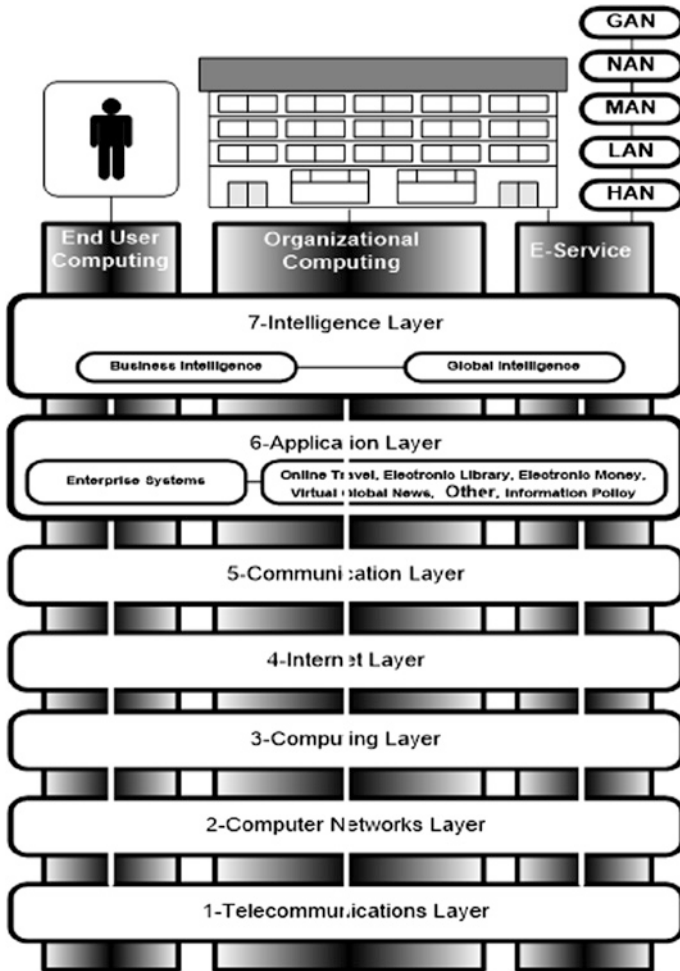


Fig. 2.2 Global Information Infrastructure architecture

## Global Enterprise Information Infrastructure

The Global Enterprise Information Infrastructure (G-EII) is the extension of the C-EII through the Global networks/infrastructure, as it is illustrated in Fig. 2.2. The user-visible Layer 6 has applications more complex than applications of a classic enterprise, since they have to cover that enterprise geographic presence around the Globe and must comply with a given set of nations' legal rules. This requirement is particularly important in the Human Resources Applications, which must comply with each country's rules. In the G-EII, new applications are in demand, such as e-Collaboration, e-CAD/CAM. The e-Collaboration allows for

simultaneous team or teams work in a virtual space, including virtual reality, saving on the costs of trips to be in meetings. E-CAD/CAM is particularly applicable in off-shore outsourcing of manufacturing processes. Also e-Library is a convenient application, particularly for remotely located users, without a limited access to good libraries.

The 7th Intelligence Layer contains two intelligence-oriented systems: the classic business intelligence and global intelligence. The difference between BI and GI is in their content; the latter analyzes business processes in the global platform and traces the Globalization Index to be aware of a given enterprise's global operations.

## Global Civilization and Global Enterprise

The current third wave of globalization takes place on the threshold of the third millennium and is the most extensive to date. Globalization refers to a multidimensional set of social processes that create, multiply, stretch, and intensify worldwide social interdependencies and exchanges while at the same time fostering in people a growing awareness of deepening connections between the local and distant (Steger 2003). The world is shrinking fast and comes together as a Global Civilization, which shapes our lives and changes politics, work, and families.

