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Dynamic Capabilities of Chinese Small Private Vocational Education and Training Institutions: A Case-based Research

XIANG Qian

Doctor of Management

Supervisors:
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Declaration

I declare that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university and that to the best of my knowledge it does not contain any material previously published or written by another person except where due reference is made in the text.

Signed: 何前 Date: 05/20/2021

Name: Xiang Qian

作者申明

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Abstract

China's vocational education and training (VET) industry is undergoing rapid growth and transformation. Small private VET institutions face the dual dilemma of a shortage of educational resources and low market reputation. Thus, it is important to understand how these institutions may develop and sustain competitive advantages. This dissertation has analyzed the strategic development of ZK, a small private VET institution in China, using the dynamic capabilities framework. The company's strategic success in the last years was due to its dynamic capabilities of sensing opportunities and threats, seizing opportunities, and managing threats and reconfiguring resources. The study has shown that ZK's dynamic capability of sensing opportunities and threats has two micro-foundations, namely entrepreneurship and social capital at individual and organizational levels. Seizing capability were grounded on microfoundations such as the firm's value chain positioning, integrating resources including complements, organizational flexibility, and commitment to implementation. The microfoundations of ZK's dynamic capability of managing threats and reconfiguring resources were organizational learning and knowledge management. To support the future strategic development of ZK, four strategic initiatives were devised using the SWOT framework. The study contributes to management practice by increasing the understanding of the capabilities and microfoundations that can support the development of small private VET institutions in China. It also sheds light on the relationship between these capabilities and the obtention of competitive advantages in the Chinese market. Its conclusions are of interest to other VET institutions, government departments and other stakeholders, as well as foreign institutions interested in the Chinese VET industry.

Keywords: China, dynamic capabilities, vocational education and training (VET), small private VET institutions, online degree program, certificate program
JEL: M10; M13

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Resumo

A indústria chinesa da educação e formação vocacional (inglês: Vocational Education and Traning ou VET) está em plena expansão e transformação. O estudo das estratégias das pequenas instituições de VET tem grande importância, no sentido de compreender como as mesmas podem se manter competitivas. Esta dissertação tem o objetivo de analisar o desenvolvimento estratégico da ZK, uma pequena instituição chinesa de VET, através da teoria de capacidades dinâmicas. O éxito estratégico da ZK deveu-se ao seu dinamismo em antever oportunidades e riscos e reestruturar os seus recursos. Este dinamismo resultou de um forte espírito empresarial e de um elevado capital social, tanto ao nível individual como institucional. O aproveitamento das oportunidades deveu-se a cinco micro-fundamentos: o posicionamento da empresa na cadeia de valor, a integração de recursos, a inclusão de complementos, a flexibilidade organizacional e a dedicação na implementação. Por sua vez, a capacidade de minimizar riscos e reconfigurar recursos resultou de aprendizagem organizacional e de uma boa gestão da informação. Com base nas referidas capacidades dinâmicas, e através da matriz SWOT, foram desenvolvidas quatro linhas estratégicas para o desenvolvimento futuro da ZK. A dissertação contribui para uma melhor compreensão das capacidades dinámicas e dos micro-fundamentos que podem suportar o desenvolvimento das pequenas empresas de VET na China. Além disso, revela a íntima relação entre as referidas capacidades e as vantagens competitivas no mercado chinês. As conclusões são úteis para outras instituições de VET, departamentos governamentais relacionados, partes interessadas em VET na China e instituições estrangeiras interessadas nesse mercado.

Palavras-chave: China, capacidades dinámicas, vocational education and training (VET), pequenas instituições de VET, cursos superiores online, programas de certificação
JEL: M10; M13

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摘要

中国职业教育和培训（VET）行业正在经历快速增长和转型。小型私立 VET 机构面临教育资源短缺和市场声誉低的双重困境。因此，了解这些机构如何发展和保持竞争优势非常重要。本论文运用动态能力框架分析了中国一家小型私立 VET 机构 ZK 的战略发展。这家机构过去十多年的战略成功归功于其感知机会和威胁、抓住机会、管理威胁并重新配置资源的动态能力。研究表明，ZK 感知机会和威胁的动态能力有两个微观基础，即创始人的企业家精神、以及创始人个人层面和组织层面的社会资本。ZK 抓住机会动态能力的微观基础包括公司的价值链定位、整合包括互补品在内的资源、组织柔性、组织承诺和实施等。ZK 管理威胁和重新配置资源的动态能力的微观基础是组织学习和知识管理。为支持 ZK 未来的战略发展，SWOT 框架被用于设计四个战略目标。本研究增加了对支持中国小型私立 VET 机构发展的能力和微观基础的理解，有助于增进管理实践。本研究还阐明了在中国市场这些能力与获得竞争优势之间的关系。研究结论对其他 VET 机构、政府部门、其他利益相关者以及对中国 VET 产业感兴趣的外国机构具有吸引力。

关键词：中国，动态能力，职业教育和培训（VET），小型私立 VET 机构，网络学历项目，职业培训项目

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At this moment, I am holding the thesis with complicated feelings. I cannot help but think of all the efforts I have made and support I have received over the past five years.

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此时此刻，我怀着复杂的心情捧着这篇论文。我不禁想起了过去五年来我所做的努力和得到的支持。

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List of Acronyms

Cedefop	European Centre for the Development of Vocational Training
EU	European Union
ICT	Information and communication technology
MIITC	Ministry of Industry and Information Technology of China
MOEC	Ministry of Education of China
MVA	Manufacturing value added
SMEs	Small and medium-sized enterprises
TVET	Technical and vocational education and training
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
VET	Vocational education and training

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Chapter 1: Introduction

1.1 Research background

Vocational education and training (hereinafter VET), also called technical and vocational education and training (hereinafter TVET), is defined by the United Nations Educational, Scientific and Cultural Organization (hereinafter UNESCO) as "comprising education, training and skills development relating to a wide range of occupational fields, production, services and livelihoods." As part of lifelong learning, it "can take place at secondary, post-secondary and tertiary levels and includes work-based learning and continuing training and professional development which may lead to qualifications" (UNESCO, 2015). This thesis mainly focuses on the field of continuing education and training for part-time adult students in VET.

1.1.1 The significance of the VET industry in China

Rapid technological change and China's economic transformation in the context of globalization have brought about a huge demand for high-quality workers. To meet this demand, developing its VET industry has become of important significance for China.

Firstly, the VET industry provides fundamental support for China's labor market reforms in light of the technological changes underway in the country.

With the rise of the scientific and technological revolution, technological development has accelerated and become increasingly more widespread. This has brought both enormous opportunities and challenges to the labor market (World Economic Forum, 2018). Industrial automation, artificial intelligence, the Internet of Things, and 3D printing are increasingly being adopted. These new changes make the processes of production and learning different, promote a need for new production technologies and business models, and result in a significant increase in work quality and labor productivity. All of this has totally changed the global manufacturing system. At the same time, the development of new technologies has also brought about changes in the structure of the labor market, followed by a reduction in, or even the disappearance of traditional jobs, and the emergence of new jobs. As pointed out in the World Bank report about the future of manufacturing-led development, the adoption of

technology in the manufacturing system has led to a decline in middle-skill jobs and growth in low-skill and high-skill jobs, and automation threatens between 2-8% of today's jobs in developing economies (World Bank, 2017).

The VET industry plays an important role in adapting to the above changes in the labor market by seizing the opportunities and coping with the challenges brought about by the industrial revolution. At the international level, there is worldwide consensus that there is a need to improve the quality of VET. It is reported in *Education 2030 Framework for Action* issued by UNESCO in 2015 that by 2030, in terms of vocational education and training, all people should be ensured equal access to affordable and quality technical and vocational education and provided lifelong learning opportunities. UNESCO also published a report in 2016, called the *Strategy for Technical and Vocational Education Training (TVET)* (2016-2021), which outlined the aim to train all young people and adults and provide them with the essential skills they need to gain access to employment and entrepreneurship, find decent jobs, and participate in lifelong learning (UNESCO, 2016). The World Economic Forum initiated a report *Closing the Skills Gap Project* in 2017 to address future-oriented skills development and prepare workforces for the future of jobs (World Economic Forum, 2017). In China, the State Council issued the *National Vocational Education Reform Implementation Plan* in Feb. 2018, aimed at cultivating technical compounds and technical personnel by establishing a cooperation mechanism between VET institutions, firms and government (State Council of China, 2019).

Secondly, the VET industry provides important support for China's economic transformation in the new era.

Nowadays, China is going through an important historical period of economic and social transformation. There is an urgent need for the development of the VET industry to ensure the China's transition from an extensive growth mode to an innovation-driven development mode. Meanwhile, China's manufacturing industry also needs to transform from being a large scale situation to one of high competitiveness (Xue & Shan, 2019).

China's economic growth path from factor-driven to innovation-driven is to some degree determined by the development of the VET industry. Since China has entered a New Normal economic stage, its economic growth can no longer be driven by traditional factor inputs. Instead, China's future economic development will rely on knowledge and skills innovation, which increasingly requires high-quality professional skills and talents, and puts a huge demand on the VET industry.

At the same time, China's transition from a large-scale manufacturing country to one with

strong manufacturing competitiveness requires a large number of skilled workers. Since surpassing the United States in 2010, China has become the largest manufacturing country in the world. According to the United Nations Industrial Development Organization (hereinafter UNIDO), China's manufacturing value added (hereinafter MVA) was close to US$3 trillion in 2016, accounting for about a quarter of the global MVA and 31.7% of its GDP, and reached an annual growth rate of 6.4% (UNIDO, 2017). Since the industrial revolution has brought about an urgent need for transformation in manufacturing, China is facing a bigger impact than other countries. Differently from traditional manufacturing, which relies on manual or mechanized technology, advanced manufacturing uses more innovative technologies to improve processes and products, and therefore places higher demands on human capital. To cope with this, the Chinese government proposed the *Made in China* 202*5 Strategy* in 2015 to guide the transformation and upgrading of China's manufacturing industry. Thus, the VET industry is crucial for China to increase its human capital and achieve competitiveness in the manufacturing industry.

1.1.2 Current status and future prospects of the VET industry in China

In terms of market demand for the VET industry, China needs a large pool of skilled talent to successfully achieve economic transformation and, especially, the necessary upgrade in manufacturing. Zhang (2019) points out that only one-third of the industrial workers in China are skilled workers, of which 60% are junior workers, 35% are intermediate workers, and 5% are senior workers. In Germany, however, senior workers account for 35% - 40%. This shows that there is a huge demand for skilled personnel in China, especially senior technicians. To meet that demand would require and, therefore, bring about rapid growth in China's VET industry. With regard to student numbers, according to China's *Modern Vocational Education System Construction Planning* (*2014-2020*), there were already up to 210 million people receiving continuous VET services in China in 2012 (Ministry of Education of China [MOEC] et al., 2014). Based on this, China's *13th Five-Year Plan for National Education Development* issued in 2017 estimated that the demand for VET services could reach 350 million in 2020 (State Council of China, 2017). From the perspective of the VET market size in monetary terms, the *Report on the Competition Pattern and Future Development Trends of Chinese Vocational Education Industry Market 2019-2025* shows that the Chinese vocational education and corporate training market in 2017 reached RMB 600 billion and 150 billion yuan, accounting for about 27% and 7% respectively of the whole education market (Zhiyan Consulting Group, 2018).

In terms of the market supply of the VET industry, since the reform and opening up in China, the VET system framework has gradually been established to provide multiple VET services for China's economic and social development. According to China's *Modern Vocational Education System Construction Planning* (*2014-2020*), as shown in Figure 1.1, there are three kinds of VET providers in China: vocational colleges and universities; firms' own internal training centers; and other VET institutions (MOEC et al., 2014).

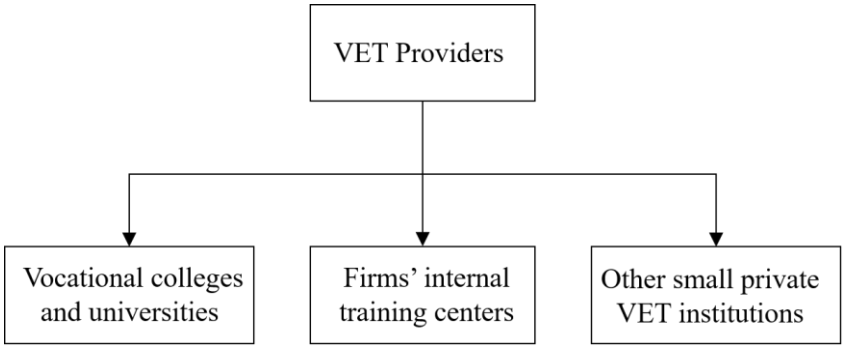

Figure 1.1 Three types of VET providers in China

Source: Drawing according to MOEC et al. (2014).

Vocational colleges and universities, which are mostly public, are the main VET providers and offer lifelong vocational education and training services to all types of workers. It can be seen from China's *Modern Vocational Education System Construction Planning* (*2014-2020*) that China's vocational colleges and education groups accounted for 75% of the VET market in 2012 (MOEC et al., 2014). Firms' own internal training centers are the second type of VET provider. By establishing an institutionalized system of job training, these centers provide continuous VET services to their own workers based on the demands of the firms' business development. In addition to these first two types of providers there is a third, which involves a large number of private, smaller VET institutions. Owing to the lower entry and exit barriers of these institutions, they can be operationally more flexible and, therefore, perform an important bridging function in matching the supply and demand of the VET market.

In terms of the future prospects of the VET industry in China, to get a sense of the opportunities and challenges brought about by the industrial revolution and economic transformation, the State Council of China issued the *National Vocational Education Reform Implementation Plan* in Feb. 2019, which clarified the objectives, requirements and measures for vocational education reform (State Council of China, 2019). The plan proposes that China's vocational education system should emphasize academic education and training in equal measure so that different educational content can correspond to the different learning needs of workers. It also aims to establish a "1+X" certification system, which translates as -

one academic certificate plus any number of vocational skill certificates. This system is intended to help cultivate the technical compound skills and talents essential for future work opportunities. It finally emphasizes the integration of industry and the education system by promoting school-firm cooperation and by stimulating firms to actively participate in designing VET curricula. These reform guides are in line with the future prospects of the global VET industry and will greatly promote the upgrading of China's VET industry. These ideas are the same as the *Closing the Skills Gap Project* published by the World Economic Forum in 2017, which shows that VET institutions should organize work-based learning for workers and ensure that curricula development is aligned with the market demand for skills (World Economic Forum, 2017).

1.1.3 The significance of small private VET institutions in China

Small private VET institutions play a significant role in the development of China's VET industry. This can be shown by comparing the three types of VET providers. In terms of VET programs, these three providers have different characteristics and roles.

The first step is to analyze the characteristics of vocational colleges and universities, especially the public institutions among them. Compared with the other two types of institutions, these are large in size and, having superior educational resources, are at an advantage with regard to fundamental and professional knowledge. Benefiting from strong political support, they are qualified to provide academic education and, more importantly, can issue academic certificates, thus setting a high entrance barrier within the VET industry. However, the main problem with vocational colleges and universities is that most of their VET programs are not designed in close connection with market demand and consequently do not meet the standards vocational professions require. The reason is that academic education was dominant in China for a long time, and the development of vocational education seriously lagged behind.

The second step is to analyze the characteristics of firms' internal training centers. These centers design and implement VET programs more suited to their own development, with the programs being mainly based around the firms' production operations and designed to match their practical business needs. However, due to the limitations of firms' internal educational and training resources, these VET programs may lack forward-looking content in terms of the industry's future prospects. Hence, there is a strong need for these internal training centers to cooperate with external VET institutions.

The final step is to outline the characteristics of the small, private VET institutions. These

institutions have no academic education credentials and cannot issue academic certificates. Due to the entry and exit barriers to this type of VET institution being low, there are a large number of them providing similar adult training programs, which leads to fierce competition. There is a huge difference in size between these institutions and the dominant vocational colleges and universities. According to the MOEC (2020), the number of private VET institutions had reached 32,780 in 2019. They are called small institutions because the average number of faculty and full-time teachers is only 11 and 6 respectively. By comparison, the average number of faculty and full-time teachers in universities in 2019 was 1,476 and 969, 491 and 362 in higher vocational colleges, and 106 and 84 in secondary vocational schools. However, compared with the dominant vocational colleges and universities, the small private VET institutions are market-oriented and highly flexible. Only a small number of such institutions rely on their own full-time teachers to design and carry out VET programs, with most of them acting as a bridge between vocational colleges or universities and enterprises and students. They link university teaching and training resources to market demand and play a very important role in matching the supply and demand of VET programs. Until now this type of institution has been an indispensable intermediary in promoting university-enterprise cooperation and industry-university integration.

The importance of small private VET institutions in China can also be seen in *The Future of Jobs Report 2018* published by the World Economic Forum (2018). The report uses survey data to show the projected use of training providers by the Chinese companies surveyed. As shown in Annex B.1, the internal department is the respondents' first choice, accounting for 52%. Among the external VET institutions, private training providers and private educational institutions account for 28% and 21% respectively, higher than the ratio of public educational institutions (18%) and public training providers (14%). This data shows that private VET institutions, despite a shortage of sufficient educational resources and political support, target more the needs of firms' labor re-education and up-skilling, leading to higher market recognition. As a result, the private VET institutions play an important role in upgrading the vocational education industry.

1.2 Research problem and questions

Within China's VET industry, small private VET institutions face the dual dilemma of a shortage of educational resources and little or no market reputation, so it is difficult for them to achieve success. As previously mentioned, there are three types of providers in China's

VET industry: vocational colleges and universities, firm's own internal training centers, and other small private VET institutions. First and foremost are the vocational colleges and universities, especially the public institutions. These have superior educational resources and strong political support under China's economic system, with public ownership as the mainstay. More importantly, they are accredited to provide academic vocational education and issue academic certificates. This sets a high industrial barrier to entry and exit, leading to high market power. Second are firms' own internal training centers which design and provide VET programs based around their own business needs, and do not participate in market competition. The third type are the small private VET institutions with little or no market reputation. They lack high-quality VET resources and, having little or no control over market demand, find themselves up against intense competition and under enormous market pressure. In addition, the vast majority also lack the capability to offer differentiation in their VET programs. From the perspective of industry characteristics, the entry and exit barriers being low means the number of similar institutions is high. Therefore, in the rapidly changing industrial environment, it is of important research significance to explore how these small, private VET institutions overcome the shortage of educational resources and lack of market reputation to gain competitive advantages. One representative of a small private VET institution (ZK) has successfully overcome the dual dilemma by building dynamic capabilities. This makes it of great significance as a model to reference with regard to the development of similar organizations.

The ZK institution (hereinafter ZK) is a small private VET institution in China. It was established in Chengdu City, Sichuan Province in 2003 with 30 employees and a registered capital of 2.43 million RMB yuan (equivalent to 321 thousand Euros). When it was first established, and like other small private VET institutions, ZK faced the dual dilemma of a shortage of education and training resources and little or no market reputation.

During the 17 years of its development, however, ZK actively adapted to both the demand and developmental trends of the VET industry. By building dynamic capabilitie of sensing opportunities and threats, seizing opportunities, and managing threats and reconfiguring resources, ZK has successfully overcome the dual dilemma of a shortage of VET resources and little or no market reputation. ZK's success lay in managing to transition from an ordinary, small private VET institution to a learning center that can provide online university degree programs and a National Talent Training Base accredited by the Ministry of Industry and Information Technology of China (hereinafter MIITC). It has achieved this by dint of hard work and a willingness to take the risks inherent in entrepreneurship. It developed customized

majors for online university degree programs in continuing education (hereinafter online degree programs), built up its social capital of broad social networks in the VET industry, instituted an innovative business model matching VET supply and demand by customizing majors for online degree programs targeting the electric-power industry and, along the way, garnered a reputation among customers and cooperators. ZK has not only integrated with the education and training resources of universities, but is also highly regarded by the cooperating universities and related government departments, all of which has ultimately led to ZK achieving a competitive advantage.

ZK has gone through three stages of development. Step by step it has broken through the dual dilemma of shortage of VET resources and lack of market reputation. With its innovative and differentiated VET program majors and curricula, quality corporate customer resources and good quality management of programs, ZK has not only been rated as an excellent learning center for online university degree programs by the MOEC for five consecutive years, but is also acknowledged by MIITC as an excellent National Talent Training Base. These successes have secured ZK's good reputation and led to continuous growth in enrollment, income and profits. For example, ZK had only 18 employees in 2019, but enrollment for its online VET programs reached 12,688 students. Its annual revenue and gross profit in 2019 was 95.77 million RMB yuan (equivalent to 12.67 million Euros) and 38.96 million RMB yuan (equivalent to 5.15 million Euros), respectively. Whether from the point of view of its economic indicators or for its market reputation and government recognition, ZK has become a leader among the small private VET institutions. Against the background of rapid changes in China's VET industry, the development and final success of ZK demonstrates the dynamic process of building dynamic capabilities and gaining competitive advantages. This thesis chose, therefore to conduct a descriptive case study of ZK that analyzes its past, present and future development, and tries to explore the evolution of its dynamic capabilities and competitive advantage through which ZK successfully got round the dual dilemma.

Based on the above problem description and ZK's development stages, the specific research questions of this thesis are as follows:

1. As a small and private VET institution, what was the dual dilemma of shortage of education and training resources and lack of market reputation initially faced by ZK? What has ZK done so far to cope with this dilemma?

The development dilemma faced by ZK at the beginning of its establishment is a common problem for small private institutions in China's VET industry. Through extensive data

collection in the VET industry, analysis of external and internal environment and comparative research on different types of VET institutions, the thesis first reveals that the problem of dual dilemma initially faced by ZK is a shortage of education and training resources and lack of market reputation.

Secondly, based on a dynamic capabilities framework and a survey of the main stakeholders, the thesis elaborates how ZK built dynamic capabilities of sensing opportunities and threats, seizing opportunities, and managing threats and reconfiguring resources to cope with the dual dilemma and successfully achieve competitive advantages. By conducting in-depth interviews with ZK's leaders and employees, the thesis reviews the ZK's trajectory from the time of its inception through to the present day. The thesis also investigates the requirements for an evaluation of ZK based on interviews with VET resource providers (cooperating universities), related government officers, managers from corporate customers, and graduate students.

2. What growth issues is ZK currently facing in its competitive landscape?

Although ZK has obtained short-term competitive advantage in its past development, it still faces many growth issues in its current and future competitive landscapes. By conducting in-depth interviews with main stakeholders and analyzing both the internal and external environment, this thesis reveals that the main growth issues ZK is now facing are: its differentiated courses are being imitated by competitors, some market regions have been taken away, customer resources are too individual, and the supplier has too much power.

3. What strategic actions should ZK take to achieve sustainable growth?

Based on the analysis of ZK's current growth problems, the thesis explores what strategic actions ZK should take to improve its dynamic capabilities so as to adapt to the new development environment and achieve sustainable competitive advantage.

1.3 Research framework

The framework of the thesis is as follows:

Chapter 1: Introduction. This chapter introduces the research background, the research issue and questions, the research framework and future contribution.

Chapter 2: Literature review. This chapter reviews the fundamental theories and the related applied literature to provide a theoretical background and analytical framework for the thesis. In terms of fundamental theories, the content includes position theory which focuses

on the external environment, and the resource-based view focusing on internal organization. The literature of dynamic capability and its micro-foundations is reviewed emphatically. In terms of applied research, this includes literature focusing on the VET industry in both the European Union and China.

Chapter 3: Research methods and design. This chapter covers methods of research design, data collection and data analysis. It also explains why a single, descriptive case study was chosen, how data were collected from desk research and in-depth interviews, and how the qualitative and quantitative data were analyzed.

Chapter 4: Evolution and development stages of ZK. This chapter depicts the detailed historical development of ZK from its beginning up to now, and divides the process into stages. It introduces the ways ZK has so far dealt with the dilemma of a shortage of educational resources and little or no market reputation and provides background for the following descriptive case study.

Chapter 5: Evolution of ZK's external environment. Using external analysis tools such as PEST analysis and the five-force model, and macro-level, industry-level data and interview data, this chapter analyzes ZK's external environment from an evolutionary perspective. The content includes (1) how the external scenario has evolved since the start of ZK; (2) what the current external strategic context is, as well as the competitive scenario; and (3) the expected changes to the external scenario that will likely affect the future development of ZK. The final part is of the most importance and is analyzed based not only on documental evidence but also on interviews with qualified experts.

Chapter 6: ZK's dynamic capabilities, micro-foundations and future strategic choices. First, based on the interview data and development stage of ZK, a framework for analyzing ZK's dynamic capabilities is proposed. Based on this, a descriptive case study of ZK's dynamic capabilities and its micro-foundations is carried out to extract the strengths and weaknesses of ZK. Second, combined with the opportunities and threats faced by ZK and analyzed in Chapter 5, this chapter uses the SWOT framework to identify the main strategic issues and to propose ZK's future strategy options.

Chapter 7: Conclusions and future research. This chapter summarizes the results, discusses implications for theory and practice, points out the limitations and makes suggestions for future research.

