

Business integration unit (BIU) adapter for industrial global value chain on the web

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Abstract

Today's manufacturing enterprises rarely live in isolation. They need to be connected in order to create products from which a group of enterprises, called global-value-chain (GVC), can derive value. Service-oriented architecture (SOA) and event-driven architecture (EDA) are two different paradigms that address complex integration challenges. Enterprise service bus (ESB) allows for the implementation of both the SOA and the EDA concepts. This paper addresses the development of an enterprise service bus (ESB) to grant the operation of GVC. A proposed business-integrator-unit (BIU) is designed to be plugged in each enterprise system. The BIU contains a "business collaboration map configurator" that allows real time allocation of roles to members' enterprises. © 2016 Electronics Research Institute (ERI). Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Keywords: Global value chain; GVC; Process integration; Interoperability; UML model; ESB

1. Introduction

In this introductory section, we explore the reasons for the research program, important definitions and the scope of the problem addressed.

1.1. Business rationale for the research

In this section we explore the business reasons for the research. The [WTO \(2013\)](#) quotes in a recent report

"In the last three to four decades, government and business have been part of a far-reaching economic transformation, made possible by remarkable advances in information, communication and transport technologies. The proliferation of internationally joined-up production arrangements – that is, global supply chains – has changed our economic and political landscape in fundamental ways."

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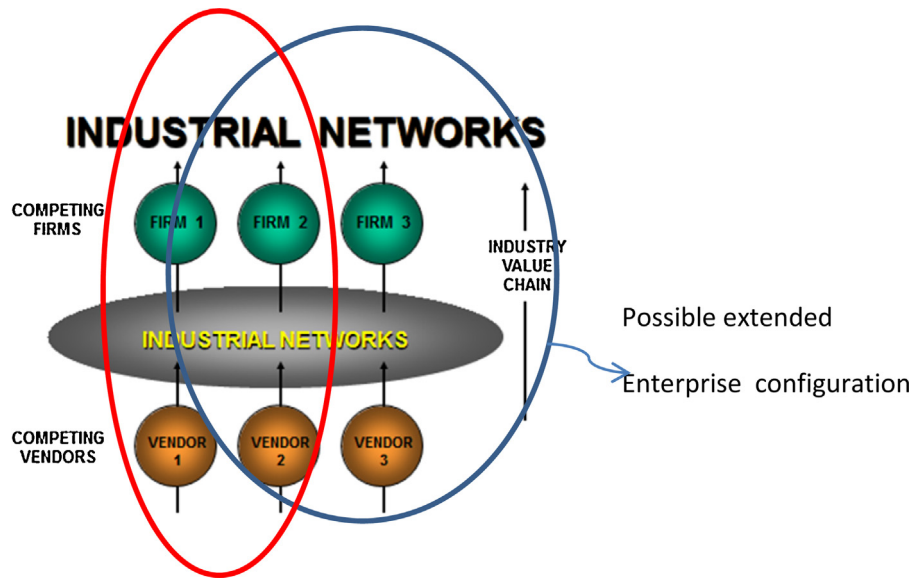


Fig. 1. Value web: collection of firms acting together in an industrial value chain coordinated by networks.

Advances in technology and an enabling policy environment have allowed businesses to internationalize their operations across multiple locations in order to increase efficiency, lower costs and speed up production.

For their part, governments recognize that participating in global value chains will bring value and opportunities to their workers and economies; they have thus sought to foster friendly policy frameworks.

On the other hand, the [UNIDO](#) and The [OECD](#) promote that main growth drive for economy is becoming more specialized in knowledge-intensive, high value-added activities. Specialization in more traditional cost-based industries and activities is no longer a viable option for most firms. A cluster approach will help the members enterprises moving beyond their individual capacities, organizing themselves in dynamic production networks, developing strategic relationships with other firms and institutions to improve their competitive advantages based on economies of scale, innovation and learning.

The above mentioned international drives leads to more development in the Global value chain GVC. GVC is the evolution of SCM; “*the collaboration between partners and the transportation*”. It shifts the focus from production alone to the whole range of activities, see Porters value chain ([Porter, 1985](#)), from design to marketing, and it problematizes the question of governance – how chains are organized and managed.

1.2. GVC definition

The GVC is a grouping of business organizations which sell goods and services on the market or as the whole multitude of interactions between suppliers, manufacturers, distributors and customers. Due to the fact that, as a result of the interactions between suppliers, manufacturers, distributors and customers we add value to the material objects, [Fig. 1](#). It is now an accepted fact that in the twenty first century, competition will be between value-chains, which efficiently and effectively integrate their competencies and resources to compete in the global market. We do not have, any more, the model of closed-protected local market.

The idea of the value chain is based on the process view of organizations, the idea of seeing a manufacturing (or service) organization as a system, made up of subsystems each with inputs, transformation processes and outputs. Inputs, transformation processes, and outputs involve the acquisition and consumption of resources – money, labor, materials, equipment, buildings, land, administration and management. How value chain activities are carried out determines costs and affects profits.

The value chain concept is well known in operation management science. According to [Porter \(1985\)](#), [Fig. 2](#). The subsystems can be classified generally as either primary or support activities that all businesses must undertake in some form.

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