A model of Global Civilization is shown in Fig. 2.3. This model indicates that the Global Civilization is possible because of the Internet and global transportation systems and is driven by market forces only, which in many opinions are driven by stateless corporations' greed and unregulated policies, since their strategies and operations are very difficult to regulate by international organizations. In other words,

**Fig. 2.3** The Solar Model of Global Civilization in the twenty-first century



the Global Civilization is getting out of social control, and while it can be stopped, it cannot be the only solution for the World Civilization's progress and survival.

The notion of "globalization" and its universality is perceived by many as a Western value only. According to United Nations statistics, most of the people in the world do not have running water, most are illiterate, most have less than a high school education, and many are malnourished. Similarly, the "Silicon Valleys" of the "Third World," in places such as Bangalore are sensationally displayed as further evidence of this globalism, when just a few blocks away from the internet cafes and computer shops in Bangalore (which themselves occupy only a few blocks), rural India in all its traditional manifestations resumes its predominance. Thus, with the exception of the Group of Eight industrialized countries (G8)—all of which except one are Western—the majority of people on this globe do not truly and meaningfully benefit from, nor form a crucial part of, that globalization.

Through the time from 4000 B.C. to 1800 A.D., our civilization was growing 3 % per 1000 years, and the budgeting of strategic resources was not the issue (Maddison 2001). Since the Industrial Revolution in the nineteenth century, civilization was in the Accelerated Growth and in the twenty-first century it entered the Growth Trap period, when the Accelerated Growth is even intensified by the growth of population and managerial/global or even super capitalism, which looks for tremendous growth in executive benefits and replaces voters by lobbyists.

We used to think and act in terms of a local community, nation, region, even a group of nations, but now we need to take these considerations in a broader—planetary context, if we want to sustain our social life. The planet is so large for every individual but for the population is becoming smaller and smaller. In the last 200 years, the population grown from 300 million to 6.7 billion and is still growing. We have about 4.7 acres of available footprint, but we use 5.4 acres in terms of calculated resources. "We are living beyond our ecological means. The planet is shrinking, because we are running out of resources. We are using the planet with such intensity that it is unable to restore itself" (Steffen 2008: 16).

The global-oriented enterprises are mostly stateless corporations which promote the following business practices:

1. The sky is the limit in business? Really, what about depleting resources and inequality?
2. Growth-centered business? *Starbucks* around each corner?
3. Enlarge the market share? 200 new *Wal-Mart* stores every year in the USA?
4. Efficiency obsessed business? What about the environmental destruction—200,000 acres of cropland under a single manager? But smaller farms produce much more food per acre (in tons, calories, and in dollars).
5. Only business effectiveness? Only minimized cost is the most important factor? Neglecting environment and community costs.
6. Getting business moving? But where business is moving is less important, at \$2.5 billion/day foreign trade deficit, and exporting debts is it the American business direction?

7. Globalization is better than localization? To satisfy stateless corporations. Perhaps the truth is vice versa.
8. If you “do not fit it is your fault, re-skill.” Government advises, go to community colleges and be another craftsmen? What about university graduates?
9. We teach “information and knowledge” but what about teaching “wisdom”? Can we differentiate knowledge from wisdom?
10. We teach short-term decision making? Long-term sounds like central planning? No vision is plus?
11. Human resources of the 1960–1970s versus of the 2000th. Workers are strategic resources (past) versus disposable commodity (today).
12. Anti-Fordism, factories without workers? It is possible but necessary?
13. Social cohesion and economic forces are splitting apart, but we are irrelevant in teaching about it.
14. The “football strategy”—the leader (CEO) takes all? What about the other stakeholders?
15. From individualism to super-individualism (there is no such thing as “society,” only individuals and families (M. Thatcher)?
16. Only leadership is important in *autistic* business of isolated individuals?
17. Stay at home and virtualize? Since it is possible but is it necessary?
18. An urban core giving way to an urban prairie. It is what we strive in advanced civilizations?
19. We in Western Civilization cannot compete with others; therefore, we have to accept the decline of our level of living? It is not true, since we compete with sweatshops and this is not fair competition.
20. Other.