1.4 Relevance of the research

This thesis chose as its research object a representative small private VET institution in China (ZK), and will conduct a descriptive case study to analyze ZK's past and current development. It aims to explore the evolutionary process through which ZK built dynamic capabilities and gained competitive advantage in a dynamic external environment, and puts forward strategic choices for ZK's future development.

The theoretical relevance of the thesis is that it applies the theory of strategic management, especially dynamic capabilities, to China's VET industry, which broadens the research scope of existing theories. A review of the literature shows that most studies on dynamic capabilities focus on high-tech industries and manufacturing, there being few studies on dynamic capabilities based on VET industries.

The practical relevance of the thesis is that conducting a descriptive case study on ZK, a representative small private VET institution in China, will be useful to similar VET institutions, local regulators and other stakeholders in the VET industry in China as well as the foreign institutions interested in the Chinese VET industry. In practice, with the acceleration of China's economic transformation, the VET industry has developed greatly. Rapidly changing environments have promoted the development of the dynamic capabilities of VET institutions. Therefore, studying this dynamic evolution process helps to deepen the understanding of changes in the VET industry, and the dynamic capabilities and micro-foundations of VET institutions. This thesis focuses on the evolutionary path that ZK took as it built up its dynamic capability in order to get round the dual dilemma of a shortage of VET resources and little or no market reputation to finally gain a competitive advantage. It also reveals the strengths and weaknesses of ZK, as well at the opportunities and threats it faces, and puts forward the strategic choices for the future development of ZK. This research not only provides a good reference for the construction of dynamic capabilities and micro-foundations of similar VET institutions in China, but also helps local regulators to understand the basic demands of such VET institutions and improve related policies. It also helps other stakeholders to fully understand the typical characteristics of this type of VET institution and better achieve cooperation. In addition, this thesis also has important practical significance for foreign institutions interested in the Chinese VET industry by helping them understand the dynamic environment and main stakeholders of China's VET industry and the evolutionary path of small private VET institutions.

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Chapter 2: Literature Review

As Hitt, Ireland, and Hoskisson (2016) show, the strategic management process is a set of decisions and actions taken by a company to achieve strategic competitiveness and excess profits, and consists of three basic elements of analysis, strategy and performance. Specifically, companies first need to analyze their external and internal environments to determine what resources, capabilities, and core competencies are available to them to support strategic action. Companies then need to implement two strategic actions through strategy formulation and strategy implementation to pursue positive performance of expectations. During this process, positioning and action are two different concepts in strategic management. The positioning concept advocates logical analysis from the outside in, focusing on the analysis of the industrial environment. The action view advocates logical analysis from the inside out, focusing on the analysis of enterprise resources and capabilities, and regards the core competitiveness of a particular company as a resource-based capability able to obtain a sustainable competitive advantage over competitors (McGuigan et al., 2011).

2.1 Positioning theory

2.1.1 Basic ideas

As Andrews (1980) points out, “corporate strategy is the pattern of decisions in a company that determines and reveals its objectives, purposes, or goals, produces the principal policies and plans for achieving those goals, and defines the range of businesses the company is to pursue, the kind of economic and human organization it is or intends to be, and the nature of the economic and non-economic contribution it intends to make to its shareholders, employees, customers and communities.” When a company successfully formulates and implements a value creating strategy, it achieves strategic competitiveness (Hitt, Ireland, & Hoskisson, 2016). When a company “implements a strategy that creates superior value for customers and that its competitors are unable to duplicate or find too costly to imitate”, it has a competitive advantage (Teece, 2014).

From the 1960s to the 1980s, the external environment was considered to be the main determinant of a successful strategy for business selection (Hoskisson et al., 1999). This

forms the basic idea of strategic positioning theory. Under this theory, the industry or segment of a company's industry has a greater impact on a firm's performance than internal factors. Therefore, corporate performance depends mainly on a range of industry characteristics, including economies of scale, barriers to market entry, product differentiation, and concentration of firms in the industry (Hitt, Ireland, & Hoskisson, 2016). Figure 2. 1 shows the analytical framework and the steps of the strategic positioning theory, which divides the company's strategic management process into five steps. The premise of this framework is that excess profits are mainly determined by environmental characteristics external to the enterprise, rather than the internal resources and capabilities of the enterprise. Therefore, enterprises should choose strategies that can obtain excess profits in specific industries and implement them efficiently.

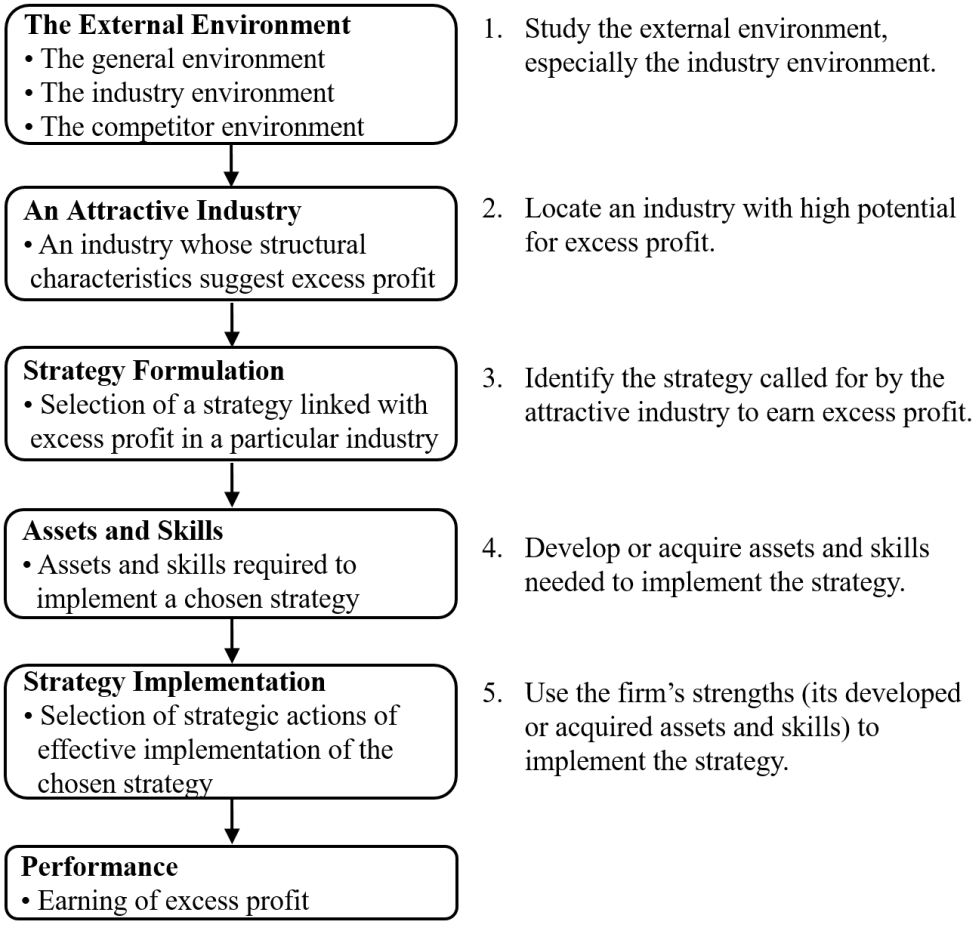

Figure 2.1 External analytical framework based on positioning theory

Source: Hitt, Ireland, and Hoskisson (2016)

2.1.2 Critical assumptions

The positioning theory relies on the following four fundamental assumptions (Galbreath & Galvin, 2008). Firstly, the external environment is assumed to impose pressures and

constraints on a firm's strategies. Secondly, most companies competing in the same industry are assumned to have similar strategic resources and take similar strategic actions. Thirdly, strategic resources are assumed to be highly mobile across competing companies, so the resource differences between companies will not last long. Fourthly, strategic decision makers are rational and pursue profit maximization goals. Given these assumptions, companies should therefore choose the most attractive industry to compete and improve business performance by imitating the best practice.

The positioning theory suggests that the external environment of a company, rather than its unique internal resources and capabilities, and the strategic positioning chosen (if successfully implemented), determine its profits. However, the external environment of a company is not the only determinant of profits. Some companies can obtain excess profits in industries with fierce competition and slow growth, while some companies cannot formulate and implement strategies that can achieve excess returns even in industries with many opportunities and few threats. The study of McGahan and Porter (2003) shows that only about 20% of a company's profitability can be explained by the industry the company has chosen to compete in, while 36% of the profitability can be explained by the company's characteristics and actions taken. Hence it can be seen that both the external environment and a company's internal resources and capabilities jointly determine the realization of the excess profits.

2.1.3 Analytical tools

As shown in Figure 2.1, the external environment of strategic analysis involves three levels: the overall environment, the industry environment, and the competitive environment. Together, they determine the opportunities and threats facing the enterprise. In contrast, general environmental analysis focuses on overall macro-environmental trends and their impacts. Industry environmental analysis focuses on factors and conditions that affect the profitability potential of the industry, while competitive environmental analysis focuses on predicting competitors' behaviors, reactions, and intentions (Hitt, Ireland, & Hoskisson, 2016). Analytical tools corresponding to the external environment include PEST analysis, the five-force model, and competitive intelligence analysis.

PEST analysis is a strategic tool for overall environmental analysis and focuses on the political, economic, social, and technological segments outside companies. The overall environment influences the strategic choices and performance of an industry and internal business. Companies cannot directly control the overall environmental factors, so the trends of each factor and their possible impact on the business should be recognized (Hitt, Ireland, &

Hoskisson, 2016).

The five-force model is a tool for analyzing the industrial environment. The industrial environment is a set of factors that directly affect companies and their competitive behaviors and responses (Hitt, Ireland, & Hoskisson, 2016). According to the structure-conduct-performance (S-C-P) model, the industrial structure determines the behavior and long-term performance of the firm. For the industrial structure, Porter (1980) proposed a conceptual framework to analyze the industrial environment from the five competitive forces, which includes the intensity of rivalry, threat of substitutes, threat of potential entrants, buyer's power and supplier's power. Compared to the macro-analysis of the overall environment, the analysis of these forces belongs to the micro perspective of the enterprise.

In Porter's (1980) five-forces framework, as shown in Annex B.2, the profit rate of an enterprise is firstly determined by the intensity of competition among existing competitors. This is affected by factors such as industry concentration, conversion costs, exit barriers, and industry growth rate. The second force is the threat of alternatives. The greater the difference between the substitutes, the higher the brand loyalty of the product; the more significant the network effect, the smaller the threat of the substitute and the stronger the profitability of the enterprise. The third force is the threat of potential entrants. Entry threats are determined by entry costs, and entry costs depend on the level of entry barriers. The higher the barrier to entry, the more profitable the incumbent is. Factors affecting entry barriers to industry include economies of scale, product differentiation, customer loyalty, channel access, and government policies. The fourth force is consumer/buyer bargaining power, which is determined by factors such as the concentration of consumers, the degree of standardization of products, the level of industrial production capacity, network effects, and potential backward integration. The last force is the supplier's bargaining power, which is determined by the number of suppliers, the degree of differentiation and substitutability of the products supplied, and the potential for forward integration.

As an extension of Porter's Five Force framework, Brandenburger and Nalebuff (1995) used the game theory tool to introduce a sixth, the "complementors" of market forces. Different from the market share of competitors, the complement here will help to increase the value of the company's products or services when selling products or providing services, thereby increasing market share. For example, Intel, which manufactures microprocessors, has a complementary relationship with Apple, the computer manufacturer. Forming strategic alliances rather than engaging in traditional competition can help companies gain competitive

advantage.

The competitive environment is the final part of the external environment analysis, which complements the analysis of the overall macro environment and industrial environment (Kilduff, Elfenbein, & Staw, 2010). Competitor analysis is about how companies collect and understand competitor information, that is, competitive intelligence. Competitive intelligence analysis helps companies gather intelligence about their competitors and about global public policies in order to better understand and predict competitors' goals, strategies, assumptions, and capabilities (Hitt, Ireland, & Hoskisson, 2016).

2.2 Resource-based view

2.2.1 Basic ideas

As Hitt, Ireland, and Hoskisson (2016) showed, the premise of strategic positioning theory is that the excess profits of enterprises are mainly determined by the external environment. The resource-based view (RBV), however, is that the company’s strategy and excess profits are mainly determined by the company’s unique resources and capabilities. This theory focuses on the role of resources and capabilities in determining a company's core competencies, and thereby determines the source of competitive advantage.

According to Barney (1991), resources are all kinds of tangible and intangible assets that are controlled by enterprises and invested in the production process. The four main types of tangible resources involve: (1) financial resources, such as financial strength and borrowing capacity, (2) organizational resources, such as formal planning, control and coordination systems, (3) physical resources, such as plant equipment, ability to obtain raw materials, and (4) technical resources, such as patents and trade secrets. The three main types of intangible resources are human resources such as knowledge and skills, innovative resources such as technology and innovation capabilities, and reputation resources such as brand, customer and supplier reputation (Hall, 1992).

According to Barney and Hesterly (2015), capabilities are a subset of enterprise resources and are tangible and intangible assets that enable companies to make better use of existing resources, including marketing capabilities, teams, and collaboration. Core competencies are resources and capabilities that provide a source of competitive advantage for companies, generally expressed in the form of organizational functions. In RBV, the three concepts of resources, capabilities and core competencies are not strictly distinguished. The concept of

resources refers to the intangible and tangible assets used by enterprises. It is also believed that the process of acquiring various resources and developing unique capabilities is the way to integrate the process of using resources.

Taking the resource-based view, the strategy chosen by the company should give full rein to its resources and capabilities to avoid any disadvantages and help it obtain excess profits in an attractive industry. Figure 2.2 shows a strategic analysis framework that takes a resource-based view (Hitt, Ireland, & Hoskisson, 2016). This still includes five steps, but is fundamentally different from the industry identification highlighted by the strategic positioning theory.

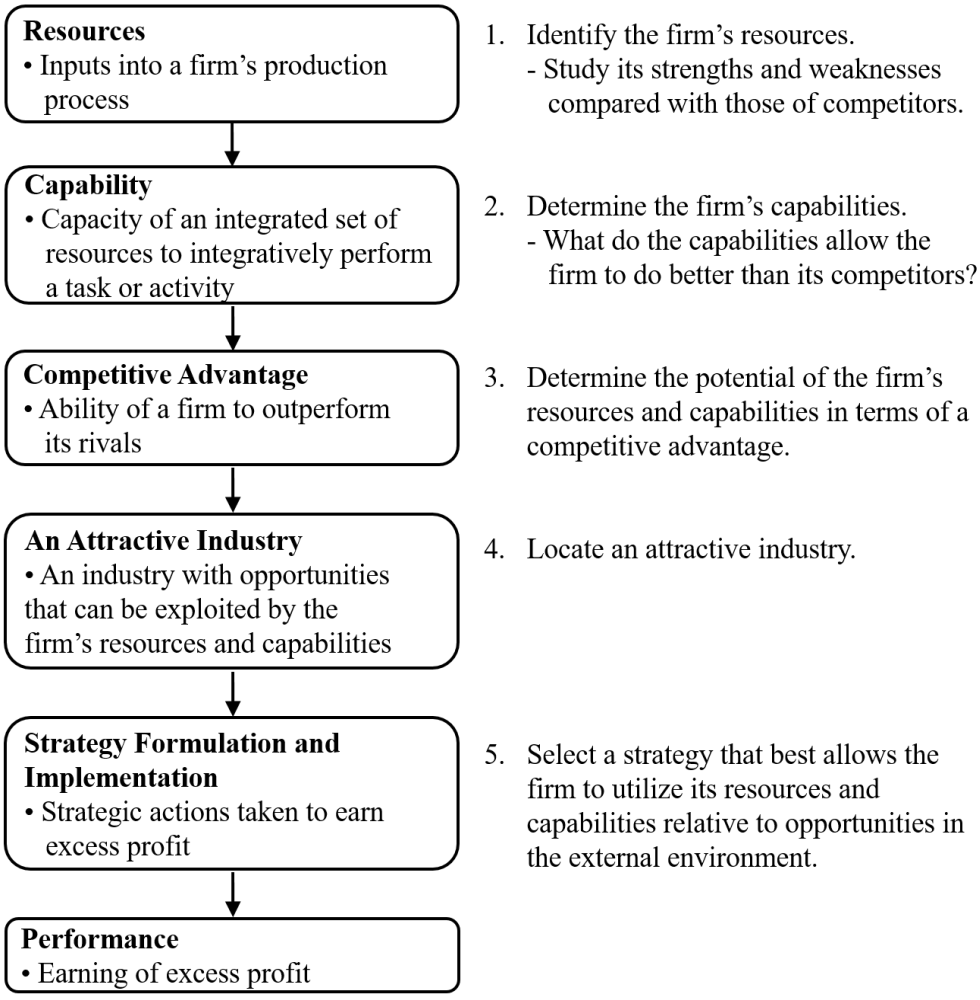

Figure 2.2 Internal analytical framework based on resource-based view

Source: Hitt, Ireland, and Hoskisson (2016)

2.2.2 Critical assumptions

Compared with the assumptions of positioning theory, the resource-based view follows such general assumptions as the company's pursuit of profit maximization and the bounded rationality of managers. However, two different critical assumptions about resources and

capabilities are put forward (Barney & Hesterly, 2015).

Firstly, companies' resources and capabilities are unique and heterogeneous and, therefore, are the basis of competitive advantage. The resource-based view assumes that each organization is a unique combination of resources and capabilities, so even within the same industry, the resources and capabilities of competing firms may be quite different and, as such, determine the size of profit between firms. This is totally different from the assumption of positioning theory that the strategic resources and capabilities within an industry are similar.

Secondly, resources and capabilities are not highly mobile across companies. In contrast to the high mobility of enterprise resources assumed by positioning theory, the resource-based view holds that resource transfer and acquisition between companies have high barriers, so companies with specific resources and capabilities will continue to gain competitive advantage. Companies that lack these resources and capabilities have long been lagging behind due to high acquisition costs. A possible explanation for why some companies outperform others even if they compete in the same industry may derive from these two assumptions.

Although the resources and capabilities of companies are playing an increasingly important role in determining competitive advantages, the characteristics and evolution of the industrial structure still form the main basis for companies to formulate long-term competitive strategies. Therefore, both the external industrial environment and the company's internal resources and capabilities simultaneously affect the company's performance (Kapoor & Furr, 2015). The positioning theory and resource-based view are complementary since the former focuses on the external environment of a firm while the latter focuses on its internal resources and capabilities. Hence, as suggested by Barney and Hesterly (2015), a firm's strategy should be an organic combination of what it could do (that is, the strengths and weaknesses of the internal organization) and what it should do (that is, the opportunities and threats of the external environment).

2.2.3 Analytical tools

Based on the RBV, we need to analyze the various resources and capabilities that the company has and the competitive advantages it may generate, thereby identifying the strengths and weaknesses within the company. The tools for internal enterprise environmental analysis mainly include the VRIO framework, the dynamic capability framework and the value chain analysis.

2.2.3.1 VRIO framework

The first analytical tool of the resource-based view was proposed by Barney (1991). He argues that to ensure a competitive advantage, the company's resources must be valuable, rare, inimitable and non-substitutable (VRIN). However, the source of competitive advantage should not be static resources, but should be the effective use of key resources (Peteraf & Barney, 2003). To this end, the company's organizational structure has been emphasized, thus forming a new analytical tool for RBV--VRIO, that is, the basis of competitive advantage is valuable, rare, inimitable resources and organization. Compared with VRIN, VRIO emphasizes the prominent role of the company's internal organizational structure in transforming key resources into competitive advantages (Barney, 1995, 1997).

Annex B.3 provides a detailed description of the VRIO framework. Here, four key questions about the strengths and weaknesses of a company should be answered. The first is the question of value i.e., whether a certain resource helps the enterprise to seize the opportunity of the external environment and mitigate the threat of the external environment; the second is the scarcity problem i.e., whether a certain resource of the enterprise is controlled by a few competitive enterprises; third is the imitation problem, which is whether the enterprise lacking a certain resource faces high imitation cost; and the fourth is the organizational problem i.e., whether the enterprise strategy is organized around the effective use of its valuable, scarce and difficult to imitate resources. If the answer to these four questions is in the affirmative, then the resources and capabilities constitute the advantage of the enterprise, otherwise it becomes a disadvantage of the enterprise (Barney & Hesterly, 2015).

2.2.3.2 Dynamic capability framework

Since the VRIO framework does not specify how unique resources and capabilities are obtained (Priem & Butler, 2001), the researchers propose the concept of dynamic capability (DC) to explain how a firm innovates its resources and capabilities to adapt to a changing business environment and to ensure the acquisition and maintenance of competitive advantage (Ambrosini & Bowman, 2009).

(1) Concept of dynamic capabilities

The concept of dynamic capabilities has undergone a long evolution. Back in 1994, Teece and Pisano proposed the term "dynamic capabilities" as a source of a firm's competitive advantage. Teece and Pisano (1994) emphasize the dynamic capabilities from two aspects, that is: "the term of 'dynamic' refers to the shifting character of the environment" and "the

term of ‘capabilities’ emphasizes the key role of strategic management”. On this basis, many researchers define this concept from the perspective of capabilities. For example, Teece, Pisano, and Shuen (1997) define the dynamic capabilities as “the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments”. Winter (2003) defines dynamic capabilities as those that operate to extend, modify or create ordinary capabilities. He regards dynamic capabilities as higher-order capabilities, different from ordinary or “zero-level” capabilities that permit a firm to “make a living” in the short term. Similarly, Teece (2016) distinguishes ordinary capabilities, which are about “being efficient”, from dynamic capabilities, which are about “learning and improving and about being innovative and effective”. Teece (2007) further disaggregates dynamic capabilities as sensing (opportunities and threats), seizing (opportunities), and reconfiguring (resources) capacities. Teece (2014) also finds that dynamic capabilities are built on the idiosyncratic characteristics of entrepreneurial managers and the history-honed routines and culture of the organization. Based on the systems theory framework, Teece (2018a) regards dynamic capabilities as a workable system that involves the explicit role of management/leadership being to allow systemic change to start.

Another perspective that defines dynamic capabilities is process-based. For example, Eisenhardt and Martin (2000) argue that dynamic capabilities are not vague or tautological, but involve “a set of specific and identifiable processes such as product development, strategic decision-making, and alliancing”. According to their observations, dynamic capabilities have commonality in corporate management practices, commonly known as “best practices”. The effective model of dynamic capabilities change with the market environment. The more highly volatile the markets, the greater the difference in dynamic capabilities. They point out that the value of dynamic capabilities to a company’s competitive advantage depends on the allocation of the resources they create, not on the capabilities themselves. Similarly, Zollo and Winter (2002) refine and define dynamic capability as “a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness”.

(2) The nature and microfoundations of dynamic capabilities

The concept of dynamic capabilities is very abstract and hard to understand. Therefore, it is necessary to establish an analysis framework for dynamic capabilities by clearly defining its nature and micro-foundations. Just as Helfat and Peteraf (2015) said, the micro-foundations of dynamic capabilities have assumed greater importance in the search for factors that facilitate

strategic change.

There has been much debate among researchers regarding this field. Helfat et al. (2007) disaggregate two aspects of dynamic capabilities as the deployment of resources in a firm and the search, selection and creation of resources, both of which serve "to purposefully create, extend or modify" the firm's resource base. Wang and Ahmed (2007) regard adaptive capability, absorptive capability and innovative capability as three main component factors of dynamic capabilities which help firms link internal resource advantage to external marketplace-based competitive advantage.

In the analysis framework proposed by Teece (2007), dynamic capabilities are disaggregated into three aspects as sensing, seizing, and reconfiguring capacities. Specifically, Teece describes them as capacities "(1) to sense and shape opportunities and threats, (2) to seize opportunities, and (3) to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets". In this framework - shown in Figure 2.3, the micro-foundations of dynamic capabilities is further summarized as "distinct skills, processes, procedures, organizational structures, decision rules, and disciplines". This analysis framework of dynamic capabilities not only defines capabilities of resource integration and reconfiguration from the perspective of behavior, but also defines capabilities of seizing opportunity and threats from the cognitive perspective (Bareto, 2010). It helps to understand the contents of the dynamic capabilities "black box" (Dixon, Meyer, & Day, 2014), and provides a baseline from which to understand the sources of a company's competitive advantage.

