Digital Transformation Driven by Internet Data Center:
Case Studies on China

Poshan Yu
https://orcid.org/0000-0003-1069-3675
Soochow University, China & Australian Studies Centre, Shanghai University, China

Haiyue Gu
Shanghai University, China

Yue Zhao
Independent Researcher, China

Aashrika Ahuja
Independent Researcher, India

EXECUTIVE SUMMARY

With the acceleration of the digital transformation and technological upgradation of various industries, in the wake of application of new technologies such as 5G, artificial intelligence, and the internet of things, the demand for data storage, computing, transmission, and applications has greatly increased. Remote working, remote education, and e-commerce on account of the pandemic have led to a drastic increase in data consumption as well. The processing and analysis of massive data requires the construction of an information infrastructure—Internet Data Center (IDC). In the past few years, China's government has been dedicating itself to the task of constructing IDCs in some underdeveloped areas and establishing more detailed regulations. This chapter introduces some basic policies and implications behind this and a mathematical way to quantitatively analyse the investment efficiency of R&D resources in China's different regions. Several recommendations for the government and the society at large have also been outlined in this chapter for improvement in the whole ecosystem for IDCs in China.

1. INTRODUCTION

A data center serves as a hub of storing servers, network systems and subsystems, networking switches, routers, firewalls as well as all kind of information technology equipment for organizing, storing, processing and disseminating a large amount of data. Internet Data Center (IDC) is thus, a place that contains a large number of servers and auxiliary components. According to the rack scale, IDC can be divided into: super-large data centers, large data centers, medium data centers, micro data centers (computer rooms) and other types of data centers (Vance, 2008).

As the world economy continues to undergo a digital transformation mode, more and more industries are extracting valuable information by using structured or unstructured data resources such as the Internet of Things, Industrial Internet, and e-commerce. The processing and analysis of massive data requires construction of an information infrastructure—IDC. The scale and quality of information infrastructure construction will directly determine the speed and height of economic development in the current digital economy era. IDC is the underlying infrastructure of the smart economy and the construction of IDC is a necessary requirement for industrial digital transformation, which now has become a matter of international competitiveness (Cahen & Borini, 2020).

It is worth noting that, in recent years, China's policy has favored the construction of IDC in three- and four-tier cities such as Guizhou, rather than in one - and two-tier cities with higher economic levels and more high-tech industries, for example, Beijing and Shanghai.

This article mainly focuses on "triple helix" approach – coordinated efforts between academia, industry and government as a catalyst for transition and as a tool of fostering innovation (Wang, 2019). To explain that idea more clearly, a statistical method was applied to the data collected from 2006 to 2020 and this chapter briefly outlines the same. Section 2 talks about the current characteristics of IDC in China and other main developing countries, especially chalking out a contrast between the situation of developed and underdeveloped areas in China. Section 3 discusses about the role of the governments at all levels, including municipal, provincial and national. Section 4 answers an important question, about there being more focus on underdeveloped areas rather than in developed areas for this kind of technology. Section 5 uses some statistical methods to evaluate the input-output efficiency of China's R&D resources. Section 6 demonstrates the opportunities and challenges for construction of IDC in China. Lastly, section 7 provides a brief conclusion and discusses some possible recommendations for the IDC industry and the whole economy.

2. AN OVERVIEW OF IDCS IN DEVELOPING COUNTRIES

2.1 Characteristics of IDCS in China

2.1.1 Overall Situation

According to statistics from CCID Consulting (2020), there are currently approximately 74,000 IDCs in China, accounting for almost 23% of the total number of IDCs in the world. However, the proportion of large and super-large data centers in China still has a lot of room for development. In 2019, the number of super-large and large data centers accounted for 12.7%. Also, there are 320 data centers under construction. After completion, it is estimated that the number of super-large and large data centers will