These questionable business practices lead to the necessity of developing a sustainable and global enterprise which will (Princen 2007):

1. Mitigate the super-consumerism by promoting “cautious consuming”.
2. Promote the rational principle of “sufficiency” in the context of the strategic resources depletion, since the economy cannot operate as if there is never enough and never too much. Sufficiency is contrary to modern society’s dominant principle efficiency.

## **Sustainable and Global Enterprise Information Infrastructure**

The footprint methodology determines humanity’s total impact on the planet in terms of being within or exceeding the earth’s biocapacity. Today, the earth has just over 15 hectares of bioproductive land per person, but the average per capita footprint is 22 hectares. It means that each person on earth (on average) is using about 6 more hectares of productive land than is available. This is known as overshoot. Since this extra land is not technically available, the figure of 6 hectares is a

way to represent the fact that human demands on the environment are greater than the earth can support.

The opposite of overshoot is “sustainability”—living within the limits of the environment. Sustainability it is “progress that meets the needs of the present without compromising the ability of future generations to meet their needs” (The Brundtland 1987). In broad terms, business sustainable practices mean that the current generation’s moral obligation is to ensure that future generations enjoy at least as good a quality of life as the current generation has now (Pezzey 1989). In order to do so, the current generation must apply the following strategies:

- Economic vitality
- Environmental accountability
- Social responsibility

According to Dow Jones, measuring business sustainability or corporate sustainability is a business approach that creates long-term shareholder value by embracing opportunities and managing risk deriving from economic, environmental and social developments. Several types of sustainability indexes measure a given corporation’s ability to run a sustainable business. The architecture of the Sustainable and Global EII is shown in Fig. 2.4.