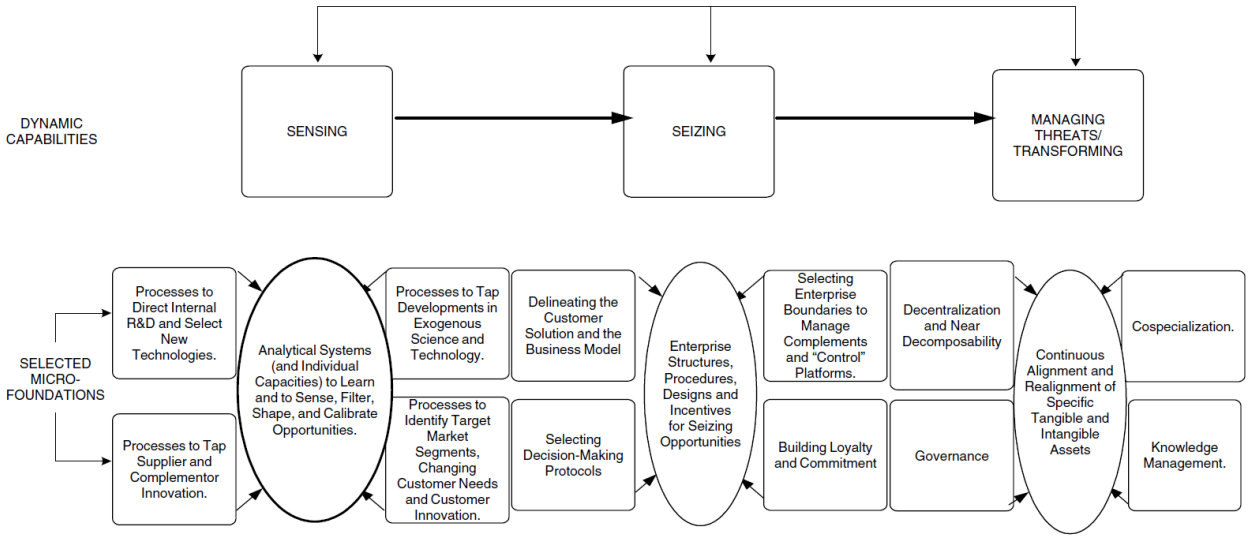

Figure 2.3 Nature and microfoundations of dynamic capabilities

Sources: Teece (2007)

The dynamic capability analysis framework proposed by Teece (2007) has become an

important basis for subsequent research. Based on this framework, Helfat and Martin (2015) focus on micro-foundations at the level of individual managers and introduce the concept of "managerial cognitive capability" with the definition of "the capacity of an individual manager to perform one or more of the mental activities that comprise cognition". As shown in Annex B.4, for the dynamic managerial capabilities of sensing, seizing, and reconfiguring, the micro-foundations are identified as perception, attention, problem-solving, reasoning, language and communication, and social cognition.

Teece (2018b) further highlights the interdependence between dynamic capabilities, business models, and strategies. As shown in Figure 2.4, dynamic capabilities and strategy combine to create and refine a defensible business model, which guides organizational transformation. In this framework, the sensing, seizing, and transforming capabilities are described as identifying opportunities, designing and refining business models, and committing resources, and realigning structure and culture, respectively.

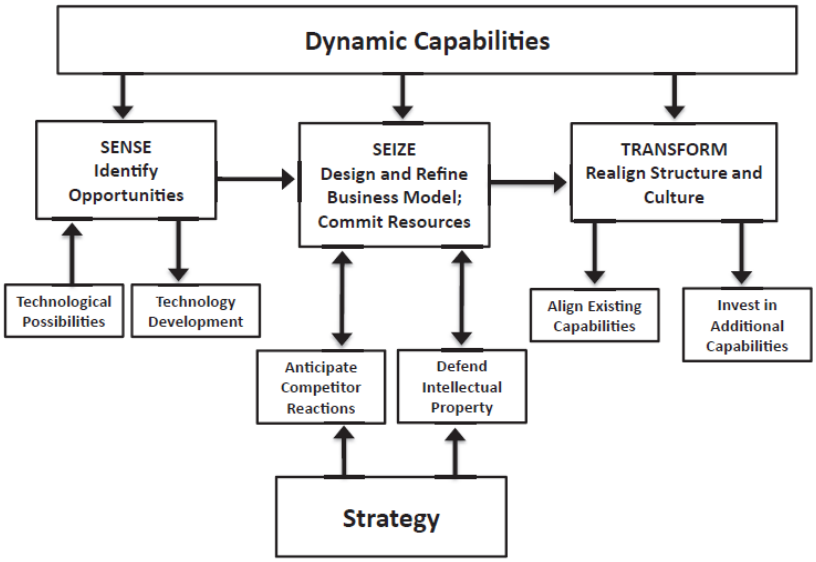

Figure 2. 4 Dynamic capabilities, business models, and strategy

Source: Teece (2018b)

In the application of Teece (2007)'s framework, Warner and Wager (2019) explore how incumbent companies in traditional industries build dynamic capabilities for digital transformation. They propose a process model comprising three dynamic capabilities (digital sensing, digital seizing, and digital transforming) and nine relevant micro-foundations. As shown in Figure 2.5, factors of external triggers, internal enablers and barriers are also considered.

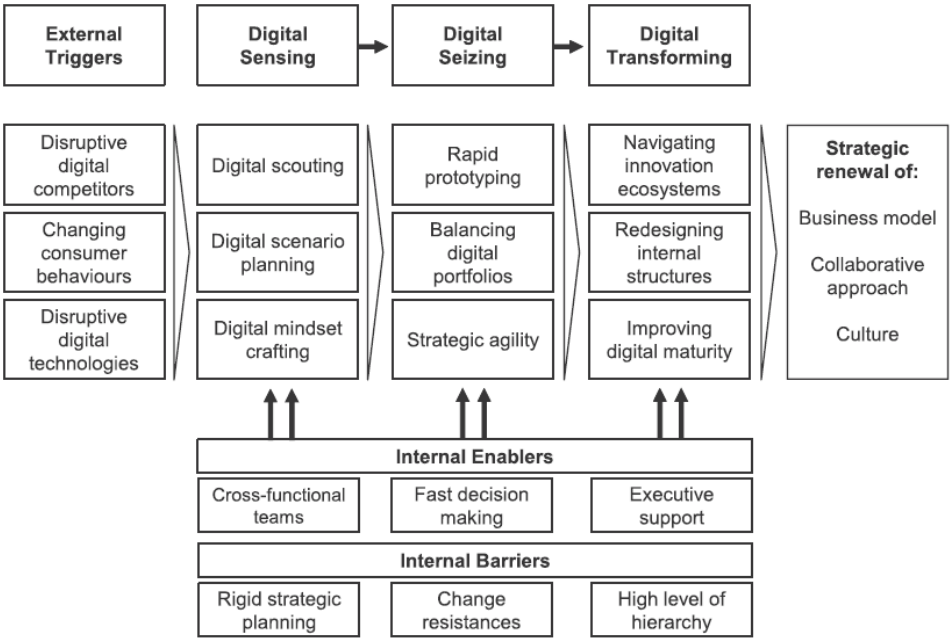

Figure 2. 5 Microfoundations of dynamic capabilities for digital transformation

Source: Warner and Wager (2019)

In the context of transition economies, Dixon, Meyer, and Day (2010) distinguish dynamic capabilities such as deployment capabilities from search and innovation capabilities based on stages of organizational transformation, and explain how these capabilities are linked to organizational learning. Later, Dixon, Meyer, and Day (2014) built an empirically-grounded synthesis of the micro-foundations of the dynamic capabilities based on Teece (2007). By conducting a descriptive case study on a Russian oil company, Yukos, in a highly volatile environment, they identified two types of dynamic capabilities - adaption and innovation - that help an organization obtain short-term and long-term competitive advantage, respectively. As shown in Annex B.5, Dixon, Meyer and Day indicate that "adaptation dynamic capabilities relate to routines of resource exploitation and deployment, which are supported by acquisition, internalization and dissemination of extant knowledge, as well as resource reconfiguration, divestment and integration. Innovation dynamic capabilities relate to the creation of completely new capabilities via exploration and path-creation processes, which are supported by search, experimentation and risk taking, as well as project selection, funding and implementation."

Other research perspectives of dynamic capabilities involve social capital, entrepreneurship, innovation and so on. In terms of social capital, Blyler and Coff (2003) argue that "social capital is essential for the acquisition, integration, and release of resources at the core of a dynamic capability". Based on this, Luo and Liu (2009) also propose that the micro-foundations of dynamic capabilities involve not only the sensing capability, absorptive

capacity, and integrating capability but also the relationship capability which includes the ability to establish and integrate social capital, to integrate social network relationships, and to promote positive interaction between related members.

In terms of entrepreneurship, Zahra et al. (2006) propose that one source of dynamic capabilities are the entrepreneurial processes which "reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by its principal decision-maker(s)". In contrast to the extant literature focusing on entrepreneurship in start-up firms, Teece (2016) regards entrepreneurial management as a core element of dynamic capabilities in large organizations. Here, entrepreneurial management is composed of transformational leadership and organizational entrepreneurship, and defined as "the ability to sense opportunities and shifts in the business environment, to coordinate the resources to exploit promising new avenues, and to develop plans to adapt the organization and its business model" (Teece, 2016). Bendig et al. (2018) integrate micro-foundations of dynamic capabilities from both the managerial and organizational levels. They argue that the individual- or managerial-level micro-foundation represented by the personality of CEOs influences the organizational-level micro-foundations represented by knowledge-based capital, which is to say human, social, and organizational capital.

In terms of innovation, Parthasarathy et al. (2011) separate dynamic capabilities into two types by innovation characteristics, and hypothesize that "material resource-based dynamic capability will positively impact product innovation, people resource-based dynamic capability (especially managerial resource-based) will positively impact process innovation". Based on the assumption that dynamic capabilities facilitate the ability to adapt to change through innovation, Rothaermel and Hess (2007) argue that the antecedents to innovation lie across the individual-, firm-, and network-levels and have compensatory or reinforcing effects on innovative output at the firm level.

(3) Dynamic capabilities and microfoundations in the context of China

Regarding the dynamic capabilities in the context of Chinese organizations, researchers mainly focus on the micro-foundations and determinants of dynamic capabilities, and their roles in obtaining competitive advantage. The research perspectives involve knowledge management, technology innovation, strategic orientations and entrepreneurial orientation in environment dynamics. Very little literature focuses on the dynamic capabilities of VET organizations in China. Case studies and regression analyses are the main methods.

In terms of organizational knowledge, Dong et al. (2004) regard dynamic capabilities as a

collection of knowledge and propose that the process of knowledge growth is the process of dynamic capability formation. They divide knowledge capabilities into three categories which include specific knowledge, integrative knowledge and deployment knowledge, disaggregate the evolution of knowledge-based dynamic capabilities as four stages involving mutation, internal selection, dissemination, and maintenance, and conduct a single case study of a listed company in Hunan Province, China. Zheng et al. (2011) define knowledge-based dynamic capabilities as "the ability to acquire, generate and combine knowledge resources to sense, explore and address environment dynamics", and disaggregate them as knowledge acquisition capabilities, knowledge generation capabilities, and knowledge combination capabilities. By using survey data from 218 Chinese manufacturing companies and structural equation modeling, they explore the impact these capabilities have on innovative performance in networked environments. Tseng and Lee (2014) argue that a firms's knowledge management capability can be applied to develop dynamic capabilities. From the responses to 232 questionnaires of small and medium-sized enterprises (hereafter SMEs) in Taiwan, they found that the knowledge management capability enhances an organization's dynamic capability, and the latter further improves organizational performance.

Technological innovation is another main field in dynamic capabilities research. To answer the question as to what types of innovation based on dynamic capabilities improve corporate competition, Jiao (2011) disaggregates dynamic capabilities as four categories, namely sensing opportunities, integrating and reconfiguring, organizational flexibility, and technological flexibility. He also classifies innovation into two types, exploitative innovation and exploratory innovation. From the responses to 162 questionnaires issued to Chinese firms, he finds that through two types of innovation, dynamic capabilities can help raise firms' short-term financial performance and long-term competitive advantage (see Annex B.6).

Following Teece (2007), Jiao, Alon, and Cui (2011) disaggregate dynamic capabilities as sensing capability, seizing capability and integrative capability, and investigate the relationships between innovation strategy, environmental dynamism and dynamic capabilities. Based on the completed questionnaires of 110 high-tech and knowledge intensive firms in the Yantz River Delta region in China, they find that an innovation strategy can build and upgrade dynamic capabilities in both stable and rapidly changing environments.

Luo et al. (2014) define dynamic capabilities as the integration and reconfiguration capabilities needed to cope with chaotic and complex environments during a period of technological paradigm change. The dynamic capabilities are disaggregated as organizational learning capabilities, knowledge management capabilities, integration, coordination and

reconfiguration capabilities, and unique implementation capabilities such as focusing on the extreme and on trial-and-error accumulation. Based on this, a theoretical framework of dynamic capabilities, technological paradigms and innovative strategic behaviors was put forward and a descriptive case study of Tencent WeChat's micro-innovation of integration and iteration was conducted.

Using multiple case studies on 14 successful Chinese innovators, Williamson (2016) defined a new dynamic capability which he called "accelerated innovation" and described it as "the capacity for dramatically faster and less costly new product development and disruptive innovation". He went on to explore how these leading companies build and leverage dynamic capabilities by pursuing a strategy of accelerated innovation. This shows that the micro-foundations of their dynamic capabilities involve not only the sensing, seizing and reconfiguring capacities proposed by Teece (2007), but also flexible organizational structures and processes. Specifically, dynamic capabilities built by Chinese leading firms include: sensing by moving rapidly through "launch-sense-improve" cycles; seizing opportunities through a "flexible assembly line" product development process; seizing opportunities by reengineering new product development through simultaneous engineering; seizing opportunities by modularizing the product development process; and transforming by combining vertical hierarchy with horizontal flexibility (Williamson, 2016).

Zheng et al. (2016) explore the relationships between technological catch-up, dynamic capabilities and innovation capabilities based on the single case study of a manufacturing firm. They found that the dynamic capabilities of sensing, seizing and reconfiguring promote innovative capability and continuously improved during the process. Jiao et al. (2017) chose Chinese State-owned SMEs on which to conduct their case study on the effect of dynamic capabilities on strategic transformation. They found that dynamic capabilities such as seizing opportunities of State-owned enterprise reform, integrating external resources, and developing innovative technology help to promote organizational transformation.

From the perspective of strategic orientation, which focuses on how firms interact with external environments, Zhou and Li (2009) examine whether three types of strategic orientations, namely customer orientation, competitor orientation, and technology orientation, build dynamic capability and its contingencies in China's emerging economy. By using survey data from 380 Chinese firms and adaptive capability as a key element of dynamic capabilities, they found that strategic orientations play important roles in building adaptive capability, but the role of different orientations is contingent on market dynamics. Li and Liu (2014) affirm that they used an adapted definition of dynamic capabilities by Barreto (2010) to fit better

with the Chinese context, and disaggregated dynamic capabilities into three dimensions, namely, strategic sense-making capacity, timely decision-making capacity, and change and implementation capacity. By using survey data from 217 enterprises in China, they found that dynamic capabilities have a positive impact on firms' competitive advantage, and that environmental dynamism is a driver rather than a moderator.

From the perspective of entrepreneurial orientation, Jiao, Wei, and Cui (2010) disaggregate dynamic capabilities as environmental sensing capabilities, change and renewal capabilities, technological and organizational flexibility capabilities, and distinguish entrepreneurial orientation as innovativeness, risk-taking and proactiveness. Using questionnaire data from the Yangtze River Delta region in China, they found that while dimensions of entrepreneurial orientation have a positive impact on dynamic capabilities, organizational learning plays a partial mediating role between the two.

There is scant literature focusing on the dynamic capabilities of Chinese VET organizations. Qin and Cao (2008) define dynamic capabilities as the ability of higher vocational schools to adapt to a complex and rapidly changing environment and enhance competitive advantages. The dynamic abilities of higher vocational schools are disaggregated as managerial capabilities, organizing and coordinating capabilities, and innovation capabilities. Among them, managerial capabilities are reflected in seizing opportunities and threats and formulating or repositioning development strategies. Organizing and coordinating capabilities are reflected in rapidly integrating resources and restructuring process to form a new routine. Innovation capabilities are reflected in an organization's continuous response to market demand changes. Three ways to build dynamic capabilities are proposed. These are: internal cultivation, inter-school joint development, and external acquisition.

Choosing private higher education institutions as a research object, He (2009) proposes that dynamic capabilities that secure competitive advantage involve building a learning mechanism, developing a competency system, effectively integrating resources, and choosing the right strategic path. Wang and Qin (2011) point out that there are five dimensions of dynamic capabilities of higher vocational schools, namely: strategic ability, organizing ability, learning ability, innovation ability, and college-enterprise cooperation ability. Han and Dong (2016) studied the dynamic capabilities of the E-commerce major of a vocational college and found that a major's dynamic capabilities are determined by the strategic capabilities of the major's leaders, the learning capabilities of professional teams, and the routines consistent with dynamic strategies. Nan and Zhang (2016) discuss how to build the dynamic capabilities of a college-enterprise cooperation network for higher vocational education institutions. The

college-enterprise cooperation network is regarded as having dynamic, open, complementary, expansive, and self-organizing characteristics. Hence to establish mechanisms of college-enterprise cooperation flexibility, it is necessary to have environmental adaptation, development by learning and co-governance. These helps build the dynamic capabilities of the college-enterprise cooperation network and achieve innovative development. Zhang and Liu (2017) conducted interviews with 15 experts from Sichuan, Guizhou, and Yunnan provinces in China, and pointed out that the dynamic capabilities of higher vocational colleges have three dimensions, namely: knowledge management, college-enterprise cooperation, and innovation, and that the development and improvement of these affects competitiveness. They also argue that the intangible assets are the guarantee and key driving factor for building the dynamic capabilities of higher vocational colleges.

The above literature review is summarized in Table 2.1. It shows that the dynamic capabilities at both the aggregate and micro-foundations level are specific in different contexts, so the dynamic capabilities in one field may not necessarily be the same in another (Luo et al., 2014). This means that research on dynamic capabilities should to be carried out based on specific context.

Combining both the existing literature and the business practice of the small private VET institution ZK, this thesis proposes a dynamic capabilities framework to conduct a descriptive case study on ZK (see Table 2.2).

Table 2.1 Review of representative studies on dynamic capabilities in the context of China

Authors (year)	Method and sample	Focus of the study	Microfoundations of dynamic capabilities
Dong et al. (2004)	Single case study; a manufacturing listed firm in Hubei province	Constructing a dynamic capability evolution model based on organizational knowledge	Specific knowledge; integrative knowledge; deployment knowledge
Zheng et al. (2011)	Regression analysis; 218 manufacturing firms in Yangtze River Delta region	Exploring the impact of dynamic capabilities on innovation performance in networked environments	Knowledge acquisition capabilities, knowledge generation capabilities, knowledge combination capabilities.
Tseng and Lee (2014)	Regression analysis; 232 SMEs in Taiwan	Exploring the relationships between knowledge management capability, dynamic capability and organizational performance	Knowledge management capability
Jiao (2011)	Regression analysis; 162 firms in Yantz River Delta region	Considering what types of innovation based on dynamic capabilities improve corporate competition	Sensing opportunities, integrating and reconfiguring, organization flexibility, technological flexibility
Jiao et al. (2011)	Regression analysis; 110 high-tech and knowledge intensive firms in Yantz River Delta region	Investigating the relationships between innovation strategy, environmental dynamism and dynamic capabilities	sensing capability, seizing capability and integrating capability
Luo et al. (2014)	Single case study; Tencent's Wechat product	Constructing a theoretical framework of dynamic capabilities, technological paradigms and innovative strategic behaviors	Organizational learning capabilities; knowledge management capabilities; integration, coordination and reconfiguration capabilities; unique implementation capabilities
Williamson (2016)	Multiple-case study; 14 leading Chinese companies	Exploring how Chinese leading companies build and leverage dynamic capabilities to pursue a strategy of accelerated innovation	Sensing, seizing and reconfiguring capacities; flexible organizational structures and processes
Zheng et al. (2016)	A single case study; a leading manufacturing firm	Exploring how dynamic capabilities play a role in technological catch-up and the accumulation of innovation capabilities of latecomers	Sensing, seizing and reconfiguring capacities
Jiao et al. (2017)	Single case study; a State-owned manufacturing SME in Shandong province	Exploring how State-owned SMEs build dynamic capabilities to promote strategic transformation	Seizing opportunities of State-owned enterprise reform; integrating external resources; developing innovative technology

Authors (year)	Method and sample	Focus of the study	Microfoundations of dynamic capabilities
Zhou and Li (2009)	Regression analysis; 380 firms in consumer product categories in six major manufacturing industries	Exploring whether strategic orientations (customer orientation, competitor orientation and technology orientation) build dynamic capability and its contingencies in China's emerging economy	Adaptive capability
Li and Liu (2014)	Regression analysis; 217 enterprises	Investigating the relationships between environmental dynamism, dynamic capabilities and competitive advantage	Strategic sense-making capacity; timely decision-making capacity; change and implementation capacity
Jiao, Wei and Cui (2010)	Regression analysis; high-tech and knowledge-intensive business firms in Yangtze River Delta region	Examining how to develop dynamic capabilities through utilization of entrepreneurial orientation and continuous organizational learning in the context of China	Environmental sensing capabilities; change and renewal capabilities; technological flexibility capabilities; organizational flexibility capabilities
Qin and Cao (2008)	Conceptual	Exploring the composition and development path of dynamic capabilities of higher vocational schools	Managerial capabilities; organizing and coordinating capabilities; innovation capabilities
He (2009)	Conceptual	Exploring the composition of dynamic capabilities of private higher vocational colleges to realize sustainable development	Building a learning mechanism; developing a competency system; effectively integrating resources; choosing the right strategic path
Wang and Qin (2011)	Conceptual	Exploring how to build dynamic capabilities of higher vocational schools to maintain consistency with market needs	Strategic ability; organizing ability; learning ability; innovation ability; college-enterprise cooperation ability
Han and Dong (2016)	Conceptual	Exploring how to build dynamic capabilities of a specific major in higher vocational colleges to maintain consistency with market needs	Strategic capabilities of major leaders; learning capabilities of professional teams; routines consistent with dynamic strategies
Nan and Zhang (2016)	Conceptual	Discussing how to build dynamic capabilities of college-enterprise cooperation network for higher vocational colleges	College-enterprise cooperation flexibility; environmental adaptation; development by learning ; co-governance
Zhang and Liu (2017)	Conceptual, interviews with 15 experts	Exploring the composition of dynamic capabilities of higher vocational colleges	Knowledge management; college-enterprise cooperation; innovation

Table 2.2 Dynamic capabilities framework for case study on ZK

Dynamic Capability	Microfoundation Name	Microfoundation Description	Reference(s)
Sensing opportunities and threats (Teece, 2007)	Entrepreneurship	The capability of entrepreneurs to figure out how to spot opportunities of technologies and markets, how to interpret new events and developments, which technologies to pursue and which market segments to target.	Zahra et al. (2006); Teece (2007); Teece (2016); Han and Dong (2016); Bendig et al. (2018)
	Social capital	The capability of individuals or organizations to secure benefits from sensing opportunities and threats by virtue of membership in social networks.	Blyler and Coff (2003); Luo and Liu (2009)
Seizing opportunities (Teece, 2007)	Designing business model based on value chain	The capability of designing value proposition in product and service, customer needs and geography, defining the value chain structure, and selecting the revenue and cost structure to meet customer needs.	Teece (2007, 2018); He (2009); Warner and Wager (2019)
	Integrating resources including complements	The capability of combining specialized and co-specialized assets to enhance value.	Teece (2007, 2018); He (2009); Jiao (2011); Wang and Qin (2011); Dixon et al. (2014); Nan and Zhang (2016); Jiao et al. (2017)
	Organization flexibility	The capability of flexibly adjusting organizational structures, incentives and routines to support a new business model	Teece (2007, 2018); Jiao, Wei and Cui (2010); Wang and Qin (2011); Williamson (2016); Han and Dong (2016); Warner and Wager (2019)
	Commitment and implementation	The capability of implementing a new business model by demonstrating leadership and effective management, building loyalty and cooperating with stakeholders.	Teece (2007); Qin and Cao (2008); Luo et al. (2014); Nan and Zhang (2016); Zhang and Liu (2017)
Managing threats and reconfiguring resources (Teece, 2007)	Organizational learning and knowledge management	The capability of integrating know-how from outside as well as within the organization and further generating new knowledge to maintain competitiveness through institutional arrangements for learning and knowledge-sharing.	Teece (2007); He (2009); Zheng et al. (2011); Wang and Qin (2011); Tseng and Lee (2014); Dixon et al. (2014); Luo et al. (2014); Han and Dong (2016); Nan and Zhang (2016); Zhang and Liu (2017)

2.2.3.3 Value Chain

The third internal analysis tool is value chain analysis. To understand the relationship between resources, capabilities, and core competencies, value chain analysis is used to examine whether a company's capabilities are a source of core competencies and competitive advantages (Costa et al., 2013). Porter (1985) first proposed value chain analysis and defined the value chain as a series of value creation activities of the enterprise. By systematically disaggregating corporate activities, companies can better design organizational structures, identify industry segments, and analyze relevant value chains in different areas (Nucciarelli et al., 2017). In business practice, all successful business models are value-based since they are based on customer expectations of perceived value; the business model then determines which part of the value chain forms the final product created by the business plan (McGuigan et al., 2011).

