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Competitive advantage in an industry cluster: The case of Dalian Software Park in China

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This paper explores the competitive advantage of Chinese software parks for promoting industrial development. These industry clusters provide competitive advantage because they are rooted in local institutional systems. Taking the case of Dalian Software Park in China, this analysis is conducted qualitatively based on Porter's "diamond" model, SWOT framework and interview results. Industry clusters, which encompass a series of interconnected firms in designated geographic concentrations, show competitive advantages for industrial development with substantial resources rooted in local institutional systems including government, industry and academia aspects. In order to successfully navigate the economic paradigm shift from mass manufacturing production to innovative new product development in China, it is essential that the competitive advantages of industry clusters are strengthened and sustained in order to enhance industrial development, generate innovation and increase regional economic growth.

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1. Background

Since the emergence of information and communication technology (ICT) in the 1990s, a tremendous amount of socio-economic changes has occurred, transforming daily life, global economic markets, and business practice. ICT is central to discussions about economic growth and performance because it is pervasive and widely diffused.

China, with its rapidly expanding economic growth, has experienced tremendous development and change in various sectors of ICT, particularly in the development of the software industry. The Chinese government stepped forward to promote the software industry in the mid-1990s. Although this emphasis began later than the promotion of the hardware sectors in ICT, software development in China benefited from the hardware development that preceded it. Simply put, software development increasingly demands a sizeable installed computer base, with reliable and pervasive telecommunications links both domestically and internationally. These requirements were addressed by the rapid strides in PC and Internet development in China.

Development has been accelerated by a series of regulations, important policies, excellent industrial support, and many factors that benefit rapid development. In particular, the Eleventh Five-Year Plan (2006–2010), which began in the spring of 2006, accelerated these strengths [1]. In this plan, innovation was again key, and improving innovation capability was identified as the crucial task for future development in all areas. In addition, developing the information service industry was also pinpointed as an important development strategy. Industrialization by informatization, or an information-driven economy, was also emphasized in the plan. As a core industry, the information industry was given high priority to develop

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rapidly and promote the development of related industries. The software industry, as another important sector, continues to develop innovative products that can compete in the global market.

The development history of the Chinese software industry is relatively short. In its brief history, a distinct industrial structure with two basic strategies—development in domestic markets, and exports—have led this effort. By stimulating domestic market demand and encouraging software exports, resources for software development are expected to improve in quality and in turn, induce further expansion of the domestic market and strengthen the competitive advantages of the industry.

It is generally understood that demand is an important factor in promoting industrial development. ICT development brings with it a huge demand for software in various sectors of an information society. The compound annual growth rate of ICT software spending¹ in 38 countries, between 1993 and 2004, ranked China at the top [2]. This demand is an important catalyst for the remarkable development of the software industry in China.

At the same time, China has been adjusting its development strategy, and in 2000 it began strengthening its export policies [3]. The underlying principle of this policy is to make the software industry face two kinds of market and two kinds of resources, domestic and international, in order to make the industry more competitive globally and technologically. Efforts continue at the national level to promote software-related industry clusters in order to help realize China's goals and to achieve success in domestic and international markets.

Since the early 1990s, China has begun to establish software parks, including 11 national software industrial bases and 6 national software export bases, which support the overall planning and layout of the Chinese software industry. As a result, the development environment of the Chinese software industry has been dramatically improved and awareness of the competitive advantages of these industry clusters has greatly increased. Thus, more research on the recognition and improvement of competitive advantage in an industry cluster is indispensable.

1.1. Objectives and structure

This article seeks to identify institutional sources for the competitive advantages offered by Chinese software parks. To do this, we take the case of Dalian Software Park (DLSP). Dalian's local institutional systems, and especially their drive toward software exports, are the focus. Section 2 introduces some related research work. Section 3 outlines the analytical framework, including methodology and data collection, and Sections 4 and 5 provide results and discussion of the analyses.

2. Literature review

2.1. Competitive advantage

“Competitive advantage” is a popular term in many fields, and broader definitions include national, industrial, and firm levels. The advantage is termed “competitive” when what the firm does is unique and difficult to replicate. In the global context, developing competitive advantage has become the core strategy for many businesses. And when it comes to this term, existing work must be introduced from the basis of the theory and research concerning competitive advantage completed by Michael Porter [4]. In his book *The Competitive Advantage of Nations*, he addresses the question “Why [do] nations succeed in particular industries, and [what are] the implications for firms and for national economies?” He stresses the important role played by “a nation's economic environment, institutions and policies” that lead to successful competitive industry development, and he states:

Differences in national economics structures, values, cultures, institutions and histories contribute profoundly to competitive success. The home nation takes on growing significance because it is the source of the skills and technology that underpin competitive advantage. ([4], p. 19)

Based on this view, our paper analyzes the competitive advantage of industry clusters embedded in local institutional systems within the macro context of national institutional systems. Porter developed the “diamond model”² which he uses to discuss the determinants of national advantage based on four broad attributes of a nation: factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry [4]. Porter states:

The determinants, individually and as a system, create the context in which a nation's firms are born and compete: the availability of resources and skills necessary for competitive advantage in an industry; the information that shapes what opportunities are perceived and the directions in which resources and skills are deployed; the goals of the owners, managers, and employees that are involved in or carry out competition; and most importantly, the pressures on firms to invest and innovate. ([4], p. 71)

¹ ICT software spending refers to “expenditure for ICT development/utilization including the purchase of all software products, external customization of computer programs, systems software/utilities, application tools and application solutions” [2].

² Diamond is used to refer to the determinants as a system [4].

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