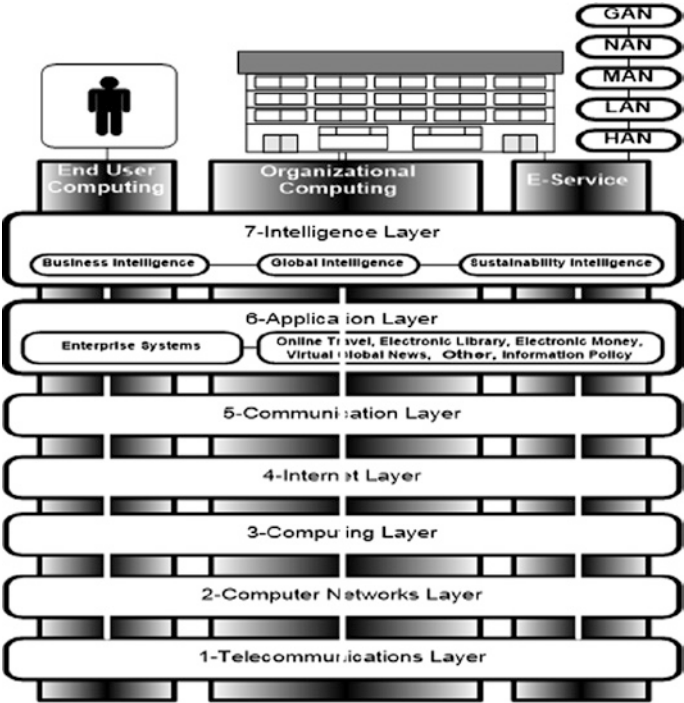
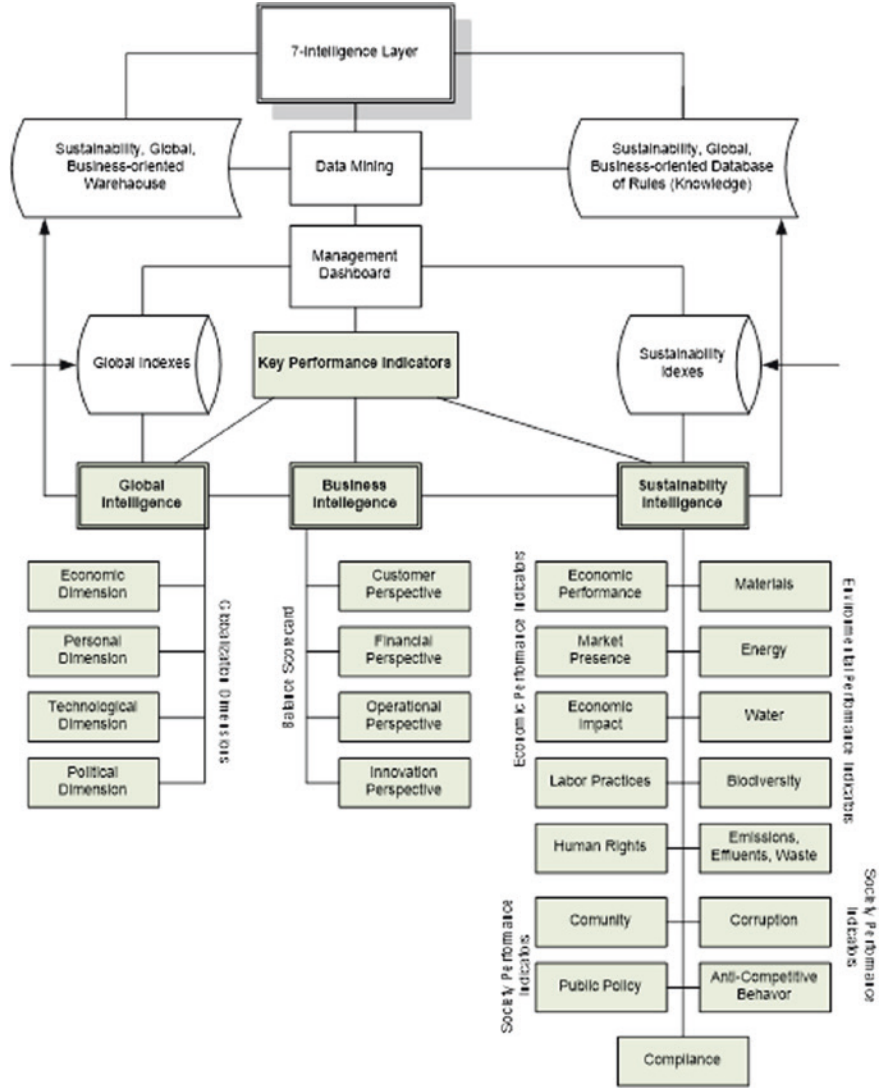


Fig. 2.4 Sustainable, Global Enterprise Information Infrastructure architecture



**Fig. 2.5** Architecture of the 7th Intelligence Layer (list of Key performance indicators is limited to their

Figure 2.5 defines the content of the 7th Intelligence Layer. The main component of the 7th Layer is a set of key performance indicators (KPI) monitored by the systems of Business Intelligence (BI), Global Intelligence (GI), and Sustainability Intelligence (SI). The BI's Key Performance Indicators belong to the well-established Balance Scorecard.

The GI is based on key performance indicators published and updated by the A. T. Kearney ([www.atkearney.com/main](http://www.atkearney.com/main)). The SI is based on indexes published and updated by Dow Jones and Global Reporting Initiative (GRI) in Amsterdam.

The sustainable, global enterprise is managed by a set of three kinds of KPIs. The business KPIs are applied every day, week, months, quarter, year, and so forth. The GI and SI Key Performance Indicators may be applied every quarter or every six months, at least every year. These three sets of intelligence should be coordinated into one composite Management Dashboard.

The sustainable, global enterprises operate within the civilization boundaries and either protect or destroy civilization. Therefore its place must be noticed in the civilization monitoring system, and vice versa.