In Porter's value chain model, companies' value creation activities are divided into two broad categories: primary activities and support activities (Porter, 1985). The primary activities are the substantive activities of the company's production and operation, including inbound logistics, operations, outbound logistics, marketing and sales, and service. Support activities involve firm infrastructure such as accounting, legal, financial, control, public relations, quality assurance, and general strategic management, human resource management, technological development, and procurement. Since each link in the enterprise value chain requires the use and integration of different resources and capabilities, value chain analysis encourages researchers to study the resources and capabilities of firms at a more micro level to understand the sources of competitive advantage based on resources.

Porter's value chain model was originally proposed based on manufacturing. However, with the advancement of management practices, the analytical perspective of the value chain has also undergone a major transformation. As summarized by Freeman and Liedtka (1997), the changes in research focus are reflected in five areas (see Annex B.7). First, from the physical value chain to the virtual value chain, the latter involves the creation and use of information. The flow of information accompanying the flow of matter provides a new set of opportunities for competitive advantage (Rayport & Sviokla, 1995). Second, the shift from the product itself to the underlying capabilities in the input-output process extends the focus of analysis from a single department to multiple departments. Third, the transition from in-company analysis to inter-company analysis. This stems from the fact that partnerships and alliances between organizations can create new value chains and create higher value than a

single organization. Fourth, the value chain shifts from static and fixed concepts to evolving and shapable concepts. Companies are increasingly seen as part of a cross-industry business ecosystem rather than a single industry member (Moore, 1993). Finally, the perception of the value chain shifts from a linear and sequential perspective to a matrixed and a simultaneous perspective. Value is no longer created by the static capabilities of individual companies, but by a wider range of value creation activities carried out simultaneously by different companies (Freeman & Liedtka, 1997). Consistent with the evolution of the value chain research perspective, a number of related concepts have been proposed, including value networks (Li & Whalley, 2002), value grids (Pil & Holweg, 2006), and value groups (Normann & Ramirez, 1993).

In addition, in order to give full play to the role of value chain analysis, it is necessary to extend the enterprise value chain model to the entire business system and conduct research on supplier value chains, channel value chains, and buyer value chains. When companies have good business relationships with suppliers and customers, they have social capital, which is based on trust between partners. When companies cannot create value in value chain activities, outsourcing becomes an effective alternative.

In conclusion, matching what a firm can do (a function of its resources, capabilities and core competencies in the internal organization) with what it might do (a function of opportunities and threats in the external environment) is a process that yields insights that the firm requires in order to select strategies (Hitt, Ireland, & Hoskisson, 2016). SWOT analysis provides a comprehensive analytical framework by identifying four elements included in the acronym (strengths, weaknesses, opportunities, and threats). This method aims to increase strengths and reduce weaknesses while evaluating opportunities and identifying threats (Dyson, 2014). It allows firms to specify the objective of firms and identify the internal and external factors, both favorable and unfavorable, that are necessary to achieve that objective.

2.3 Review on VET development

2.3.1 Review on VET development in European Union

In the European Union (hereinafter EU), fast-changing technical developments and global competition have led to growing demand for well-qualified workforces. To meet this demand and improve the performance, quality and attractiveness of VET in Europe, the EU launched the “Copenhagen process for enhanced European cooperation in VET” in 2002 to strengthen

the connection among stakeholders and to foster common learning (Cedefop, 2015). Based on the Copenhagen Process, the European Commission acts in partnership with all relevant stakeholders to (1) improve the quality of training (initial education and continuing development), (2) improve the quality of teachers, trainers and other professionals in the sector, and (3) make courses more relevant to the labor market. The European Commission's work on VET is supported by two agencies. One is the European Centre for the Development of Vocational Training (Cedefop) which provides information and analysis of VET systems, policies, research and practice in the EU. The other is the European Training Foundation (ETF) that works to develop VET systems in the Western Balkans, neighboring countries and Central Asia.

With the support of the European Commission, there has been continuous cooperation among all relevant VET stakeholders including national governments, employers' and workers' groups in the EU and abroad. As the official website of the EU shows, in June 2009, the 'Recommendation of the European Parliament and of the Council on the Establishment of a European Quality Assurance Reference Framework for VET (EQAVET)" was adopted. The EQAVET framework comprises an action pattern for quality assurance and quality improvement in VET, based on the PDCA (plan-do-check-act/review) cycle, or Deming cycle, quality criteria and indicative descriptors, and a set of coherent quality indicators (Cedefop, 2015). EQAVET is a voluntary system to be used by public authorities and other bodies involved in quality assurance.

In 2015, Cedefop published the VET *Provider Handbook: Supporting Internal Quality Management and Quality Culture* that was intended first and foremost for VET providers rather than policy-makers (Cedefop, 2015). This handbook seeks to help VET institutions create or improve their quality management processes for the benefit of the institution itself, students and society. Based on multiple-case studies of 20 vocational training institutions with successful quality management practices, the handbook provides a series of guidance and recommendations to guide VET providers towards establishing and improving their quality management system (QMS) based on the PDCA cycle. It states that VET's effective internal quality management should: (1) involve all relevant stakeholders; (2) improve the quality of both teaching and learning; and (3) adjust the delivery process of key services. The handbook also lists an example of strategic planning by VET agencies based on internal quality management. As shown in Annex B.8, the overall objective of strategic planning is to modernize the learning processes. The sub-objectives involve strengthening self-learning and increasing the use of e-learning. Teachers and trainers should develop and provide appropriate

supplementary materials and study guidance for self-learners and online learners through a series of teaching activities.

Through promoting a series of policy measures, the EU's VET has achieved remarkable results. According to the first Cedefop opinion survey on VET in Europe, of the 24,146 respondents who received vocational education, 90% were satisfied with the general skills they acquired, 89% were satisfied with the quality of the teaching, 87% were satisfied with the work-related skills they had acquired, and 81% were satisfied with the teaching equipment (Cedefop, 2017). All these satisfaction levels were higher than those for general education.

2.3.2 Review on VET development in China

Rising unemployment is one of the most serious problems facing the world's economies and societies. With this in mind, the United Nations Educational, Scientific and Cultural Organization (UNESCO) issued the *Strategy for Technical and Vocational Education and Training (TVET) (2016-2021)* with the objectives of: (1) supporting Member States in their efforts to enhance the relevance of the TVET system; (2) cultivating in all Young people and adults the necessary skills to achieve employment, find decent for jobs, equip them for entrepreneurship and lifelong learning; and (3) ultimately promote the overall implementation of the 2030 Agenda for Sustainable Development. This strategy provides a good opportunity to accelerate the development of China's vocational education and training industry and increase the level of international cooperation.

In terms of the development of China's VET industry, the *China Vocational Education 2030 Report* points out that after years of reform and development, China's vocational education has explored a development path with Chinese characteristics (Central Institute for Vocational and Technical Education of Ministry of Education, 2016). China's VET has accumulated a wealth of experience, but it also faces bottlenecks that need to be urgently unblocked. Measures already adopted include: first, to serve the national strategy, VET has been adapting to the requirements of major national strategies such as Made in China 2025, the Belt and Road Initiatives, Innovation-driven Development, and New Urbanization Construction; second, VET has made quality improvement a priority and tried to combine students' professional ethics, professional skills and humanities; third, rigorous reforms and innovation have been adopted to actively explore various forms of talent training models, school-running models, cross-regional VET cooperation and integration of industry demand and education supply; and fourth, while strengthening top-level design, local institutions have been encouraged to take the path of differentiated and diversified development based on

actual conditions.

However, the development of China's VET is still beset by problems (Central Institute for Vocational and Technical Education of Ministry of Education, 2016). First, the VET has not received the attention it deserves, and the phenomenon of emphasizing academic qualifications and neglecting practical ability is still serious. Second, the management system needs to be improved. At the national level, the VET lacks a separate administrative department or system. It is managed by multiple functional departments including the Ministry of Education, the Ministry of Industry and Information Technology, and the Ministry of Human Resources and Social Security. Therefore, coordination and cooperation among multiple departments has become an important factor in ensuring the quality of VET and the healthy development of the industry. At the local level, insufficient input from provincial and municipal governments has restricted the development of the VET industry. Third, the incentive mechanism for enterprises to participate in VET cooperations is insufficient, which makes it difficult to effectively promote the integration of industry and education and school-enterprise cooperation. Fourth, the fundamental capability of vocational colleges is relatively weak. The curricula setting does not fit well with the industry and regional development. The teaching mode and evaluation method are not adapted to the VET requirements of skilled and technical talents. And information technology has not been fully applied in VET. As a result, the quality of personnel education and training is not adequate to meet the needs of economic, social and human development. Hence Wu and Ye (2018) point out that a modern technological and vocational education system closely related to employment, industrial restructuring and economic development should be established to make it flexible, open, unique and independent. The management form of VET should be shaped into "a style which the central government plan, the local government implement and social parties participate in". Through the cooperation of different stakeholders, it is beneficial to improve the efficiency of VET resources and realize the unity of VET development and social and economic development.

In addition, the Chinese government has cooperated extensively with international institutions to actively promote the development of the VET industry. For example, the Australian government-funded VET reform project has been piloted in Chongqing, China's municipality, and has achieved a good outcome. With the implementation of China's Belt and Road Initiatives, the VET cooperation between China and countries along the route has made progress. Take Kenya as an example, a collaborative educational program called the Kenya-China Technical and Vocational Education and Training (TVET) project has used

modern equipment to improve classrooms and developed essential skills for Kenyans through many cooperation opportunities with Chinese companies, leading to an increase in self-employment and manufacturing in Kenya and mutual understanding between the two countries (Musyimi, Malechwanzi, & Luo, 2018).

In the field of sub-sectors, scholars have carried out targeted research based on VET needs brought about by the actual development of different industries. For example, based on China's fast-growing wind power industry and its education and training needs related to wind energy, Xie et al. (2013) studied wind energy education and training in current Chinese universities and training centers, and found that education and training in wind energy is lacking overall. It lags behind the growth of the wind power industry, so while there are tremendous opportunities, there are also enormous challenges. Specifically, public universities recognized by the Ministry of Education are the mainstay of wind energy education, but there are shortcomings, such as the long years of education and lack of sufficient flexibility. The shortage of professionals has created a huge demand for on-the-job training, especially for short-term courses or on-site instructional courses, but the number of existing wind energy training institutions in China is far from sufficient. Based on the characteristics of the chemical industry and the need for safety training, Chen et al. (2021) put forward a talent training model related to chemical process safety from three aspects of the curriculum-system, teaching and evaluation. In conclusion, the close integration of VET systems with related industries is a priority area and a core principle of VET policy reform in China (Comyn, 2007).

Chapter 3: Research Design and Methods

3.1 Selection of research method: single-case study

3.1.1 Introduction to case study research

3.1.1.1 Application and classification of case study methods

Case study is one of the important methods in social science research. It helps provide understanding of comprehensive social phenomena, to uncover new concepts and ideas, and even to build theories (Eisenhardt, 1989). Compared with other methods such as experimentation, survey and historical analysis, there are three situations in which case study is more applicable. Firstly, the main research questions are about “how” and “why”. Secondly, the research object is a contemporary, real-life phenomenon or event. Thus, there is a considerably less defined line between the phenomena under study and the context, which differentiates the case study method from historical research and survey. Thirdly, researchers can’t control the research objects or only have a very low degree of control, which makes a case study different from an experiment (Yin, 2014).

There are many types of case studies. First, depending on the purpose of the research, case studies can be divided into three types: an exploratory, descriptive, and explanation or causal case study. Second, in terms of the number of units of analysis, the case study involves two categories: a single unit of analysis (holistic) case study and a multi-unit of analysis (embedded) case study. The latter has a number of logical sub-units including organization as a whole and individuals. Third, in terms of the number of cases, case studies can involve either single or multiple cases. The single-case study design is applicable to five situations, that is: cases have either critical, unusual, common, revelatory, or longitudinal characteristics. Among them, longitudinal case studies are comparative studies of a single case at two or more different time points, or at different stages of development. When these five conditions are not met, the single-case study design is just the pilot case at the beginning of the multiple-case study.

3.1.1.2 Design of case study research

As case study is an empirical research method, designing a research plan is extremely

important. The case study design uses empirical data to establish a logical relationship between the questions to be studied and the final conclusions. There are five elements of research design, i.e., research questions, theoretical assumptions (if any), unit of analysis, the logic to connect the data and assumptions, and the criteria for explaining the research results (Yin, 2014). The first three elements determine how to collect case data, and the last two elements determine how to analyze case data.

Case study design generally consists of three steps. The first step is to define research issues, put forward theoretical assumptions, and define the unit of analysis. Only by properly constructing the problem framework can the case study design and research result be interpreted. The theoretical hypothesis is a hypothesis about why behavior, events, structures, and thoughts occur (Sutton & Staw, 1995). It is important to propose theoretical assumptions based on research questions. This not only makes the research design more convincing, explains the final data more deeply, and summarizes the results of the case study through analytic generalization, but also helps avoid repeating work by guiding data collection and analysis. Defining the unit of analysis is to determine the case to be studied and to set case boundaries. A case to be studied can be a single person or an event or entity, depending on the definition of the research question. Setting the case boundaries refers to determining them with regard to space, time, or otherwise.

The second step is to collect data from multiple sources. As there are more variables of interests than data points in case studies, researchers need to collect data through multiple sources. Data sources of case studies involve archives, interviews, questionnaires, and observations (Eisenhardt, 1989). It is important to combine the data and conduct cross analysis to form a chain of evidence. Researchers should collect as much information as possible to ensure that most of the evidence is from two or more different sources.

The final step is to analyze the data based on the appropriate analysis strategies and techniques. There are four basic analysis strategies which involve analyzing the case based on theoretical assumptions, and from the bottom up, performing case descriptions, and testing rival explanations. Case analysis techniques involve model matching, explanation building, time-series analysis, use of logical models, and cross-case analysis. If the rival explanations can be considered and further verified or rejected one by one during the process of data analysis, the conclusion will be more convincing and explanatory. Data analysis tools involve computer-assisted qualitative data analysis software (CAQDAS) or general text processing tools such as Word or Excel.

Case study is an important research method to use in conducting an in-depth study and

even to help build theories. Eisenhardt (1989) proposed a whole process framework of building theories from case study research. Besides the above three steps of case studies, and in addition to the above process which involves defining research questions, selecting cases, designing protocols, entering the field and analyzing data, the other steps involve shaping hypotheses, comprehensively covering the literature and reaching conclusions.

3.1.1.3 Verification of case study design

The quality of case study design is reflected in four aspects: trustworthiness, credibility, confirmability, and data dependability. Yin (2014) proposed four standards for verifying design quality and the corresponding implementation strategies and phases. As shown in Table 3.1, constructing validity involves forming a set of correct and operable indicators for research concepts. The internal validity applies only to an explanation case study by finding causal links from phenomena. The external validity is to conclude research results according to a particular theory through analytical generalization. The reliability involves making every step of the case study repeatable. The implementation of these four inspection indicators is distributed over different stages such as research design, data collection, evidence analysis, and report writing.

Table 3.1 Inspection standards and implementation strategies of case study design quality

Inspection standards	Case study research strategy	Stages of case study to conduct strategy
Constructing validity	- Use multiple sources of evidence	Data collection
	- Form a chain of evidence	Data collection
	- Require the main providers of evidence to check and verify the case study protocol	Report writing
Internal validity	- Use model matching	Evidence analysis
	- Build explanation	Evidence analysis
	- Analyze rival explanation	Evidence analysis
	- Use logic models	Evidence analysis
External validity	- Guide single-case study by theories	Research design
	- Conduct multi-case study by replication	Research design
Reliability	- Ues case study protocol	Data collection
	- Build case study database	Data collection

Source: Yin (2014)

3.1.2 Selection of the single-case study method

The design of a case study depends on the nature of the phenomenon and questions being studied. This thesis chose to conduct a single case study on a small private VET institution, (ZK), because this case has both common and descriptive characteristics. ZK is quite

representative of small private VET institutions in China. It was transformed from an internal training center of an IT company. When it was established, ZK had a registered capital of 2.43 million RMB yuan (equivalent to 321 thousand Euros) and 30 employees. Similarly, to other small private VET institutions, ZK faced the dual dilemma of a shortage of education and training resources and little or no market reputation in its early stages of development. This thesis aims to explore how ZK evolved during its three-stage development and built the dynamic capabilities to overcome the double dilemma and gain competitive advantage. This makes the case study common and descriptive. Based on this research object, it is an explanation case study.

For the case study of ZK, the unit of analysis is embedded. This means that in addition to the case study research method, the survey method is supplemented to obtain more comprehensive data and deepen the analysis of the embedded unit of analysis. Specifically, the thesis not only explores the stages of development and related characteristics of ZK at an overall organizational level, but also interviews ZK's VET programs' graduate students, corporate customers, and government departments to register their evaluations. Furthermore, the research design of this case study is flexible and is constantly adjusting to the collection of data, thus ensuring that the research plan of this thesis is rigorous.

For the purpose of this research, it is of great relevance for the thesis to conduct a single-case study of a private small VET organization in the Chinese context. One reason is that there are large differences between China and Western developed countries in terms of the political, economic, social and technological environment and the VET industry. Obviously, the adoption of the case study research method is helpful to comprehensively depict the Chinese phenomenon and contribute to the theoretical and practical research based on the Chinese context.

At the same time, environmental dynamism is an important driving force of dynamic capabilities (Teece, 2007; Li & Liu, 2014). China is a typical transitional economy and its VET industry is undergoing rapid change, which has brought huge changes to VET institutions. During its 17 years of development, ZK, a representative small private VET institution, has actively adapted to the environmental dynamism of China's VET industry. By building dynamic capabilitie of sensing opportunities and threats, seizing opportunities, and managing threats and reconfiguring resources, ZK has become an online learning center for universities and a National Talent Training Base of MIITC. ZK's differentiated professional curricula and good reputation have resulted in continuously rising enrollment numbers, increasing income and profits, and in its successfully managing to overcome the double

dilemma of a shortage of VET resources and little or no market reputation, all of which has led to gaining a competitive advantage. Therefore, a descriptive single case study on ZK is revelatory and intense and can more deeply demonstrate environmental dynamism and ZK's evolution. It can also provide a good reference model for the development of similar VET institutions in transitional economies.

3.2 Selection of the study case

This thesis chose to conduct a single-case study on the small private VET organization, ZK. ZK was established in Chengdu City, Sichuan Province in 2003 with a registered capital of 2.43 million RMB yuan (equivalent to 321 thousand Euros) and only 30 employees. Its predecessor was the internal training center for an IT company. When it was first set up ZK, like other small private VET institutions, faced the dual dilemma of a shortage of education and training resources and little or no market reputation.

During 17 years of development, however, ZK has built up dynamic capabilitie of sensing, seizing and reconfiguring, and has finally earned excess profit. In 2019, ZK had only 18 employees, but the number of registered students in its online VET programs reached 12,688. The annual revenue and gross profit in 2019 reached 95.77 million RMB yuan (equivalent to 12.67 million Euros) and 38.96 million RMB yuan (equivalent to 5.15 million Euros), respectively. In terms of both its income and gross profit per capita, ZK is a very successful institution among small private VET institutions.

Looking at ZK's 17-year development trajectory, ZK has been transformed from an offline IT training institution competing in multiple industries, to an online VET institution mainly targeting the electric-power industry. More importantly, it has obtained two VET qualifications: one as an online learning center for universities in China and the other as a National Talent Training Base accredited by MIITC.

Table 3.2 depicts ZK's stages of development and the actions taken over time to overcome the dual dilemma of a shortage of educational resources and little or no market reputation to finally obtain competitive advantage.

Table 3.2 ZK's three stages of development

Stage	Year	Characteristics of ZK	Characteristics of market competition	Characteristics of VET progams
Stage I	2003-2009	Offline IT training institution transforming from the internal training center of QM IT Company	(1)Perfect competition; (2) Competing with numerous small private VET institutions with homogeneous programs	(1) Provide homogeneous offline training in the IT field for different enterprises in multiple industries; (2) Rely on a small number of internal teachers and a large number of external teachers; (3) Have 30 employees, mainly marketing personnel responsible for the promotion of undifferentiated VET programs.
Stage II	2010-2013	Learning center for university online degree programs	(1) Oligopoly; (2) Competing with a few online learning centers of other universities in Sichuan Province; (3) Differentiated majors and curricula of online degree programs	(1) Identify the specific VET needs from the electric-power industry; (2) Develop differentiated majors and curricula for employees of a central state-owned enterprise in the electric-power industry; (3) Become a learning center of university online degree programs to provide differentiated degree programs on online learning platform; (4) Provide channels for students to obtain university's academic degree; (5) Have 18 employees, mostly program managers responsible for providing teaching and learning services for online degree programs.
Stage III	Since 2014	Learning center for university online degree programs National Talent Training Base accredited by MIITC	(1) Oligopoly; (2) Competing with a few online learning centers of other universities in Sichuan Province; (3) Differentiated majors and curricula of online degree programs plus vocational skill certification	(1) As a learning center for university online degree programs, provide differentiated degree programs mostly targeting the electric-power industry; (2) Provide channels for students to obtain an academic degree from universities; (3) Become a National Talent Training Base accredited by MIITC and provide students with a channel to obtain professional certification through certificate programs.

Source: ZK's internal records and notes on interview with the founder in 2019.

During the first stage, ZK adapted to the changes in the external environment and strove to survive in a fiercely competitive market. The forerunner to ZK was an internal training center of an IT company that did not directly participate in market competition. Therefore, when it was first established, ZK had to adapt to the fiercely competitive external environment to survive. To this end, falling back on previous VET resources, ZK competed fiercely with other similar institutions and actively expanded its IT training business in various industries to acquire more customers. At this stage, similar to its peer competitors and as previously mentioned, ZK faced the dual dilemma of a shortage of educational resources and little or no market reputation.

During the second stage, ZK set about integrating the online educational resources of universities. This completely solved the first part of the dilemma (the shortage of educational resources) and led to a partial resolution for the second part (little or no market reputation). By sensing corporate customers' specific demand for VET and by seizing the opportunity of public-private partnerships and online education, ZK's next innovative move was to cooperate with universities and become their online learning center. ZK developed a new major and related curriculum for the employees of an electric-power company, which made it possible for students to obtain both vocational skills training and an academic education. After completing the required courses and getting enough credits, students could obtain an academic qualification that would be helpful for their career progression.

During the third stage, ZK integrated government resources to overcome their lack of market reputation. Based on the second stage of the organizational change, ZK seized the new opportunity provided by the national vocational education reform and higher demand for skills training. It innovated to cooperate with the government department, MIITC, and was accredited as a National Talent Training Base. As a result of this new innovation, the students could obtain vocational skill certificates through credit exchange.

3.3 Data collection and analysis

3.3.1 Data resources

The case study research method of this thesis strictly follows the four basic principles of data collection in order to obtain the most sufficient and effective source of evidence and ensure the reliability and validity of the case study data. The data sources involve two types: secondary data and primary data. As shown in Table 3.3, the thesis' secondary data are

derived from relevant academic literature, research reports, government policy documents, industrial statistics, and press articles. The primary data are derived from internal records, interviews and participant-observation. The detailed examples are also shown in Table 3.3.

Table 3.3 Data sources of ZK case study

Type of data resource	Data source	Example
Secondary data	Academic literature	Literature reviewed on strategic analytic tools, dynamic capabilities, and case study research methods
	research reports	VET industrial report such as VET *Provider Handbook: Supporting Internal Quality Management and Quality Culture* published by Cedefop
	Government policy documents	*Implementation Plan for National Vocational Education Reform* issued by the State Council of China
	Industrial statistics	Statistical Communiqué on National Education Development and Statistical Yearbook on China's Education issued by MOEC
	Press articles	Press releases; interviews
Primary data	Internal records	Financial reports, cooperation agreements with firms and universities.
	Interviews	Leader, managers, employees; managers from firms, universities, and government departments; Students
	Participant -observations	ZK's formal meetings, informal meetings and the field work

With regard to the detailed sources of secondary data, the reviewed academic literature focuses on case study research methods, and analysis tools for internal and external strategic environments, especially dynamic capabilities. The VET industrial research reports include the *Strategy for Technical and Vocational Education and Training (TVET) (2016-2021)* published by UNESCO (2016), VET *Provider Handbook: Supporting Internal Quality Management and Quality Culture* published by Cedefop (2015), and Chinese consulting reports. Government policy documents include *The 13th Five-Year Plan for National Education Development* (State Council of China, 2017), and the *National Vocational Education Reform Implementation Plan* (State Council of China, 2019) among others. The VET industrial data came from the National Bureau of Statistics, the Statistical Communiqué on National Education Development and the Statistical Yearbook on China's Education issued by the MOEC, and the National Talent Training Base name list issued by MIITC. Press articles about the VET market and organizations involve press releases and interviews. Industry websites such as the Modern Distance Education and Continuing Education of China (http://www.cdce.cn) were also very important data sources.

