Timing - Spatial Information System is the Informative Infrastructure to Develop the Smart World

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SUMMARY

Currently, in the world as well as in Vietnam, people's great efforts have been focused on moving from the "electronic" stage to the "smart" stage under the impact of 4 generations of technology to create the development of humanity: mechanization, electrification, information-telecommunication technology and artificial intelligence. This article provides an analysis of the human development under Alvin Toffler's view of three civilizations: agricultural civilization (based on manual labor); industrial civilization (using machines to replace manual labor); information civilization (using machines to replace intellectual labor).

Based on this analysis, the article points out the opportunities and challenges in the transition from "electronic" period to "smart" period. Finding the right road map of development will help countries to shorten the time and distance to the destination of a "smart country", especially for developing countries. In a "smart country", the development scenario achieves the optimal plan, the cost of development is minimal, the benefits are maximal, and the people are most satisfied with all public utilities. Artificial intelligence will help people always to find the best solution when information is full, correct, continuously updated and all entities are connected in real time. Therefore, it can be said that artificial intelligence is only a means and essence of development is based on the decisive role of information.

All types of information have spatial and temporal attributes. In other words, information must be determined at a specified location and at a specified time in a timing-spatial reference frame of the real-world. Thus, to create a complete information system, the first thing to do is building timing-spatial information systems of the real-world. That is the real-world model that artificial intelligence needs to be aware of to analyze and to propose decisions for development. Unlike human intelligence based on qualitative thinking, artificial intelligence must always be based on

quantitative thinking, that is, based on the quantitative analyses of data from the real-world model. The real-world is not static but always changing. Unmanned entities controlled by artificial intelligence must also know where they are, at what time and the timing-spatial relationship with other entities. All entities must be positioned and connected in a timing-spatial information system of the real-world. Thus, the timing-spatial information system always plays the role of information infrastructure in the information civilization.