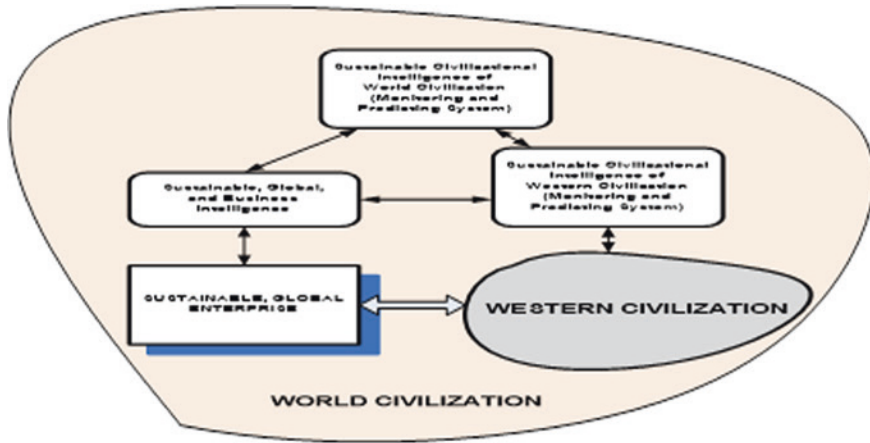
## Monitoring and Predicting Systems of Sustainable Global Civilization

The current level of the world affairs on the one hand is tending to deemphasize the meaning of a state for the sake of larger organizations such as EU or NAFTA; on the other hand, more and more the political and economic competition in the world is taking place at the level of a civilization. Huntington (1993) argues that the clash of civilizations characterizes a new world order after the Cold War (1945–1991). Civilization is a larger in space and time entity composed of humans (society), their culture and infrastructure. In the last 6000 years, we had about 30 civilizations, which nowadays are: Western, Eastern, Chinese, Japanese, Hindu, Islamic, Buddhist, and African, oriented by religion and emerging Global Civilization driven by business (Targowski 2009).

The future of World Civilization is bleak, since the combination of Population Bomb, Ecological Bomb, and Depletion of Strategic Resources Bomb creates the Death Triangle of Civilization which about 2050 will be very evident Targowski (2009: 404). Its first symptoms are evident nowadays, under the form of the overcrowded Planet, deforestation and land degradation, greenhouse effect, floods, drought, shrinking strategic resources, and so forth. The financial and economic crisis in 2008–2009, which was triggered mostly by the global, stateless corporations, shows the relationships among the enterprise and civilization levels must be established for the sake of the humans' survival, even in the perceived future.

The relationships among Intelligence Systems of Sustainable, Global Enterprises and a given civilization such one as the Western Civilization and the World Civilization are depicted in Fig. 2.6. The Civilization Monitoring and Predicting System (CMPS) is the set of the following components:

- Aggregated KPIs of the Enterprises (sustainability, globalization, and business),
- Population Index
- Living Planet Index
- Biophysical Index



**Fig. 2.6** Monitoring and redirecting systems of civilizations (an example limited to the western civilization)

- Wars and Conflicts Index
- Well-being of Nations
- Eco-efficiency Index
- Resources Index
- Societal Index
- Globalization Index
- Genuine Progress Indicator
- Other
- Aggregated Index of a given civilization
- Aggregated Index of World Civilization

There are about 20 different indexes which measure the dynamics of civilization but there is no one aggregated index which could easily monitor and predict the Planet's status and impact of human behavior and develop sustainability spirit among institutions involve in developmental activities.

## Conclusion

The pathways to a sustainable future of civilization depend upon the following activities:

1. Expanding the number of sustainable, global enterprises (SGE)
2. Establishing the relationships among the SGE level and national, and civilizational levels
3. Embedding strategies of sustainability in development-oriented organizations

**Fig. 2.7** The Solar Model of Sustainable, Global Civilization in the twenty-first century



4. Strengthening national and civilizational coordination, leading to:
  - a. Improving livelihoods on fragile lands
  - b. Transforming policies associated with the use of land, water, energy
  - c. Getting the best from cities
  - d. Other
5. Strengthening the institutions to solve global problems
6. Other

Figure 2.7 defines a model of the Sustainable, Global Civilization, which perhaps has chances for more rational development.

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