With regard to the detailed sources of primary data, there are three channels, namely internal records, interviews, and participant-observations. Internal records include: financial

reports; business archives such as management rules for online learning platform, students' learning records, and other administrative materials; cooperation agreements with electric-power companies and universities; and documented communications with relevant government departments. Regarding interview design, the internal interviewees include ZK's founder and dean, Mr. X, as well as the vice dean, the administrative director and project managers. The external interviewees are managers from electric-power companies, cooperating universities and the government department, MIITC. In the design of participant-observations, the observation scene involves ZK's formal meetings, informal meetings, and the field work such as the operational process of the online learning platform.

Table 3.4 is a detailed record of in-depth interviews. The interviewees include 8 internal interviewees from ZK and 9 external interviewees. The interview period was from 2018 to 2020. The interview duration was 1-2 hours and the average interview duration is 1.5 hours. All interviews were unstructured. The eight internal interviewees are numbered from M1 to M8. The nine external respondents are numbered from E1 to E9.

ZK's internal interviewees were chosen according to the organizational structure and job responsibilities. ZK's organizational structure is very flat since it is a small private VET organization with only 18 people. Its top managers include the dean, vice dean, and administrative director. Other staff are project managers directly responsible for different online learning programs. Based on the situation, eight respondents were selected for in-depth interviews, among them being three top managers and five VET project managers (see Table 3.4). The interview questions with the top management team include: ZK's history and development stages; opportunities and challenges, advantages and disadvantages of each development stage; core competitiveness at each stage; and the current challenges and risks. Interview questions with project managers focused on project implementation, student learning and evaluation, and communication with other partners.

Table 3.4 ZK interviewee details

Respondent	Respondent's ID	Seniority	Organization	Interview data, duration and method
Internal interviewee	M1 (Mr. X)	Dean, the founder	ZK	Jan., 10, 2018, 2 hours Jul., 15, 2018, 2 hours Jan., 19, 2019, 1.5 hours Jul., 20, 2019, 1.5 hours Oct., 19, 2019, 2 hours In-person interview
	M2	Vice dean	ZK	Jul., 15, 2018, 2.5 hours Jan., 19, 2019, 1.5 hours In-person interview

Respondent	Respondent's ID	Seniority	Organization	Interview data, duration and method
	M3	Administrative director	ZK	Jan., 20, 2019, 2 hours In-person interview
	M4	Manager for University "A" program	ZK	Jan., 20, 2019, 2 hours In-person interview
	M5	Manager for University "A" program	ZK	Jan., 26, 2019, 2 hours In-person interview
	M6	Manager for University "B" program	ZK	Jan., 26, 2019, 2 hours In-person interview
	M7	Manager for University "C" program	ZK	Jan., 27, 2019, 2 hours In-person interview
	M8	Manager for certificate program	ZK	Jan., 27, 2019, 2 hours In-person interview
External interviewee	E1	Manager of human resources department	Corporate customer	Jul., 22, 2019, 1 hours Telephone
	E2	Manager of training center	Corporate customer	Jul., 23, 2019, 1 hours Telephone
	E3	Online degree program manager	University "A"	Jun., 10, 2019, 1.5 hours Telephone
	E4	Online degree program manager	University "B"	Jun., 11, 2019, 1 hours Telephone
	E5	Online degree program manager	University "C"	Jun., 6, 2019, 1 hours Telephone
	E6	Manager	MIITC	Jul., 2, 2019, 1 hours Telephone
	E7	Student A	University "A"	Jan., 6, 2020, 1 hours Telephone
	E8	Student B	University "B"	Jan., 7, 2020, 1 hours Telephone
	E9	Student C	University "C"	Jul., 7, 2020, 1 hours Telephone

Source: Notes on the interviews.

The nine external respondents in Table 3.4 are main stakeholders and have close business ties with ZK. They include one manager from the human resources department and one manager from the corporate customer's training center, three online degree program managers from different cooperating universities, one manager from MIITC, and three students. The interview questions related to the demand for VET programs, assessment of the VET market situation, and the evaluation of the quality of ZK programs.

These multi-channel data provide a triangle of evidence for this single-case study and provide valuable evidence for objectively analyzing ZK's internal and external development environment and innovation practices.

3.3.2 Data analysis

The data collected in this thesis involves two types: quantitative data and qualitative data. The purpose of data analysis is to find answers to research questions and seek analytical evidence based on a large amount of data. For quantitative data such as VET industry data, ZK's financial reports and student archives, and students' interview data, the thesis uses Excel software for descriptive statistical analysis. Among these, the descriptive comparison of VET industry data provides evidence for the changes in ZK's external environment. The analysis of ZK's internal records and students' evaluation of different dimensions of the quality of the ZK online learning programs helps to depict its innovation practices and the evolution of its dynamic capability.

Following Dixon, Meyer, and Day (2014), this study first inductively questioned the findings from the qualitative data, and then wove those findings into the relevant theory identified in the literature review. Specifically, each research question is accompanied by a source of information related to that question, including the name of the respondent and relevant documents or observation records, to establish a link between the question and the source of the evidence. The qualitative data is described, coded, and classified into distinct units of meaning. Through step-by-step analytical induction, the different development stages of ZK are devided and the data at each stage are linked to several dimensions of microfoundations of dynamic capabilities.

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Chapter 4: Evolution and Development Stages of ZK

This chapter depicts the detailed historical development of ZK from its inception, and divides the process into three stages. It introduces the ways ZK has so far dealt with the dilemma of a shortage of educational resources and little or no market reputation, and provides background for the descriptive case study that follows.

4.1 Introduction of ZK institution

ZK is located in Chengdu, Sichuan Province, China. It was transformed from an internal training center of a private company, QM IT Company. This company was mainly engaged in software customization and sales, providing software training services to customers through its internal training center. In 2003, considering the development potential of the VET industry, the QM IT Company spun off its internal training center into a separate VET institution, ZK, by investing RMB 2.43 million (equivalent to 321 thousand Euros) as the registered capital. The former director of the internal training center served as the dean of ZK institution. ZK became a private VET institution under the management of the Education Department of Sichuan Province. To begin with, ZK mainly provided offline training services in IT related fields and was not eligible for a degree program.

Table 4.1 summarizes the development trajectory of ZK since 2003 and divides the process into three stages.

Stage I of ZK was between 2003-2009. During that period, ZK had 30 employees and provided offline training services in IT related fields on the basis of its training resources. Although the potential VET market was huge, ZK's training programs were not the only ones available and thus, like other small private VET institutions ZK was up against stiff competition. Compared with the dominant vocational colleges and universities, ZK faced the dual dilemma of shortage of education and training resources and lack of market reputation. It was very difficult for ZK to expand its training programs. As Table 4.1 shows, during the first stage of ZK, the annual number of new students was around 2000 person-years. The annual training income was between RMB 4-6 million (equivalent to 530-790 thouand Euros) and the annual gross profit was about RMB 0.8-1.8 million (equivalent to 110-240 thousand Euros).

Table 4.1 ZK's development of VET programs since establishmentablishment

Stage	Year	Characteristics of ZK	Number of new students (people)	Income (million Euros)	Gross profit (million Euros)	Field or major of VET programs
Stage I	2003-2009	Offline IT training institution	2000	0.53~0.79	0.11~0.24	IT related field
Stage II	2010	Online learning center of three universities	8547	7.74	2.26	Electrification Technology Electrical Engineering and Automation Software Engineering Agricultural Electrical Automation Technology
	2011		10593	9.55	2.79	
	2012		13198	11.82	3.78	
	2013		13380	12.52	3.86	
Stage III	2014	Online learning center for universities; National Talent Training Base accredited by MIITC	12579	11.66	4.10	Electrical Engineering and Automation Electrical Intelligence Software Engineering (cancelled since 2017) Agricultural Electrical Automation Technology
	2015		11115	10.58	3.52	
	2016		11704	11.65	4.13	
	2017		12022	11.85	4.46	
	2018		11810	11.94	4.63	
	2019		12688	12.67	5.15	

Note: (1) Here uses 7.56 as the exchange rate of Euro and RMB yuan.
(2) The data in Stage I is average annual data.
(3) The Software Engineering major was cancelled from 2017 during Stage III.

Source: ZK internal records.

Stage II of ZK was from 2010 to 2013. During this period, ZK successfully transformed from an ordinary small private VET institution into an online learning center for three universities, which meant it had solved the first part of the double dilemma, the shortage of VET resources. In accordance with the cooperation agreements, ZK was authorized to carry out online programs for the undergraduate degree courses of the partner universities, resulting in both VET resources and market reputation. More importantly, compared with other competitive universities, these cooperative online degree programs were significantly differentiated for the single majors and curricula. Aiming to meet the learning needs of the electric-power industry, ZK took the lead by setting up three majors. These were Electrification Technology, Electrical Engineering and Automation and Agricultural Electrical Automation Technology. Meanwhile, ZK's staff was reduced to only 18 to match the organizational transformation. Based on the partner universities' online learning platform for enrollment and learning management, ZK's enrollment, income and profit greatly increased. As shown in Table 4.1, the number of new students jumped to 8,547 in 2010, leading to the annual income and gross profit increasing to RMB 55.85 million (equivalent to 7.74 million Euros) and RMB 17.1 million (equivalent to 2.26 million Euros), respectively. By 2013, the number of additional students had exceeded 13,000.

Stage III of ZK is from 2014 to the present. In 2014, ZK was accredited by MIITC as a National Talent Training Base based on its VET scale of enrollment, which meant it had solved the second part of the dual dilemma as it no longer had little or no market reputation. At the same time, the official accreditation of National Talent Training Base enabled ZK's students to exchange credits between its degree programs and certificate programs. Once students completed the required credits, they could simultaneously obtain a degree certificate from university and a vocational technology certificate from MIITC. This created added value to degree programs and greatly enhanced ZK's attractiveness to partner universities and students. In addition to this, ZK was accredited as a National Talent Training Base by MIITC, which not only further enhanced ZK's credibility and market reputation, but also provided more room for its future expansion of VET services in the industrial and information technology segment.

From the perspective of profitability shown in Table 4.1, ZK's annual profit during the third stage continued to grow (except in 2015). From 2014 to 2019, the number of ZK's new students was between 11,000-13,000. In 2019, annual revenue increased to RMB 95.77 million (equivalent to 12.67 million Euros) and the gross profit was as high as RMB 38.96 million (equivalent to 5.15 million Euros). As an online learning center for three universities,

ZK's revenue came from their share of the universities' tuition fees. ZK's costs consisted of the R&D costs of online curricula, communication and coordination costs with partner universities, marketing costs involving enrollment and publicity, staff training costs and management costs. Compared with the second stage, the annual enrollment and revenue in the third stage did not change as much, but the annual profit increased significantly. This was because the R&D costs, communication and coordination costs, and marketing costs were mainly incurred in the second stage. In the third stage, these costs were greatly reduced. The management cost was also reduced due to the learning curve. As a result, the profit in the third stage increased greatly.

In short, ZK has become a very successful institution among small private VET institutions in terms of its profitability, market reputation and government recognition. Online education has strong economies of scale, and the marginal cost of online courses is almost zero. Therefore, the number of students is the most important factor in determining competitiveness. Although the profit data for other online learning centers of universities was not available, ZK's average annual number of new students was over ten thousand, ranking it top among similar institutions in China. At the same time, based on its differentiated and innovative majors and curricula of degree programs, and high-quality operational management, ZK has not only been rated as an excellent online learning center of universities by the MOEC for five consecutive years, but also lauded as an excellent National Talent Training Base by MIITC. ZK has achieved high market and government recognition. The following section will depict the three development stages of ZK in detail.

4.2 Development stages of ZK

4.2.1 Stage I: struggling in the highly competitive offline IT training market

The first development stage of ZK was in 2003-2009. During this period, ZK provided offline training for organizations (not for individuals) in IT related fields and had 30 employees. Due to its undifferentiated VET program, ZK had to cope with fierce market competition by covering as many industries and organizations as possible. In addition to this, of ZK's 30 personnel, the number of people in the marketing department and administration office accounted for two-thirds. There were so few full-time teachers that ZK's IT training program relied heavily on external teachers.

4.2.1.1 Characteristics of VET programs: lack of differentiation, wide industry coverage and geographical concentration to cope with fierce competition

When ZK was established in 2003, it quickly opened the offline IT training market by relying on the resources of its parent company, QM IT Company. However, ZK grew slowly during its first stage. This was because ZK's VET programs had the key drawbacks of lack of differentiation, wide industry coverage and geographical concentration to contend with. To increase its training business quickly, ZK sought out customer demand in multiple industries. From 2003 to 2009, ZK's customers were in the telecommunications, electric-power, railway, taxation and banking industries. The training fields involved computer networks and applications, information security, information systems and information services. ZK concentrated its training area within Sichuan province so as to avoid the high site rent and management costs of interprovincial training.

During its first stage, ZK gradually shed its dependence on its parent company, QM IT Company, and transformed from an internal training center to an independent competitor that strove to survive and develop amid fierce competition. After seven years of development, ZK had become familiar with the training market, accumulated rich experience in adult on-the-job training, and improved its management capabilities and staff quality. More importantly, ZK had cultivated the dynamic capability of sensing opportunities and threats in the VET industry that had two micro-foundations, entrepreneurship and social capital. As ZK's founder and dean, Mr. X had a strong entrepreneurial spirit and devoted himself to the development of ZK. Under his leadership, ZK took advantage of the original training resources and business foundation of its parent company and quickly opened the offline IT training market. Furthermore, since 2008, Mr. X had become a standing director of Sichuan Province Computer Federation and ZK had become a member institution of this Federation, which meant that ZK was able to establish a wide-ranging social network in the IT field. By actively organizing and participating in seminars, ZK kept abreast of corporate training needs and industry development trends, maintained close contact with other institutions, and discovered many high-quality trainers. In this process, however, ZK became fully aware of the double dilemma of its offline IT training programs. Fortunately, based on the software development project undertaken by ZK's parent company in 2009, ZK accurately sensed the huge market opportunities of online VET degree programs targeting the transformation needs of the electric-power industry.

4.2.1.2 Organizational structure and personnel arrangement: a lot of marketing and administration staff while few full-time teachers

In line with the above VET program characteristics, ZK's organizational structure and personnel arrangement are shown in Annex B.9. During the first stage, ZK had three departments, namely the marketing department, administrative office and project department. Of the 30 staff members, the marketing department had a total of 10 people. It was headed by a vice president and was responsible for the program marketing. At the same time, a lot of organization and coordination work was required for the offline training, so the logistics support staff of the administrative office was also close to one-third of the total. In contrast, being subject to cost constraints, the training program department had only 7 full-time teachers, thus the training program relied heavily on external teachers.

Overall, during the first seven years after its establishment, ZK, like other small private VET institutions faced the aforementioned dual dilemma, which resulted in its slow development. By comparison, vocational colleges and universities had outstanding advantages in VET resources. Taking 2009 as an example, as shown in Table 4.2, the average number of faculty and full-time teachers of private VET institutions was only 12 and 6 in 2009, considerably fewer than the other two institutions. This is why they are called small institutions in this thesis. In 2009, the total number of students enrolled in small private VET institutions was at its height, but the average number was just 438, only half the number of students enrolled in higher education institutions. The average enrollment in secondary vocational schools was at its lowest because they focused on secondary degree programs rather than training.

Table 4.2 Comparison of resources and training scale among VET institutions in 2009

		Number of institutions	Average number of faculty	Average number of full-time teachers	Scale of enrolment	Average enrolment
Higher Education	University	1090	1387	822	2098780	911
	Higher vocational college	1215	488	325		
Secondary vocational school		14427	84	63	3981864	276
Private VET institution		18597	12	6	8141965	438

Note: (1) The scale of enrolment refers to the total number of students enrolled in corresponding institutions in 2009. The average enrolment is the average number of total students enrolled divided by the number of institutions.

(2) The enrolment in both higher education institutions and secondary vocational schools only includes the number of students trained in non-academic education programs.
(3) MOEC reported the enroment of higher education institutions as a whole instead of the detailed data of universities and higher vocational colleges, so the detailed data is not available.
Source: MOEC (2020)

4.2.2 Stage II: transforming to a learning center for online university degree programs

The second development stage of ZK was between 2010 and 2013. During this period, ZK achieved its first breakthrough in the dual dilemma by successfully transforming from a small private VET institution into an online learning center for Universities “A”, “B” and “C”. By managing the online degree programs in four distinctive majors, ZK’s enrollment, income and profit rapidly increased.

4.2.2.1 Characteristics of the VET programs: online higher-degree programs in differentiated majors

ZK’s turnaround began with its cooperation with University “A”. ZK sensed the opportunities of VET in the electric-power industry and then seized these opportunities through cooperating in online higher-degree programs with University “A”. As early as 2019, ZK’s parent company, QM IT Company, undertook a software development and training project in the field of Six Sigma management for SCEP Company, the Sichuan subsidiary of a central State-owned enterprise with a monopoly in the electric-power industry. This helped ZK sense the electric-power industry’s specific demand for on-the-job VET. Taking this as an opportunity, ZK developed two differentiated VET majors and curricula namely “Electrification Technology” and “Electrical Engineering and Automation”, which had never before appeared in the list of degree programs in China. Under the impetus of ZK, University “A” took the lead in setting up these two new majors in its online degree programs, and chose ZK as its online learning center in Sichuan province. Under the cooperation agreements, ZK conducted the enrollment and management of the degree programs in these two majors aimed at SCEP Company, and obtained a share of the tuition income.

Differently from Stage I, ZK successfully cooperated with University “A” and became the latter’s online learning center in 2010. This meant that ZK’s VET programs changed from being ordinary offline IT training to being online higher-degree programs with very high barriers. As a result, the intensity of market competition faced by ZK reduced greatly. The cooperation programs with University “A” had two key characteristics. First, the majors and curricula were initially established in China, targeting the electric-power industry’s demand for VET, which filled the gap between teaching and learning. As such, it was significantly

differentiated from other universities' online degree program majors. Second, the source of enrollment was concentrated and stable. Based on the business associations of ZK's parent company and the customized majors of its VET programs, ZK and SCEP Company signed a strategic cooperation agreement on employee education and training. Since SCEP Company was a provincial subsidiary of a central State-owned enterprise and had a large number of employees and high demand for these customized majors, it provided ZK with a steady stream of students and quickly made ZK a great success.

As shown in Table 4.3, for ZK's cooperation with University "A" in the two majors, the annual enrollment in 2010 reached 6170, and the annual income and gross profit reached 42.7 million yuan (equivalent to 5.65 million Euros) and 12.6 million yuan (equivalent to 1.67 million Euros). By 2013, both the number of registered students, annual income and gross profit was nearly double what it was in 2010.

Table 4.3 ZK's development as an online learning center for universities in Stage II

Cooperating university	Year	Enrolment (person)	Income (million Euros)	Gross profit (million Euros)	Online degree program major
University "A"	2010	6170	5.65	1.67	(1) Electrification Technology (2) Electrical Engineering and Automation
	2011	8260	7.49	2.24	
	2012	10699	9.62	3.15	
	2013	11321	10.63	3.30	
University "B"	2010	802	0.74	0.23	Agricultural Electrical Automation Technology
	2011	769	0.71	0.21	
	2012	850	0.79	0.25	
	2013	616	0.65	0.23	
University "C"	2010	1575	1.35	0.37	Software Engineering
	2011	1564	1.35	0.34	
	2012	1649	1.42	0.37	
	2013	1443	1.24	0.33	

Source: ZK internal records.

In addition, ZK extended this cooperation model to University "B" and University "C". Combining the professional characteristics of ZK in the electric-power industry and the

discipline advantage of University “B” in agriculture, ZK developed a new major called Agricultural Electrical Automation Technology. Based on this, ZK was authorized as the online learning center for University “B” for student enrollment and learning management. Further, relying on the cooperation experience with Universities “A” and “B”, ZK also became an online learning center for University “C” in Sichuan, and carried out enrollment and learning management for the Software Engineering major, a very popular major at that time. Like the cooperation program with University “A”, the program major of University “B” was also differentiated, and the program major of University “C” was very popular. But the annual enrollment in these two universities was much smaller. As shown in Table 4.3, in terms of annual enrollment, the University “B” program was only between 600-900 and on the University “C” program it was between 1400-1700. The reason for this was the lack of specific corporate group customers to provide enrollment guarantees.

In this stage, ZK successfully seized opportunities by designing and implementing business models that matched the electric power company’s specific VET demand and supply through the university online degree programs. When integrating internal and external resources, ZK demonstrated organizational flexibility and effective management. The detailed case study is described in Chapter 6.

4.2.2.2 Organizational structure and personnel arrangement: mainly program managers

In line with the above business characteristics, ZK readjusted its organizational structure. With the support of distinctive majors, ZK, as an online learning center for universities, did not need to be promoted in the market, nor did it need the logistical support required for offline courses. Therefore, it reduced its employees from 30 to 18. At the same time, as shown in Annex B.10, ZK abolished the marketing department, streamlined the administration office, and increased the number of program office managers to 15. Under the direct management of ZK’s Dean, every employee in the program office was a program manager.

4.2.3 Stage III: further accredited as an official National Talent Training Base

The third stage of ZK began in 2014. That year, ZK was accredited as a National Talent Training Base by MIITC for its forward-looking professional majors and scale of enrollment in the University “A” program. This gave ZK the official qualification it needed to carry out a certificate program and made it possible for students to exchange credits between their degree program and certificate program. As ZK’s VET program was further differentiated by its added value for both students and their company, it brought ZK increased income and profits.

4.2.3.1 Characteristics of VET programs: integrating degree programs and certificate programs

From 2014 to the present, the cooperation between ZK and University "A" has led to even greater achievements, promoting ZK's further transformation and the second breakthrough in the dual dilemma. ZK's VET programs in the third stage have the following two key characteristics. First, the differentiation of program majors is more prominent. To adapt to changes in the electric-power industry's demand for VET and the competitive environment in VET industry, ZK updated the majors of its online degree programs. It cancelled the old Electrification Technology major and once again took the lead by setting up a new one called Electrical Intelligence. This adjustment was well received by University "A", the client company, SCEP Company, and students.

Second, ZK's VET programs integrate online higher education degrees with certified training, increasing the value added greatly. Based on the majors and scale of enrollment of the University "A" program, ZK obtained an official qualification as a National Talent Training Base, accredited by MIITC. Thus, through the exchange of credits, the students could obtain academic certificates plus vocational skill certificates such as "Electrical Automation Engineer" or "Electrical Intelligence Engineer" after meeting the necessary requirements. Furthermore, ZK's efficient operational management was held in high regard by the government. From 2015 to 2016, ZK was rated as an excellent National Talent Training Base by MIITC for two consecutive years (out of a total of 12 nationwide), and the curriculum of the Electrical Intelligence major was also rated excellent (out of a total of 10 nationwide). Both the manager of the certificate program and Mr. X, the dean of ZK, were rated by MIITC as excellent managers in 2015 (out of a total of 39 nationwide) and in 2016 (out of a total of 54 nationwide). As shown in Table 4.4, enrollment in the University "A" program reached 12,361 in 2019. Profits grew more rapidly than the income because of the diminishing marginal cost of online VET.

Table 4.4 ZK's development as an online learning center of universities in Stage IIII

Cooperating university	Year	Number of added students (people)	Income (million Euros)	Gross profit (million Euros)	Major of online degree program
University "A"	2014	10853	10.04	3.62	(1) Electrical Engineering and Automation (2) Electrical Intelligence
	2015	9768	9.30	3.16	
	2016	10978	10.90	3.92	

Cooperating university	Year	Number of added students (people)	Income (million Euros)	Gross profit (million Euros)	Major of online degree program
	2017	11572	11.33	4.28	
	2018	11369	11.43	4.46	
	2019	12361	12.26	5.03	
University "B"	2014	689	0.73	0.27	Agricultural Electrical Automation Technology
	2015	601	0.63	0.21	
	2016	430	0.50	0.16	
	2017	450	0.52	0.18	
	2018	441	0.51	0.17	
	2019	327	0.41	0.13	
University "C"	2014	1037	0.89	0.21	Software Engineering
	2015	746	0.64	0.15	
	2016	296	0.25	0.05	

Source: ZK internal records.

In sharp contrast to this are the cooperation programs with the other two universities. Because University "B" refused to update its major to adapt to market changes, the economic indicators declined year on year. The annual enrollment decreased from 689 in 2014 to 327 in 2019 (see Table 4.4). The program situation at University "C" was even worse. The Software Engineering major was popular in 2010, but later on it started being dropped because of mismatch between the curriculum and practical needs. This, together with increased competition from other universities, led ZK to cancel the program in 2017. In a comparison of the cooperation programs at these three universities, it can be seen that the two key factors for ZK's success are that (i) its differentiated majors and curricula of the VET programs, meet market needs, and (ii) it has high-quality corporate customer resources.

In the third stage, ZK improved its business model by successfully integrating relevant government resources. The acquisition of official qualifications led to ZK increasing its competitive advantage in VET programs and to expanding its future development potential. When integrating and reconfiguring internal and external resources, ZK also demonstrated technical flexibility and organizational flexibility, and reduced average costs through efficient

operational management. A detailed case study is described in Chapter 6.

