

Towards a knowledge economy for industrial automation

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ABSTRACT

The market for industrial automation is already to a large extent knowledge based: each player adds value through the integration of his specialized knowledge into the products of his suppliers, beginning with the providers of hardware and runtime platforms and proceeding through device and machinery vendors, system integrators and the owners and users of the final distributed and integrated industrial processes. This market exhibits the characteristics of a "network economy" where large end-user economies of scale exist; that is, the value to each user of a technology is a rapidly increasing function of the total number of users. This creates a positive feedback mechanism that causes the market to "tip" to a new technology when a critical mass of applications, tools and understanding is developed.

It is proposed that a new open, object-oriented (O3) knowledge economy be created to achieve such critical mass for the standards-based, component-oriented development and deployment of software in the domain of distributed industrial automation and control. This "O3 economy" would comprise open runtime platforms, an open software tool framework, and an open distributed repository of intellectual property (IP), which would utilize software agents as knowledge brokers and user agents. It is expected that this network economy can address the specialized needs of both the discrete manufacturing industries and the continuous process industries, which have a similar value-adding structure.

CURRICULUM VITAE

JAMES H. CHRISTENSEN received the degree of Ph.D. in Chemical Engineering with a minor in Computer Science from the University of Wisconsin in 1967. He is currently Senior Principal Engineer for Advanced Technology at Rockwell Automation in Mayfield Heights, Ohio USA. He serves as Coordinator of IEC Project 61131-3 for Programmable Controller languages, and Project Leader of IEC Project 61499 for Function Block standardization. From 1996 to 2001 he served as Inter-Regional Project Manager of the Systems Architecture and Engineering Work Package of the Holonic Manufacturing Systems (HMS) Consortium. He received the Allen-Bradley/ Rockwell International Engineer of the Year and Lynde Bradley Innovation Awards in 1991.