4.2.3.2 Organizational structure and personnel arrangement: mainly program managers

In line with the characteristics of the above programs, ZK retained the organizational structure of the second stage and only partially adjusted the personnel structure. As shown in Annex B.11, the program office, led directly by the dean, remained unchanged. However, besides the degree program group, a new program group called the "certificate program" was set up to meet the operational requirement of the National Talent Training Base accredited by MIITC.

Chapter 5: The Evolution of ZK's External Environment

By using analysis tools such as PEST analysis and the five-force model, and macro-level, industry-level data and interview data, this chapter analyzes ZK's external environment from an evolutionary perspective. The contents include (1) how the external scenario has evolved since the start of ZK; (2) what the current external strategic context and competitive scenario is; and (3) the expected changes to the external scenario that will likely affect the future development of ZK.

5.1 Evolution of the general environment in the development of ZK

PEST analysis is a strategic tool for overall environmental analysis and focuses on the political, economic, social, and technological segments outside organizations (Hitt, Ireland, & Hoskisson, 2016). Using the PEST analysis method, this section analyzes the overall environmental evolution during ZK's development.

5.1.1 Evolution of the political environment

The political environment affecting the development of ZK mainly involves laws and regulations related to VET. China's education industry has been highly dependent on government policies. Since the VET industry has largely been ignored compared to general education, the evolution of VET policies is one of the most important external environments affecting the development of ZK.

The *Vocational Education Law of China* was promulgated and implemented in 1996. It is a basic law setting out guidelines for vocational education and training activities in China. On this basis, to implement both the strategy for rejuvenating China through science and education and the Strategy of Strengthening China through Talents, the Chinese government issued a series of policies to promote the development of the VET industry. This led to an important political environment that affected the development of ZK, providing the institution with huge opportunities. Taking the development trajectory of ZK as the main focus, Table 5.1 summarizes the evolution of the key VET policies and their impact on ZK.

Since the reform and opening up of China, its VET industry has greatly developed.

Nevertheless, this industry has always been beset by many problems. These include its management system and teaching quality failing to meet the needs of economic and social development, and the lack of sufficient attention the sector receives compared to the attention general education gets. In 2002, in order to implement the strategy of rejuvenating China through science and education in 2002, the State Council of China issued a policy called the *Decision on Vigorously Promoting the Reform and Development of Vocational Education.* This was done in an attempt to reform the old vocational education system in which the government was dominant, and to encourage enterprises and social institutions to play an active role in the development of the VET industry (State Council of China, 2002). This policy set a quantitative target for vocational training development for the tenth Five-Year Plan period. It stated that in each year during 2001-2005, 50 million urban employees and 150 million rural laborers should be trained. To this end, the policy also put the emphasis on capital input. It not only required governments at all levels to increase financial investment in VET, but also required enterprises to set up a special fund for education and training. Following the regulation of the *Vocational Education Law of China*, the ratio of this special fund should reach 1.5% of the total wages in general companies, and reach 2.5% in companies with high technical and training requirements for employees and good profitability. This policy vigorously promoted vocational education reform and development by setting up a clear goal for the scale of training and requiring sufficient fund input. It also created a huge demand for the development of the VET industry. ZK sensed the opportunity the implementation of this policy would bring. In 2003, ZK transitioned from the internal training center of its parent company to an independent small private VET institution.

In 2005, during ZK's first stage (2003-2009), another important policy, *Decision on Vigorously Developing Vocational Education*, was issued by the State Council of China. This not only highlighted vocational education once again by regarding it as an important part of the lifelong education system, but also extended the quantity goal of vocational training by ensuring the training of hundreds of millions of urban and rural workers each year, from 2005 to 2009 (State Council of China, 2005). Incentivized by this government subsidized fund, market demand for VET especially from enterprises, greatly increased. As a result, although the competition was fierce, ZK still survived and continued to strive to find a way to get round the dual difficulties mentioned earlier.

The policy that induced ZK to enter Stage II was the *Outline of National Medium and Long-term Plan on Education Reform and Development (2010-2020)* issued by MOEC in 2010. This created a favorable political environment thus enabling ZK to get round the dual

dilemma for the first time. This policy not only greatly increased the goal of VET enrollment from 166 million in 2009 to 350 million in 2020, but also emphasized the market demand-oriented professional settings and the form of online education (MOEC, 2010). This provided the ideal opportunity for ZK to set up, in 2010, differentiated majors targeting the VET needs of the electric-power industry and become an online learning center for universities.

The policy that induced ZK to enter Stage III was the *Decision on Accelerating the Development of Modern Vocational Education* issued by the State Council in 2014. This policy emphasized improving the quality of vocational education by establishing connections between majors and the needs of industry, and between curricula and professional standards. It also initiated the dual certificate system, namely the academic certificate plus vocational skill certificate system, to encourage students to acquire more skills while obtaining a diploma (State Council of China, 2014). This gave ZK a great opportunity to be accredited by MIITC as a National Talent Training Base in 2014 and to get round the dual dilemma for the second time. At the same time, the policy also proposed tax incentives for enterprises to invest in VET, which greatly stimulated their demand for VET.

Currently, two main policies affecting the development of ZK are the *Opinions on the Implementation of Lifelong Vocational Skills Training System* and the *Implementation Plan of National Vocational Education Reform* issued by the State Council in 2018 and 2019 respectively. The 2018 policy emphasized the trend of VET towards lifelong, inclusive, Internet-based learning, targeting industry and corporate needs, and the importance of increasing financial subsidies (State Council of China, 2018). This shows that ZK's current business model, providing both online academic education and vocational training while dynamically adjusting majors to adapt to industry's needs, has conformed to the trends of the VET industry and made the most of a favorable political environment. It is particularly noteworthy that, in addition to continuing the main points of previous policies such as the market-oriented reform of vocational education, the 2019 policy emphasized for the first time the fundamental role of establishing standards and a quality evaluation system to improve the quality of vocational education (State Council of China, 2019). This shows that the VET industry is gradually entering a stage of standardized development. Thus, those institutions establishing industry standards and ensuring high quality will have a competitive advantage. This trend will provide further opportunities and challenges for ZK.

5.1.2 Evolution of the economic environment

The evolution of the economic environment that affects ZK's development involves three main aspects: the continuing rapid growth of the Chinese economy, transformation of the growth pattern, and change in the industrial structure. This evolution has led to increased requirements for labor quality and new knowledge structure, and affected the development of the VET industry and ZK.

Since the reform and opening up in 1978, China has experienced continuing and rapid economic growth, and has now become the second largest economy in the world. As shown in Annex B.12, China's annual GDP growth rate remained at between 6-14% from 2000 to 2019. In 2019, China's GDP reached RMB 99 trillion (equivalent to 13 trillion Euros) and GDP per capita reached RMB 70,000 (equivalent to 9,000 Euros) (National Bureau of Statistics of China, 2020a). Strong economic growth has provided a huge market for the development of the VET industry.

The rapid economic growth in China has benefited from the massive input of various production factors, especially natural resources and physical capital. However, the aggravation of resource consumption and environmental pollution made it difficult to sustain the investment-driven growth mode. The Chinese government proposed, therefore, to transform the old growth mode to a new one more reliant on technology and human capital input. This has increased demand for a high-quality labor force. However, as shown in Annex B.13, according to the *Tabulation on the 2010 Population Census of China*, the percentage of either the labor force or the employed population with only secondary education and below was almost as high as 90% in 2010 (National Bureau of Statistics of China, 2012). The educational attainment of the labor force was so low that it created a bottleneck in China's economic transformation. For this reason, the MOEC issued the *Outline of National Medium and Long-term Plan on Education Reform and Development (2010-2020)* in 2010 to put forward the goal that the average number of years of education of the labor force should increase from 9.5 years in 2009 to 11.2 years in 2020 and the proportion of the population with higher education should reach 20%.

The industry sectors most closely related to ZK's VET were manufacturing and electricity production and supply. As shown in Table 5.1, among the employees in manufacturing, the ratio of the population with an educational attainment of high school or below was as high as 90.2% in 2010. This posed a huge challenge with regard to improving labor productivity in manufacturing. For this reason, the State Council came up with a plan in 2015, as shown in

Made in China 2025, to ensure that the average annual growth rate of labor productivity in manufacturing should reach about 7.5% and 6.5% during the 13th Five-Year Plan period (2016-2020) and the 14th Five-Year Plan period (2021-2025) respectively (State Council of China, 2015). This quantitative goal created broad market demand for the development of the VET industry.

By comparison, employees in the electric-power production and supply sector had relatively high levels of education. As shown above in Table 5.1, the proportion of employees with an educational attainment of high school or below in that sector was 63.3%, much lower than that in manufacturing. The reason for this is that most companies in this industry sector are state-owned. Nevertheless, driven by the rapid updating of knowledge and skills in this sector, the employees were still highly motivated to improve skills and education qualifications, which created high market demand for ZK's online learning services in the second and third stages.

Another important economic environment was brought about by the changes in the industrial and employment structures in the process of economic growth. As shown in Annex B.14, from 2000 to 2019, the contribution rate of China's secondary industry to GDP growth declined year on year, from 45.5% in 2000 to 39% in 2019. In contrast, the contribution rate of the tertiary industry increased year on year, from 39.8% in 2000 to 53.9% in 2019. Changes in industrial structure have brought about adjustments in employment structure. With the transfer of surplus rural labor from the primary industry, the share of employees in the secondary and tertiary industries has increased. Although the share of employees in the secondary industry only increased by nearly 5 percentage points between 2000 and 2018, much smaller than that of the tertiary industry, in absolute terms, the number of employees in the secondary industry increased from 162.19 million in 2000 to 213.9 million in 2018. In general, there is an urgent need for both newly-added and existing employees to update their knowledge and skills as a result of the adjustments in both the industrial and employment structures.

It can be seen from the above economic data that China's economic development has brought about increased demand for high-quality vocational skilled labors, which has stimulated huge growth potential in the VET industry. However, only targeted VET programs that can meet market demand could truly promote the smooth transformation of China's economy, which also places high demands on VET institutions.

5.1.3 Evolution of the social environment

The social environment that affects the development of ZK mainly includes factors such as the age structure and geographical distribution of Chinese population. The evolution of the social environment is reflected in the changes in these factors.

From the perspective of changes in the age structure of the population, China's entry into becoming an aging society is accelerating. As shown in Annex B.15, the proportion of the population aged 65 and over rose from 7% in 2000 to 12.6% in 2019. In 2019, the figure for this group has reached approximately 176 million. Acceleration of the aging population means that future economic growth will face the challenge of a labor shortage, which will have a negative impact on the potential growth of the economy. In this regard, encouraging technological innovation and improving labor productivity are important measures to implement in order to effectively deal with this shock. This places high demands on expanding the scale of VET and improving its quality.

From the perspective of changes in geographical distribution of the population, China is in the process of accelerating urbanization. As shown in Annex B.16, China's urbanization rate has increased from 36.2% in 2000 to 60.6% in 2019. The educational attainment of most migrant workers is generally low. According to the *2019 Migrant Workers Monitoring and Survey Report*, in terms of the educational attainment of migrant workers, 72.3% were educated to junior high school level or below, 16.6% to high school level, and only 11.1% were college or university graduates (National Bureau of Statistics of China, 2020b). In order to meet the skills required in urban employment, the demand for VET in this group is high.

5.1.4 Evolution of technological environment

The technological environment that affects the development of ZK mainly involves technological factors that change learning needs and ways. First of all, the increase in input and output of technological innovation has increased the speed of technological progress and brought about a huge demand for the knowledge and skills of the labor force to be updated. Taking industry as an example, as shown in Annex B.17 in terms of technological innovation input indicators, both the proportion of industrial enterprises above designated size who carried out R&D activities and their capital input increased year on year. The proportion of enterprises that have R&D activities increased from 11.5% in 2011 to 28% in 2018, and the ratio of R&D expenditure to sales revenue increased from 0.7% in 2011 to 1.3% in 2018. With regard to the technological innovation output indicators, the number of patent

applications of industrial enterprises above designated size has increased nearly 2.5 times in the past 8 years, reaching 957,000 in 2018. The acceleration of technological progress has not only brought about the rapid adjustment of new and old jobs, but also a rapid increase in technical requirements for various jobs, which has brought about higher demand for VET to update labor knowledge and skills.

Secondly, the development of information and communication technology (ICT) infrastructure has created conditions for the transformation in ways of learning, making it possible to learn in an online, digital, personalized and lifelong way. As shown in Annex B.18, the availability of telecommunications services and level of Internet development has increased substantially since 2000. The number of mobile phones owned by every 100 people increased from 6.7 in 2000 to 114.4 in 2019, which made it possible for mobile phones to be used in online learning. At the same time, the number of Internet users increased from 22.5 million in 2000 to nearly 830 million in 2018, and the popularization rate of the Internet increased from 4.6% in 2002 to 59.6% in 2018. In order to promote the integration of industrialization and informatization, the State Council emphasized in its *Made in China 2025* strategy that the national popularization rate of Internet use should increase to 82% by 2025.

In line with the development of the ICT infrastructure, the scale of online education users in China has increased year on year. According to the 45th Statistical Report on Internet Development in China, the number of online education users increased from 110 million at the end of 2015 to 200 million at the end of 2018 (China Internet Network Information Center, 2020). Indeed, online education has achieved explosive growth as a result of the Coronavirus - Covid 2019 pandemic. As of March 2020, the number of online education users in China reached 423 million, which amounts to an increase of 110.2% from the end of 2018, accounting for 46.8% of the total Internet users. Among them, the number of mobile online education users reached 420 million.

5.2 Evolution of the VET industry's environment in the development of ZK

An industry is a group of firms producing products that are close substitutes (Hitt, Ireland, & Hoskisson, 2016). The five-forces model is a conceptual framework used to analyze the industrial environment from five competitive forces (Porter, 1980). The five forces are: the intensity of rivalry, the threat of substitutes, the threat from potential entrants, buyers' power, and suppliers' power. By using this framework, this section analyzes the evolution of the VET industry's environment during ZK's three development stages.

5.2.1 Evolution of the intensity of rivalry among competitors

The main factors that affect the intensity of rivalry among competitors are: the number of competitors, the degree of differentiation of products or services, and the growth rate of the industry. During its development process, ZK has transformed from being an ordinary small private VET institution providing IT training, to being an online learning center for several universities providing degree programs, and a National Talent Training Base accredited by MIITC. This evolution, together with the degree of differentiation in ZK's VET programs, has greatly impacted the effect of ZK's competitors; the intensity of rivalry has been steadily weakened, improving the industrial environment for ZK and, therefore, its chances of gaining a competitive advantage. Table 5.1 summarizes the intensity of rivalry faced by ZK and its determinants at each stage.

Table 5.1 The intensity of rivalry among ZK's competitors in three development stages

Stage	Characteristics of ZK	ZK's competitors	Industry growth rate	Differentiation of VET programs	The intensity of rivalry
Stage I (2003-2009)	Small private offline VET institution providing IT training	Vocational colleges, universities and other small private VET institutions that carry out VET programs in Sichuan	Fast	Low	Strong
Stage II (2010-2013)	Online learning center for universities	Universities that carry out online degree programs in similar majors in Sichuan	Fast	High	Weak
Stage III (since 2014)	Online learning center for universities, National Talent Training Base accredited by MIITC	Universities that carry out online degree programs in similar majors in Sichuan, National Talent Training Base accredited by MIITC	Fast	High	Weak

Source: Notes on the interviews.

To begin with, during Stage I (2003-2009), ZK was an ordinary, small private VET institution providing offline IT training for employees, facing competition from vocational colleges, universities and other small private VET institutions in Sichuan Province. Although the IT training industry grew fast (see Table 5.1), the low differentiation of ZK's training programs and increasing competition resulted in a strong intensity of rivalry for ZK. Annex B.19 shows the composition of ZK's competitors and their numbers in this stage. Among

them, the higher education institutions having academic education qualifications increased from 62 in 2003 to 92 in 2009, intensifying competition in the vocational training market. The number of secondary vocational schools between 2007 and 2009 remained at 550-590. Given such fierce market competition, the number of small private VET institutions fluctuated greatly. In 2007, from being as high as 637, it decreased to 300-400 in 2008-2009.

Then, during Stage II (2010-2013), ZK successfully transitioned from an offline IT training institution to an online learning center for three universities, Universities “A”, “B” and “C”. ZK was authorized to carry out online degree programs on behalf of these universities in Sichuan Province and engaged in advertising enrollment for teaching and learning management in specific majors. These programs were mainly to meet the part-time learning needs of employees. Due to the fast growth rate of this VET industry segment, the high differentiation of ZK’s VET programs and the small number of competitors, the intensity of rivalry for ZK was weak.

China has more than 2,000 higher education institutions, but only 70 of these universities have pilot qualifications for online higher-degree programs. Therefore, the intensity of rivalry faced by ZK was greatly reduced. Instead of competing with all universities, vocational colleges and other small private institutions that provided VET services in Sichuan, as it had done in the first stage, ZK’s competitors in the second stage were only pilot universities that carried out online degree programs in similar majors within Sichuan Province. Table 5.2 presents the specific majors of ZK’s VET programs in partnership with three universities, and the situation regarding their competition. From the perspective of the University “A” programs, two of the majors - Electrification Technology and Electrical Engineering and Automation - were designed based on the development needs of the electric-power industry, which meant they were highly differentiated from other online degree program majors. The same became true of the University “B” program, with the development of a new major, namely Agricultural Electrical Automation Technology, to meet the VET demand of both the electric-power industry and agriculture. Thus, by taking the initiative and setting up the above mentioned three majors, ZK faced no competitors in 2010. This, in turn, resulted in the rapid growth of ZK’s enrollment. Although a few universities copied ZK and successively set up similar majors, ZK as the pioneer had achieved first-mover advantage and good market reputation, resulting in weak intensity of rivalry.

Table 5.2 The differentiation of programs of ZK and its competitors in Stage II

Cooperation university	Major of programs	Differentiation of programs	Number of competitors
University "A"	Electrification Technology, Electrical Engineering and Automation	High	From zero to a few
University "B"	Agricultural Electrical Automation Technology,	High	From zero to a few
University "C"	Software Engineering	Moderate	A few

Note: Since ZK's business area was limited to Sichuan province, competing universities refers to pilot universities that carried out online degree programs in similar majors in Sichuan. Due to the lack of public data, the accurate number of competitors was not available. The interviewee, the dean of ZK, could only provide rough estimates.

Source: Notes on the interviews.

In contrast, from the perspective of the University "C" program shown in Table 5.2, ZK faced a few competitors since the Software Engineering major was new and popular nationwide during the second stage. However, although this program was not unique, the high market demand brought weak intensity of rivalry to ZK. As a result, ZK's annual enrollment reached more than one thousand.

In comparison, although there were a few competitors for all majors in the latter stage, ZK won first-mover advantage in those set up first by ZK. Hence, compared with its competitors, the differentiation level of the programs of Universities "A" and "B" was considered high. However, the University "C" program major is a popular new major nationwide, so it is regarded as having a moderate differentiation.

Finally, ZK have been in Stage III since 2014. Besides qualifying as an online university learning center, ZK acquired an additional official qualification as the National Talent Training Base accredited by MIITC in the field of industry and information technology in 2014. This made it possible for students on the University "A" program to obtain both academic certificates and vocational skill certificates at the same time. This greatly increased the differentiation of ZK's programs and, consequently, market demand, which led to weaker intensity of rivalry.

During Stage III, ZK's competitors were institutions with two qualifications. It can be seen from Table 5.3 that the majors of ZK's VET programs and its competitive situation have undergone great changes since 2014. With regard to the University "A" programs, ZK cancelled the Electrification Technology major to adapt to the electric-power industry's development needs and, by doing so, took the lead again with its new Electrical Intelligence major set up in 2014. For the old Electrical Engineering and Automation major, the increasing demand of students for this major had brought in an influx of new entrants, increasing the

number of competitors from just a few to around a dozen. However, with ZK's new qualification as a National Talent Training Base, its program's significant dual-certification characteristic highly differentiated it from competitors. More importantly, for the new Electrical Intelligence major, there were no competitors from among either universities or National Talent Training Base centers. ZK therefore regards it as its main focus for future development.

Table 5.3 The differentiation of programs of ZK and its competitors in Stage III

Cooperation university	Major of programs	Differentiation of programs	Number of competing universities	Number of National Talent Training Base
A	Electrical Engineering and Automation	High	A dozen	None
	Electrical Intelligence	Very high	None	None
B	Agricultural Electrical Automation Technology	High	A few	-
C	Software Engineering	Moderate	A few	-

Note: ZK's training courses as a National Talent Training Base accredited by MIITC were only consistent with the curricula of the University "A" program. Hence for Universities "B" and "C" programs, the competitors faced by ZK just included related universities.

Source: Notes on the interviews.

In terms of Universities "B" and "C" programs, since the differentiation is high, the competitors faced by ZK are few. On average, the intensity of rivalry faced by ZK is not strong since the programs of University "A" account for an absolute proportion. As shown in Table 4.4, the proportion of enrollment scale and income of University "A" programs account for more than 70% during the third stage, and more than 90% after 2016.

5.2.2 Evolution of the threat of substitutes

Unlike the homogeneous competing products or services, the substitutes meet the approximate needs of consumers in different ways (Barney and Hesterly, 2015). The threat of substitutes is mainly related to factors such as product differentiation, brand loyalty and network effects. For VET programs, the threat of substitutes mainly depends on the degree of differentiation and brand effect.

As shown in Table 5.4, ZK provided offline IT training for employees in Stage I. The substitute for this VET program was online IT training. While on the one hand, online training broke through the space and time constraints of offline learning, and had low switching costs for students, ZK's IT training on the other hand, lacked differentiation and brand effect.

Therefore, as a newly established small private VET institution, ZK faced a high threat from substitutes.

Table 5. 4 The threat of substitutes faced by ZK in three stages of development

Stage	Characteristics of ZK's VET programs	ZK's competitors	Switching costs of customers	Brand effect	Threat of substitutes
Stage I (2003-2009)	Offline IT training	Online IT training	Low	Low	High
Stage II (2010-2013)	Online degree programs that provide academic certificates	Offline degree programs	High	High	Low
Stage III (since 2014)	Integration of online degree program and certificate program that provide both academic certificates and vocational skill certificates	Offline degree programs	Very high	Very high	Low

Source: Notes on the interviews.

ZK's VET programs changed from offline to online during Stage II and Stage III. As shown in Table 5.4, after transitioning to become a university online learning center, ZK launched online degree programs in specific majors. Thus, the substitute became offline degree programs in these majors. Since the university online degree programs were mainly for part-time adult students, and the offline degree programs were for full-time students from senior secondary schools, the threat of substitutes was low. Furthermore, ZK's programs not only met the needs of employees in the electric-power industry in terms of the new majors that were set up, but they also had the dual-certificate characteristic, namely an academic certification plus a vocational qualification certificate for learning results in the third stage. The programs' differentiation and accumulated market reputation increased the customer's switching costs, and further weakened the threat from substitutes faced by ZK.

5.2.3 Evolution of the threat of potential entrants

Potential entrants can threaten the market share of existing competitors in the industry, causing the latter to decline in revenue and profits. The threat of potential entrants depends on the entry barrier. The higher the entry barrier, the lower the entry threat (Barney and Hesterly, 2015). The factors that determine the barriers to entry in the VET industry include government policies, product differentiation, cost advantages related to economies of scale and learning curve.

As shown in Table 5.5, ZK provided offline IT training for employees in Stage I. This kind of training program is not regulated by the government and its differentiation is low. In addition, offline training is limited by space, time and the availability of competent teachers

and has no economies of scale. In conclusion, in terms of ZK's programs in the first stage, the barriers of entry and exit were low and the threat of entrants was high.

Table 5.5 The threat of potential entrants faced by ZK in three stages of development

Stage	Characteristics of ZK's VET programs	Government barriers	Program Differentiation	Cost advantage	Threat of potential entrants
Stage I (2003-2009)	Offline IT training	No	Low	No	High
Stage II (2010-2013)	Online degree programs that provide academic certificates	Yes	High	Yes	Low
Stage III (since 2014)	Integration of online degree program and certificate program that provide both academic certificates and vocational skill certificates	Yes	High	Yes	Low

Note: Cost advantages include those related to economies of scale and learning curve.

Source: Notes on the interviews.

During Stages II and III, ZK's programs changed greatly based on it being awarded two important qualifications to conduct online degree programs as an online learning center for universities and certificate programs as a National Talent Training Base accredited by MIITC. Both types of programs were characterized by high government barriers, high differentiation and cost advantages due to economies of scale and learning curve, hence the threat ZK faced from potential entrants was greatly reduced.

Firstly, from the perspective of government barriers, according to the MOEC, the number of higher education institutions increased from 2,358 in 2010 to 2,688 in 2019, but the number of pilot universities qualified to run online higher-degree programs remained steady at 70. Meanwhile, according to the MIITC, there were fewer than 100 National Talent Training Bases accredited by MIITC nationwide, and less than 5 in Sichuan Province. These data show that the government strictly regulates both types of programs, making it hard for potential entrants to gain a foothold.

Secondly, from the perspective of program differentiation, compared with the other 69 pilot universities with online education qualifications, most of ZK's major programs were highly differentiated (see Table 5.2 and Table 5.3). However, by successfully setting up majors similar to those initiated by ZK, all those universities became potential entrants. Nevertheless, ZK has maintained the differentiated characteristics of its programs through timely updating of its majors and by increasing the added value of learning results from additional vocational qualification certificates.

Finally, from the perspective of cost advantages, ZK's online learning programs had

obvious economies of scale and cost advantages. On the one hand, once the online learning platform and curricula of majors have been developed, the marginal cost of online courses is almost zero, resulting in a decrease in the average cost, along with the expansion of student scale. On the other hand, online learning programs have cost advantages brought about by the learning curve. With the expansion of the scale of students, managers can improve their efficiency by accumulating more experience of online program management and reducing communication costs with other stakeholders such as universities, customer companies and students.

5.2.4 Evolution of the buyers' bargaining power

Buyers always want to buy products or services at the lowest possible price. The bargaining power of buyers is determined by factors such as product differentiation and the concentration ratio of buyers. During ZK's development, its buyers' bargaining power has changed from high to low as a result of the adjustments made to the VET programs.

In Stage I, ZK provided offline IT training to enterprises in various industries, and those training programs were undifferentiated. Therefore, while there was a large number of companies that needed training, that is to say – buyers, there were also many small private VET institutions providing the standardized IT training. So, in their race for a share of the market, these companies competed by lowering their prices thus giving the buyers strong bargaining power.

In Stage II and III, ZK transitioned into an online learning center for three public universities "A", "B" and "C" and launched online degree programs in related majors. Among them, the programs of University "A" had unique majors that were set up to meet the needs of the electric-power industry, which meant those students came mainly from the SCEP Company. As a state-owned company in the electric-power industry, SCEP Company set up a special fund for its employees to attend continuing education and vocational skill training. So for the programs of University "A", the concentration ratio of buyers was very high. In contrast, the programs of Universities "B" and "C" had no corporate customers and their students were varied. In general, despite these online degree programs having different concentration ratios of buyers, they were under the management of public universities and their tuition fees were regulated by the MOEC. So those buyers, whether they were corporate customers or individuals, had no bargaining power.

5.2.5 Evolution of the supplier's bargaining power

Suppliers provide input for organizations, and affect the latter's performance by raising prices or lowering the quality of inputs, thereby shaping the suppliers' bargaining power. The bargaining power of suppliers is determined by factors such as the number of suppliers and the degree of the differentiation of inputs.

ZK provided offline IT training for enterprises in Stage I, and the inputs were mainly training venues and teachers. Both input markets had the characteristics of the competitive market, namely a large number of buyers and sellers and basically the same inputs. For training venues, except for ZK's own classrooms, the cost of training venues rented by ZK was basically determined by market demand and supply, hence neither party had an advantage with regard to bargaining power. The same situation applied to ZK's hiring of external teachers.

In Stage II and III, ZK transitioned into an online learning center for public universities "A", "B", and "C". Based on the online learning platform and the qualification of online degree programs of these universities, ZK provided services such as enrollment and student management. These universities were the suppliers of VET programs to ZK. Since the entrance requirements to these programs were high and the competitors in Sichuan Province were few, these universities had strong bargaining power for ZK.

5.3 Future trend of external environment faced by ZK

5.3.1 Future trend of the general environment faced by ZK

The future trend of the general environment faced by ZK is affected by such factors as the current VET policy guidance, and the economic slowdown and popularization of online learning resulting from the Coronavirus Disease 2019.

In terms of the political environment, although China's market-oriented reforms are accelerating, government policies will still play an important role in guiding the future development of the VET industry. Currently, the most important policies include *Opinions on the Implementation of Lifelong Vocational Skills Training System* (State Council of China, 2018) and the *Implementation Plan of National Vocational Education Reform* (State Council of China, 2019). For the VET industry, these two policies clearly set out the future development direction (targeting industry and corporate needs), development method (online) and development guarantees (establishing standards and quality evaluation systems, and

increasing financial subsidies), and will become one of the most important factors affecting VET institutions.

In terms of the economic, social and technological environment, the current spread of the Coronavirus Disease - Covid 2019 will have a major impact on the changes in these environments. It can be estimated that China's economic growth will continue to slow down, making human capital investment the most important factor supporting future economic development. Based on IT development, the way forward for online learning will be further popularization, and the convenience and accessibility of such training will be further improved. All this will increase demand for the VET industry and create huge opportunities for the development of VET institutions.

5.3.2 Future trend of the industrial environment faced by ZK

The future trend of the industrial environment faced by ZK is reflected in the five forces in the VET industry. As shown in Table 5.6, with the accelerated development of the VET industry in the foreseeable future, all of the five forces faced by ZK will increase, leading to intensified industrial competition. The reasons are as follows: first, that competing universities imitate similar majors and grab high-quality customers will weaken ZK's unique offer in online degree programs and reduce its market size; second, the competition from the National Talent Training Bases accredited by MIITC will intensify; and third, there will be more institutions having the dual-certificate qualifications of academic and vocational skills certification.

Table 5.6 The expected future changes in the five forces faced by ZK

Five forces	Now	The foreseeable future
The intensity of rivalry	Weak	Increasing
Threats of substitutes	Low	Increasing
Threats of potential entrants	Low	Increasing
Bargaining power of buyers	Low	Increasing
Bargaining power of suppliers	Strong	Increasing

Source: Notes on the interviews.

5.4 Summary of external analysis: key opportunities and threats

Based on the above external environment analysis, it can be concluded that the key opportunities faced by ZK are the following.

The first opportunity is that the economic transformation in China is bringing about VET market expansion.

China's continuous economic growth, changes in industrial structure and technological progress in the future will all lead to a huge need to update the knowledge and skills of the labor force, which in turn will result in high market demand for VET.

The second opportunity is that the popularization of online education greatly enhances market demand for VET.

While the development of the ICT infrastructure has created conditions for change in learning methods from offline to online, the impact of the COVID-19 pandemic has further increased the demand for online learning, both of which have enhanced popularization of online education. This new learning method adapts to workers' requirements for flexibility in on-the-job learning time and effectively solves the contradiction between work and study, thus greatly increasing the demand for VET.

The third opportunity is that the policies favorable to VET that focus on industry are demand oriented, and the development goals of standardization and high-quality promote the healthy development of the industry.

Government policies are the most important factor affecting the development of the VET industry in China. Current policies emphasize that the future development direction of the VET industry is to target the needs of industry and companies, establish industry standards and improve quality. This will create a lot of opportunities for the healthy development of the VET industry.

Accompanying the above opportunities, however, are the key threats faced by ZK which, it can be can be concluded, are as follows.

The first threat is that ZK's high dependence on a single business customer in a single industry brings about a potentially high market risk.

As a university online learning center and a National Talent Training Base of MIITC, ZK's main business focuses on the support services for online teaching and learning. However, all of this relies heavily on the online degree programs together with the online platforms of partner universities. Under the management constraints of public universities in China, not only is the enrollment scale of the online degree programs served by ZK strictly regulated, but also the development of certificate programs based on universities' online platforms cannot possibly grow very fast. This will pose a huge challenge to ZK's future business expansion.

The second threat is that ZK's high dependence on one partner university also limits the scale of expansion of its online degree programs.

The expansion of ZK's enrollment scale in the second and third stages benefited from the successful lock-in of the SCEP Company based on its customized and differentiated online degree program majors. Given that SCEP Company was a monopoly in the electric-power industry with nearly 100,000 employees, ZK signed a VET service agreement with it, aiming to enroll students from among the workers at this company. This action both saved marketing costs and increased profit for ZK greatly, but it also brought potential market risks due to the single source of customers. As competing universities successively set up similar majors and actively strive to cooperate with SCEP Company, ZK's future growth will become slow.

Chapter 6: ZK's Dynamic Capabilities, Microfoundations and Strategic Choices

Combining the interview data with the dynamic capability theory reviewed in Chapter 2, this chapter first of all describes a descriptive case study conducted on ZK's dynamic capabilities and micro-foundations, and draws a conclusion about the strengths and weaknesses of ZK. Secondly, combining the opportunities and threats faced by ZK and summarized in Chapter 5, this chapter uses the SWOT framework to identify the main strategic issues and sets out ZK's future strategic choices.

6.1 ZK's dynamic capabilities and microfoundations

The descriptive case study on ZK shows that as a small private VET institution, ZK has gone through three stages of development since it was established in 2003. It has evolved from an ordinary offline IT training institution at the beginning of its inception to become an online learning center of online university degree programs in continuing education, and has further been accredited as a National Talent Training Base by MIITC. This has led to ZK managing to get round the double dilemma of a shortage of VET resources and little or no market reputation. This success is not only a result of ZK's dynamic capabilitie of sensing opportunities and threats, seizing opportunities, and managing threats and reconfiguring resources in the VET industry, but it also relies on the micro-foundations of these capabilities. Combining the interview data with the dynamic capability theory reviewed in Chapter 2, Table 6.1 shows a dynamic capability framework for the descriptive case study on ZK.

Table 6.1 Dynamic capabilities framework for case study on ZK

Dynamic Capability	Microfoundation
Sensing opportunities and threats	Entrepreneurship; Social capital
Seizing opportunities	Designing a business model based on a value chain; Integrating resources including complements; Organizational flexibility; Commitment and implementation
Managing threats and reconfiguring resources	Organizational learning and knowledge management

Source: Author developed based on literature and survey data.

6.1.1 Capability of sensing opportunities and threats

The capability of sensing opportunities and threats is the ability of an organization to scan, create, learn and interpret across technologies and markets, and then identify and shape opportunities (Teece, 2007). ZK's capability of sensing opportunities and threats in different segments of the VET industry has two micro-foundations involving entrepreneurship and social capital. They provide strong support for ZK to seize opportunities and manage threats. The following analyzes these two micro-foundations based on the results of the interviews conducted for the case study.

6.1.1.1 Entrepreneurship

Entrepreneurship is the capability entrepreneurs have for seeing the opportunities of technologies and markets, understanding how to interpret new events and developments, which technologies to pursue, and which market segments to target. Entrepreneurship belongs at the individual-level micro-foundation of dynamic capabilities.

ZK was transformed from an internal training center of QM IT Company. Mr. X, the former director of the training center, served as the dean of ZK. The interview data show that, Mr. X, as the founder of ZK, has always had a strong entrepreneurial spirit and that his entrepreneurial flair is an important micro-foundation of ZK's dynamic capability of sensing opportunities and threats in the VET industry. The entrepreneurial personality traits of Mr. X include being dedicated, creative and always willing to seek cooperation.

First of all, Mr. X has a strong spirit of professional dedication. In this regard, the relevant colleague gave him a high evaluation. "He works hard, full of passion, and devotes himself to the development of ZK" (M3, Administrative director of ZK). In terms of institutional management, Mr. X is the essence of the top management team, making important decisions, planning ZK's development strategy and formulating management systems. He is also the executor of management decisions, participating in the specific implementation of VET programs down to the last detail including customer development and relationship management, curriculum design, and process management in teaching and learning. In terms of market development, Mr. X organizes and participates in various seminars related to the VET industry, such as annual conferences of the China Computer Federation, Sichuan Province Computer Federation, China Education Society of Electronics and Zhongguancun Smarter City Information Industry Alliance. "By keeping abreast of VET policies and industry trends, Mr. X has formed a keen insight into the needs of the VET industry and tried to find good opportunities in ZK's strategic choices" (M2, Vice dean of ZK).

Mr. X said, “Although the VET market demand is high, ZK, as a small private VET institution, had no differentiated programs and faced fierce competition at the beginning of its establishment. So, as the dean of ZK, I have to work hard and be enterprising. I have almost no rest time. I have to work every day, from morning to night. I often stay up all night to write training program proposals. I also participate in various industry seminars on weekends” (M1, Dean and the founder of ZK). For his contribution, Mr. X thought this was worthwhile. “I like education, I love education, I am willing to devote my whole life to education and be a good ferryman. Seeing that our VET programs can enable students to learn something and serve society, I derive a great sense of happiness and accomplishment” (M1, Dean and founder of ZK). The employees of ZK commented on Mr. X as “being dedicated, conscientious, pioneering and enterprising. We are also deeply motivated under his strict requirements” (M5, Manager for University “A” program).

Secondly, the founder is sensitive to the changing environment. The VET programs carried out by ZK during its first stage were mainly characterized by offline IT training, wide industry coverage and fierce market competition. So, sensing the scale of the crisis ahead, Mr. X actively sought out new development opportunities. Mr. X recalled, “Whether to myself or to members of ZK, I have always emphasized that ZK has no way out via traditional offline IT training programs. We need to brainstorm, we need to break through, we need to be different” (M1, Dean and founder of ZK). Opportunities always come to those who are prepared. Based on a software development project of ZK’s parent company, “Mr. X found that the automation and digital development of the electric-power industry brought about a huge demand from employees for on-the-job VET. This helped him realize the importance of targeting the electric-power industry to develop VET programs and adopt online learning technology” (E2, Manager of training center of SCEP Company).

Finally, he was able to seize and harness resources from outside the company. The founder was well aware of the dual dilemma of a shortage of VET resources and little or no market reputation ZK faced as a small private VET institution. Therefore, “Mr. X advocates learning from all possible opportunities and unblocking the bottleneck of ZK through cooperation with external institutions” (M4, ZK’s manager of the University “A” program). The founder said that “universities are good partners to help ZK achieve a breakthrough in the double dilemma. They have a wealth of VET resources, a good market reputation and high entry requirements to degree programs. Therefore, by targeting the on-the-job VET market, the cooperation between ZK and continuing university degree programs should provide broad development space” (M1, Dean and the founder of ZK).

In short, since the establishment of ZK in 2003, “Mr. X has been working tirelessly in the VET industry, giving full rein to his entrepreneurial personality traits of dedication, creativity and cooperation” (M2, Vice dean of ZK).

6.1.1.2 Social capital

Social capital is the capability of individuals or organizations to secure benefits from sensing opportunities and threats by virtue of social networking. ZK’s social capital includes the individual social capital of its founder, and its organizational social capital, which correspond to the individual-level and organizational-level micro-foundations of dynamic capabilities.

In terms of individual social capital, Mr. X pointed out that “As the founder of ZK, I have wide social networks based on my education and work experience in universities, experience as a director of the firm’s training center, and as a standing director of the Sichuan Province Computer Federation. This gives me timely access to information about policies and market supply and demand in the VET industry, thereby informing my capabilities to sense opportunities and threats” (M1, Dean and founder of ZK). Mr. X’s major is software engineering. He has a good professional background and former classmate resources in the IT field. Prior to becoming the dean of ZK, Mr. X worked as a manager in the training centers of two universities for 5 years and is, therefore, familiar with the institutional organization and processes of university education and training. Following that, he served as the director of the internal training center of the QM IT Company, ZK’s parent company, for one year. Based on these experiences, Mr. X is not only familiar with policies and management in the field of IT VET, but has also accrued rich resources. Most importantly, Mr. X has served as the standing director of the Sichuan Province Computer Federation since 2008. This Federation is a non-profit organization established and run voluntarily by individuals and institutions who engage in scientific research and development, education, manufacturing, management, and services in the IT field in Sichuan Province. Mr. X’s status in this Federation has greatly expanded his social resources and networks in computer-related fields.

In terms of organizational social capital, “ZK’s connection with its parent company, its status as an institutional member of Sichuan Province Computer Federation and an online learning center for universities have helped establish extensive social networks, laying the foundation for its business expansion and transformation” (M1, Dean and founder of ZK). First of all, ZK was separated from the internal training center of QM IT Company, which at first became ZK’s most important social tie in the early days of its establishment. Based on a software development project of this company, ZK, under the leadership of Mr. X, sensed the

market opportunity for online VET programs targeting the electric-power industry.

ZK has been a group director of Sichuan Province Computer Federation since 2008. “ZK has actively organized or participated in all kinds of conferences, seminars and vocational training and thus established social networks with other organizations in the IT field. ZK has also built good relationships with relevant government departments, such as the Education Department and Department of Human Resource and Social Security of Sichuan province” (M1, Dean and founder of ZK). Relying on these social ties and under the leadership of Mr. X, ZK realized the market opportunity of cooperating with universities’ continuing education department to carry out online degree programs.

Finally, since ZK began cooperating with universities and became an online learning center in its second stage, it has built a closer social connection with the public university system. This has further enabled ZK to sense good opportunities for the large-scale development of online VET programs, providing the foundation for ZK to be accredited by MIITC as a National Talent Training Base in its third stage.

6.1.2 Capability of seizing opportunities

An organization’s capability of seizing opportunities also informs its ability to act upon those opportunities (Teece, 2007). After sensing opportunities and threats in the VET industry, ZK chose to abandon its offline IT training programs and seize the opportunities of online education, targeting the electric-power industry, by cooperating with universities. In this process, ZK’s dynamic capability of seizing opportunities involve four micro-foundations: designing a business model based on a value chain, integrating resources including complements, organizational flexibility, and commitment and implementation.

6.1.2.1 Designing a business model based on a value chain

Designing a business model based on a value chain relies on the capability of designing a value proposition in terms of product and service, customer needs and geography, defining a value chain structure, and selecting revenue and cost structure to meet customer needs. As Mr. X pointed out, “on the basis of sensing the opportunities and threats of the VET industry, we have identified the key business activities through a value chain analysis of VET organizations, and then innovatively designed a business model” (M1, Dean and founder of ZK). This has become one of the most important micro-foundations of ZK’s dynamic capability of seizing opportunities.

Table 6.2 is the breakdown of business activities of VET institutions by ZK using Porter’s

value chain model to identify key business links. It can be seen that the support activities of VET institutions include three processes or activities, namely infrastructure supporting daily business operations, human resource management for teachers and staff, and curriculum development of VET programs. The primary activities comprise marketing, implementation of teaching and learning, and teaching support service.

Table 6. 2 Value chain of VET institutions

Support activities	Infrastructure	Process that supports daily operations involving administration, financial, and general management for VET programs
	Human resource management	Process related to the acquisition, training, management and termination of teachers and other staff.
	Curriculum development of VET programs	Process related to the development and update of curricula and majors of VET programs
Primary activities	Marketing	Process related to advertising and promotion of VET programs to enhance product visibility among a target audience
	Implementation of teaching and learning	Process related to the arrangements and implementation of teaching content, methods, examinations
	Support service for teaching and learning	Process related to support service for enrollment, teaching and learning management and evaluation

As Mr. X pointed out, “By combining value chain analysis and ZK’s experience of offline IT training in the first phase, we identified that curriculum development and support service for teaching and learning were two links that are key to increasing competitive advantage. The two links not only had high added value in the value chain of VET programs, but also helped us avoid disadvantages in VET resources and market reputation” (M1, the dean and founder of ZK). To this end, after ZK sensed the opportunities of online university degree programs targeting the electric-power industry at the end of the first stage, it innovatively designed business models through cooperation with the electric-power company, universities and relevant government departments. This supported ZK’s dynamic capability of seizing opportunities and promoted ZK’s transformation and rapid development in the second and third stages. Although ZK’s partner universities included Universities “A”, “B” and “C”, as analyzed in Chapter 4, the business model of cooperation with University “A” alone was representative and most successful. Therefore, the following analysis is only for ZK’s programs in partnership with University “A”.

In its first stage, ZK provided offline IT training to enterprises in different industries, and faced the dual dilemma of a shortage of VET resources and little or no market reputation. In the second stage, as Mr. X recalled, “Sensing the gap in the market of online university degree programs targeting the electric-power industry, we redesigned ZK’s business model by connecting business, customer and university with the customized online degree programs

based on the university's online learning platform. This business model effectively matched the demand and supply of VET programs and achieved great success" (M1, Dean and founder of ZK).

As shown in Figure 6.1, ZK signed a VET services agreement with the business customer, SCEP Company, to provide online degree programs for its employees in the form of customized majors. These programs are supplied by the public university, with ZK only providing a teaching and learning support service. As the manager of the human resources department of SCEP Company said, "Since the public university has a good market reputation, and the programs' majors are customized and forward-looking, and the online learning method meets the flexible needs of our employees for on-the-job learning, the two parties hit it off and our company greatly appreciated ZK's programs" (E1, Manager of the human resources department of SCEP Company). At the same time, ZK signed an agreement with the university to become a learning center for their online degree programs. ZK was then entrusted with carrying out support services for the customized majors including marketing and enrollment, student services, and teaching and learning management. "Due to the high demand for VET from the large number of employees of SCEP Company, annual enrollment on these programs has been large and steadily increasing year on year. This cooperation with a public university has greatly improved the earlier, disadvantaged position of ZK as a small private VET institution. These programs are highly valued by the university" (M1, Dean and founder of ZK).

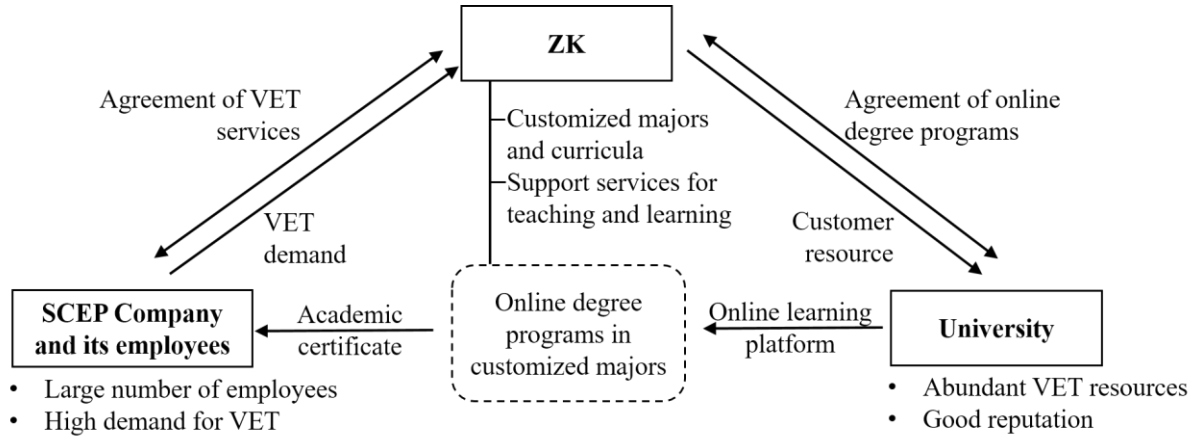

Figure 6.1 ZK's business model in stage II

Note: In stage II, the customized majors of online degree programs served by ZK were Electrification Technology and Electrical Engineering and Automation.

Based on the business model in its second stage, ZK further innovated its business model in the third stage, to provide even greater development potential. As shown in Figure 6.2, ZK was accredited as a National Talent Training Base by MIITC for its "professionally

forward-looking majors and enrollment scale in University 'A' programs" (E6, Manager of MIITC). This gave ZK an official qualification to carry out a certificate program and made it possible for students to exchange credits between the degree program and the certificate program. This meant that once students had earned the required credits, in addition to academic certificates, they could obtain vocational certificates as an Electrical Automation Engineer and an Electrical Intelligence Engineer. "The new business model increases the added value of our VET programs for students and their company, and strengthens ZK's competitive advantage. More importantly, our new qualification establishes a high barrier to industry competition, improves our market reputation, and enables us to expand the VET business beyond the university's online degree programs in the future" (M1, Dean and founder of ZK).

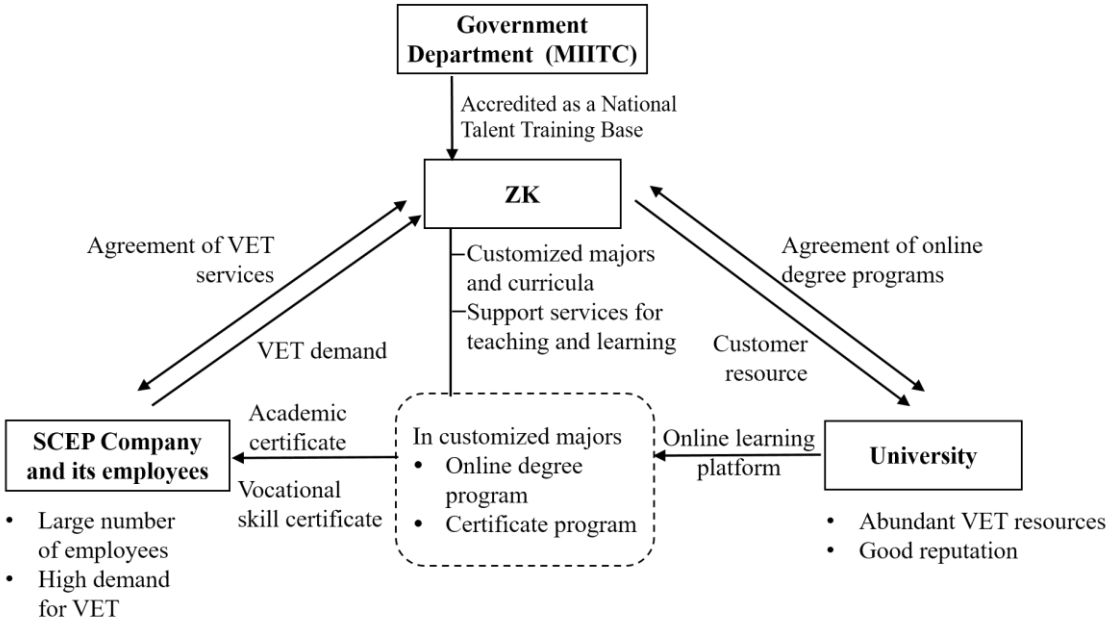

Figure 6.2 ZK's business model in stage III

Note: In stage III, the customized majors of the online degree programs provided by ZK weres Electrical Engineering and Automation, and Electrical Intelligence. The corresponding vocational skill certificates are Electrical Automation Engineer and Electrical Intelligent Engineer.

6.1.2.2 Integrating resources including complements

Integrating resources including complements is the capability of combining specialized and co-specialized assets to enhance value. It is the key to the successful implementation of the business model, and therefore one of the micro-foundations of dynamic capability of sensing opportunities. As ZK faced the double dilemma of a shortage of VET resources and little or no market reputation in the first stage, the focus of its business model in the second and third stages was to effectively integrate the quality of pubic universities' intellectual resources and market reputation as a way to get round the double dilemma. ZK had tried to cooperate with

many public universities in Sichuan Province in the first stage, but being only a small private VET institution, their attempt was not taken seriously and was rejected. To counter this, ZK began to actively try to cooperate with universities outside Sichuan. As Mr. X recalled, "Universities within Sichuan Province had a good source of local students, so they had no incentive to cooperate with us. But the situation was different with universities outside Sichuan. They were not familiar with our local market and lack of recognition, so they needed to cooperate with local institutions to expand their market, which provided the possibility for our cooperation" (M1, Dean and founder of ZK).

In order to increase the possibility of cooperation with universities, ZK strove to develop quality customer resources. As Mr. X pointed out, "When we successfully secured SCEP Company by designing the customized VET majors targeting the electric-power industry, the quality customer resource made us more attractive to University 'A' who are located outside Sichuan. This prompted us to successfully cooperate with University 'A' and become the latter's sole learning center for online degree programs in Sichuan" (M1, Dean and founder of ZK). Based on that cooperation, ZK achieved its first breakthrough in the double dilemma. Furthermore, ZK had already identified two key business links, namely the customized development of VET programs and the support service for teaching and learning. The important complement to these businesses was the online education platform. "as our partner online learning center, ZK was able to use our university's online platform to provide support service for teaching and learning in its customized majors and curricula" (E3, the online degree program manager of University "A"). Thus, ZK successfully achieved the integration of complement".

Secondly, ZK effectively integrated expert resources in IT and the electric-power industry to acquire support for its development and to update the customized majors and curricula of the VET programs. During the second and third stages, as the manager of the SCEP Company training center said, "to meet the needs of VET in the electric-power industry, ZK successively developed three online degree program majors, namely: Electrification Technology, Electrical Engineering and Automation, and Electrical Intelligence. This was unanimously recognized by our company and employees, leading to increased enrollment year on year" (E2, Manager of the SCEP company training center). The success was partly due to the integration of expert resources in IT and the electric-power industry. On the one hand, ZK made full use of the social capital in the IT field to get intellectual support, especially for the in-depth exploration of expert resources from the Sichuan Computer Federation. And, at the same time, ZK had many discussions with experts from SCEP

Company in order to understand the electric-power industry's actual needs with regard to VET, and invited these experts to participate in the design of customized majors and curricula. "ZK insisted on market-oriented design and always emphasized the important role of experts. As a result, ZK dynamically updated majors and curricula with the development of the electric-power industry to keep them forward-looking in the industry" (M1, Dean and founder of ZK).

Finally, ZK fully tapped customer resources and successfully secured a quality corporate customer. Based on a software development project of SCEP Company undertaken by ZK's parent company, ZK sensed the supply and demand gap in the university's online degree programs targeting the electric-power industry. "There is a huge demand for VET in the electric-power industry, but there is a lack of online degree programs that can meet the needs of the industry" (E2, the manager of the SCEP Company training center). More importantly, as the SCEP Company was a monopoly in the electric-power industry with as many as 100,000 employees in Sichuan Province its potential demand for VET was huge. Securing that company meant securing the market. Therefore, ZK actively communicated with the company's human resources department to discuss matters related to VET cooperation. Once ZK had successfully integrated the university's online education resources and developed customized majors and curricula targeting the electric-power industry, it was accepted by SCEP Company and became one of the latter's strategic cooperation parters for VET services. This led to enrollment at ZK rising sharply and made it stand out among the learning centers for online university degree programs across the country.

6.1.2.3 Organization flexibility

Organizational flexibility involves the ability to flexibly adjust organizational structures, incentives and routines to support a new business model. This is one of the important micro-foundations for ZK to form the dynamic capabilities needed to seize opportunities. Once ZK had recognized new market opportunities during its second and third stages, and designed new business models based on the value chain, ZK adjusted its organizational structure in a timely manner and fully empowered its employees to ensure the successful implementation of these new business models.

As shown in Figure 6.3, ZK mainly carried out offline IT training for enterprises in various industries in the first stage. The programs lacked differentiation, and competition was particularly fierce. "To adapt to this internal and external environment, in terms of ZK's organizational structure and personnel composition, the staff in the marketing department and

administrative office accounted for up to two-thirds, while the number of teachers in the program office was less than a quarter. Most training programs relied on external teachers" (M3，Administrative director of ZK).

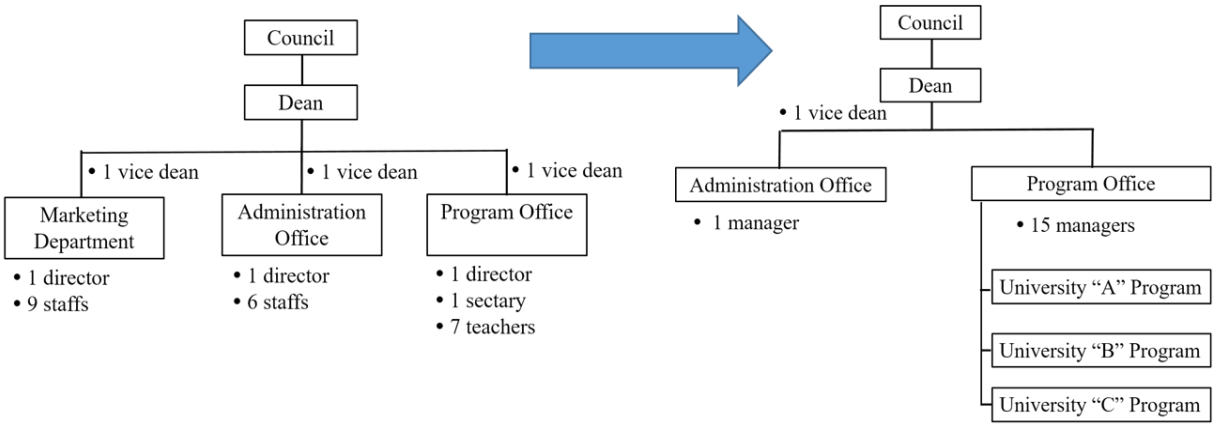

Figure 6. 3 The adjustment of ZK's organizational structure from stage I to II

During the second stage, "ZK transformed into a learning center for online university degree programs, and carried out support services for teaching and learning" (M1, Dean and founder of ZK). Correspondingly, ZK flexibly adjusted its organizational structure and reduced the total number of employees from 30 to 18. The number of vice deans was reduced from 3 to 1. And employees were fully empowered to manage online degree programs. "All these structural adjustments were made to suit the needs of the new strategy" (M1, Dean and founder of ZK).

First, ZK abolished its marketing department. ZK signed a strategic cooperation agreement with SCEP Company, the electric-power monopoly, for VET services. Thus, with employees of this company becoming a stable and sufficient source of students for ZK, a marketing department was no longer necessary.

Second, ZK streamlined the administration office. "Under the new business model, ZK used the online learning platform of partner universities to provide support services for online teaching and learning, which greatly reduced the original inbound logistics" (M3，the administrative director of ZK). Thus, ZK was able to reduce the staff of the administration office from 7 down to 1. The sole vice dean concurrently served as the director of administration office, and was in charge of ZK's financial management and logistics support.

Third, ZK expanded the program office. Under the new business model, the rapid increase in ZK's enrollment led to an increase in program support services. There were no teachers in the program office, instead different program groups were set up to serve the corresponding universities. The number of program office employees increased from 9 to 15 and they were

fully empowered to manage programs under the direct leadership of the dean.

ZK's organizational flexibility is also reflected in its third stage of development. By the third stage, ZK was already accredited by MIITC as a National Talent Training Base and possessed the qualification to implement vocational skills training that could issue vocational skills certificates from the MIITC. Hence "ZK adjusted its organizational structure and personnel composition in a timely manner to maintain competitiveness" (M1, Dean and founder of ZK). As shown in Figure 6.4, "to suit the new business model, ZK's program office was divided into two groups, degree program and certificate program. The former was responsible for the online university degree education, while the latter was in charge of vocational skills training, communicating with and managed by the MIITC. This new group provided organizational guarantees for ZK's future expansion of the VET training business" (M8, the manager of the certificate program of ZK).

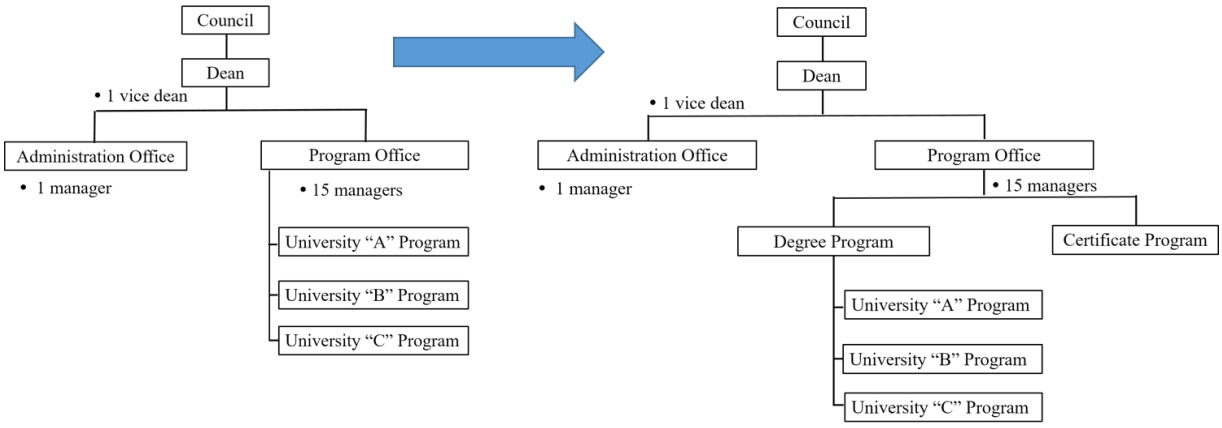

Figure 6. 4 The adjustment of ZK's organizational structure from stage II to III

Note: ZK abolished the University "C" program in 2017.

6.1.2.4 Commitment and implementation

Commitment and implementation involve the ability to implement a new business model by demonstrating leadership and effective management, building loyalty and cooperating with stakeholders. During the transformation, ZK set up management systems that adapted to new business models, and established the goal of providing quality support services. Under the leadership of the dean, Mr. X, "employees were fully authorized to provide support services for online teaching and learning, and actively encouraged to communicate with multiple stakeholders including universities, corporate customers and students. By obtaining timely feedback information, ZK ensured the smooth development and effectiveness of its online degree programs" (M1, Dean and founder of ZK).

First of all, ZK complied with the university's unified requirements for online degree programs and adopted a comprehensive teaching mode comprising online learning, online

Q&A, online discussion, online tutoring, offline tutoring, homework, self-test exercises, offline exams in the learning center, and graduation report or thesis. “But, in contrast to other online degree programs, the majors and curricula developed by ZK were market-oriented and directly targeted the learning needs of employees in the electric-power industry. In order to improve the effect of online learning, ZK strengthened the online and offline tutoring by integrating the intellectual resources of the electric-power industry” (M1, Dean and founder of ZK). ZK established a database of expert tutors, and hired 100 experts with either intermediate and senior titles, or a master’s degree or above from technical colleges in the electric-power industry, SCEP Company, and the College of Electrical Engineering of Sichuan University. These experts served as part-time tutors for students, provided guidance and answered questions throughout the online learning process. In addition, and in order to help students better develop their ability to learn independently and create a cooperative learning environment, ZK’s program managers helped set up many communication channels such as WeChat groups and QQ groups to run alongside the universities’ online learning platform. As student A said, “Under the guidance of the program managers, we have established many study groups to form a student community for cooperative learning and active learning. The students actively discussed and solved the problem of insufficient interaction in online learning” (E7, Student A of University “A”).

Secondly, ZK advocated teamwork in support services for teaching and learning. Under the leadership of the dean, Mr. X, employees were fully empowered and effectively motivated to be responsible for the quality of support services. Just as Mr. X said, “The quality of support services is the lifeline of ZK. On the one hand, I, as the dean, am also an employee. I try to participate in the whole process so as to be familiar with every detail of the teaching and learning support services. On the other hand, every employee is a program manager. While being fully authorized to provide support services, it is also necessary for them to tap into the dean’s way of thinking. For this reason, we have implemented a system that employees must take turns to serve as executive dean for half a year. This system helps employees to understand the importance of service quality” (M1, Dean and founder of ZK). Meanwhile, ZK’s salary systems were very flexible since employees had a high degree of participation in formulating remuneration plans. The salary and reward schemes would first be proposed by employees according to their abilities, positions, work goals and contributions, and then submitted to the employees’ congress for agreement, and finally reported to the dean for implementation. These measures greatly mobilized the enthusiasm of employees.

Finally, ZK actively encouraged communication among stakeholders. Under the

leadership of ZK, the three stakeholders - the partner university, the SCEP company and ZK itself - each sent a representative to set up a service center for teaching and learning with the goal of improving learning outcome. The representative from ZK was the vice dean. "This service center not only provided unified guidance and coordination in teaching and learning communication, assessment and evaluation, but also regularly obtained feedback from students. It greatly improved the degree to which VET supply and demand matched" (E1, the manager of the human resources department of SCEP Company).

6.1.3 Capability of managing threats and reconfiguring resources

An organization's capability of managing threats and reconfiguring resources is measured by its ability to maintain competitiveness through enhancing, combining, protecting, and reconfiguring its intangible and tangible assets when faced with threats (Teece, 2007). For ZK, the micro-foundation of this dynamic capability involves organizational learning and knowledge management.

Organizational learning and knowledge management are the capabilities of integrating know-how from outside as well as within the organization, and further generating new knowledge to maintain competitiveness through institutional arrangements for learning and knowledge-sharing. When ZK became an online university degree learning center in the second stage, it gained a competitive advantage by customizing the majors and curricula of online degree programs aimed at the electric-power industry. Not surprisingly, these differentiated majors triggered successive imitations from competing universities. In response to this new threat, ZK strengthened its organizational learning and knowledge management. "By building a learning organization and establishing an incentive system to promote learning, ZK successfully achieved knowledge integration, redesigned the majors and curricula, and regained its competitive advantage" (M1, Dean and founder of ZK).

First of all, ZK established a standardized internal learning system and regularly held weekly discussion meetings. The dean always personally presided over every meeting. The employees of ZK adequately communicated and exchanged ideas on the implementation of the online degree programs and support services for teaching and learning, the appeals and feedback from all stakeholders, and especially market competition environment and trends. All participants shared their own work experiences and lessons in a timely fashion. "This system enabled all employees of ZK to reach a consensus on both the focus of support services and the internal and external environment of online degree programs. Improving the quality of support services and managing new threats had been placed firmly at the center of

ZK's work" (M1, Dean and founder of ZK).

Secondly, ZK attached importance to the improvement of employees' learning capabilities and provided sufficient financial support for employees to participate in continuing education. "The tuition fees for employees participating in degree programs and short-term training were fully reimbursed by ZK" (M3, Administrative director of ZK). Additional bonuses were also awarded based on the outcomes of the on-the-job learning. For example, the basic salary would be increased by 3% to 5% for those obtaining academic certificates (5% for those obtaining a doctoral degree and 3% for a master's degree). Employees who obtained vocational skill certificates would be given RMB 1,000 to 5,000 for each one.

Finally, ZK encouraged employees to actively innovate while learning by doing. ZK emphasized that "support services should meet the needs of teaching and learning to the greatest extent" (M1, Dean and founder of ZK). Therefore "ZK encouraged employees to keep abreast of the demands of universities and corporate customers, to actively learn from partners and carry out knowledge innovation" (M1, Dean and founder of ZK). ZK required each program manager to have a comprehensive and in-depth understanding of the online education model, teaching support service system and VET market trend, and also encouraged employees to apply for research projects in these fields by providing a project budget as high as 50,000 to 150,000 yuan per item. ZK's practice of learning from partners is one that is itself worth learning. For example, in order to ensure that the teaching content and thesis topic were closely related to the work of students, ZK's corporate customer, SCEP Company, not only appointed some staff from its human resources department and training center to serve as class advisors, but also arranged for its senior engineers to provide guidance for students during their internship and thesis writing. For this, ZK's program managers "participated in the whole process, and tried to understand the concerns of both the students and customer company and follow up the directions of curricula adjustment and support service improvement" (M4，Manager for University "A" program).

ZK has achieved remarkable results in these practices in organizational learning and knowledge management. In 2014, ZK was accredited by MIITC as a National Talent Training Base in the field of industry and information technology due to its professional, forward-looking majors and the scale of enrollment in the University "A" program. In the same year, in response to the changes in the electric-power industry's demand for VET and the threat of competition, ZK adjusted its online degree program majors by cancelling the Electrification Technology major and establishing a new major in Electrical Intelligence. Their work has been unanimously recognized by multiple stakeholders. For example, ZK was

rated as an outstanding online learning center for universities by the Ministry of Education from 2015 to 2019. “ZK was also rated as an outstanding National Talent Training Base by MIITC from 2015 to 2016 and both its curricula and program managers were rated as excellent by MIITC” (E6，Manager of MIITC). Numerous honors have greatly improved ZK’s market reputation and competitiveness.

6.1.4 Summary of internal analysis: ZK’s strengths and weaknesses

6.1.4.1 Internal strengths

Based on the above analyses of ZK’s dynamic capabilities and micro-foundations, the strengths of ZK can be summarized as follows.

First, ZK has a strong dynamic capability of sensing and managing opportunities and threats, and is good at developing and updating differentiated VET programs based on the changing market environment.

The entrepreneurship flair of ZK’s founder and his social capital at both the individual and organizational level are two micro-foundations that contribute to ZK’s dynamic capability of sensing opportunities and threats. Organizational learning and knowledge management provide micro-foundations for ZK’s dynamic capability of managing threats. Both of them enable ZK to identify the dynamic changes in the market environment, and to design and update differentiated VET programs accordingly. More specifically, with the electric-power industry’s demand for VET in mind, ZK, as a learning center for online university degree programs, took the lead in developing customized and differentiated majors in the national university system during its second stage. This enabled ZK to quickly get a foothold in the electric-power industry market and gain a first-mover advantage. In the third stage, ZK sensed the changes in the competitive environment and accordingly updated the majors and curricula of VET programs to sustain its competitive advantage.

Second, ZK has a strong dynamic capability of seizing opportunities, and is good at using the official qualifications of universities and MIITC to enhance its market reputation.

Sensing the increasing market opportunities of online degree education and vocational technical training, ZK took advantage of its two official qualifications as a learning center for online university degree programs and the National Talent Training Base accredited by MIITC to design and update its business models. By improving its support services for online learning through flexible organizational structure adjustments, institutional arrangements and resource integration including complements, ZK’s VET programs have been recognized by

multiple stakeholders including partner universities, business customers, students, and related government departments including the Ministry of Education and MIITC. These achievements have not only made its enrollment scale increase steadily year on year, but also enhanced ZK's market reputation.

Third, ZK has a strong dynamic capability of integrating and reconfiguring resources, and is good at designing and implementing new business models to expand its market scale.

In its first stage, ZK faced the dual dilemma of a shortage of educational resources and little or no market reputation. Since then, however, by targeting and bridging the gap between VET program majors and industry's needs, ZK has constructed a multi-party cooperation framework involving industry customers, universities, and government departments. Through the design and implementation of new business models, ZK successfully integrated multiple resources including complements. This not only established industry barriers for ZK to compete with similar institutions, but also greatly expanded its market scale.

6.1.4.2 Internal weaknesses

However, ZK also has two weaknesses that can be summarized as follows.

The first is that ZK lacks a key complementary resource, namely the official qualification in its own right for online university degree programs.

Although ZK is the learning center for online university degree programs, it only provides the support services, having no official qualification in its own right means that ZK cannot award certificates in its own name. Therefore, despite ZK's strong capability with regard to developing the majors and curricula of online degree programs, the implementation of this capability is completely dependent on the partner universities. Once cooperation with its partner universities ceases, ZK's existing business model would be difficult to maintain.

The second key complementary resource that ZK lacks is its own online learning technology platform.

With regard to the first weakness, the quality support services for online teaching and learning provided by ZK are based on the universities' online technology platform. Once separated from the university's online platform, ZK's service capability would be difficult to sustain. More importantly, as a National Talent Training Base accredited by MIITC, ZK also completely relies on the universities' online platform to provide vocational skills training, which further increases the vulnerability of its business.

6.2 ZK's strategic initiatives: based on the SWOT matrix

The SWOT matrix is used to identify the main strategic issues and synthesize the findings. SWOT stand for Strengths, Weaknesses, Opportunities and Threats. This framework is used to analyze ZK's strategic initiatives under four strategy clusters.

6.2.1 ZK's SWOT matrix

As shown in Table 6.3, the SWOT matrix combines ZK's strengths with the opportunities and threats, and the weaknesses with the opportunities and threats that were identified in the previous analysis. Thus, the matrix reveals four clusters. Below that is a detailed discussion of the strategic initiatives ZK should implement to address each of the strategic issues.

Table 6.3 ZK's SWOT matrix

	Opportunities（O_1, O_2）	Threats (T_1, T_2)
	O_1 : Expansion of VET market from economic transformation in China O_2 : High VET demand from the popularization of online education O_3 : Favorable VET policies focusing on demand-oriented, standardization and high-quality	T_1 : High dependence on a business customer in a single industry brings about potentially high market risk T_2 : High dependence on a partner university limits the scale expansion of online degree programs
Strengths (S_1, S_2, S_3) S_1 : Has dynamic capability of sensing and managing opportunities and threats, and is good at developing and updating differentiated VET programs based on changing market environment S_2 : Has dynamic capability of seizing opportunities and is good at using the official qualifications of universities and MIITC to enhance market reputation S_3 : Has dynamic capability of integrating and reconfiguring resources and is good at designing and implementing new business models to expand the market scale	SO Strategy 1. Promote online degree programs and certificate programs simultaneously, and develop and implement both programs to meet the needs of specific sectors in the fields of industry and information technology 2. Establish online VET standards for these sectors 3. Expand the market scale of and establish a brand for ZK's online VET programs	ST Strategy 1. Choose online degree programs as the main business, and copy the existing business model to develop new business customers in new sectors with customized online degree programs 2. Increase the number of partner universities to mainly expand online degree programs and secondly develop certificate programs in corresponding majors

Weaknesses (W_1, W_2) W_1: Lack the key complementary resource namely its own the qualification for university online degree programs W_2: Lack the key complementary resource namely own online learning platform	WO Strategy 1. Choose online certificate programs as the main business, and bypass the qualification constraint of university online degree programs by increasing the scale of online certificate programs 2. Develop own online learning technology platform and promote nationwide	WT Strategy 1. Promote online degree programs and certificate programs simultaneously, and increase the number of partner universities and both programs to reduce dependence on a single university and single type of programs 2. Develop new business customers in new sectors to reduce dependence on a single customer in a single industry

6.2.2 ZK's strategic initiatives under four strategy clusters

6.2.2.1 Strategic initiatives under the SO strategy

The SO strategy involves taking advantage of opportunities through existing strengths. As shown in Table 6.3, ZK's strengths involve the dynamic capabilities of sensing opportunities and threats, seizing opportunities, and managing threats and reconfiguring resources in the VET industry. Adopting this strategy enables ZK to be good at the dynamic development of new VET programs, to design and implement new business models, and to successfully integrate resources, thereby enhancing its market reputation and expanding its market scale. The opportunities available to ZK involve the rapid growth in demand for VET, the popularization of online education and favorable political support. Thus, the strategic initiatives that ZK should formulate under the SO strategy would involve: (1) promoting online degree programs and certificate programs simultaneously, and developing and implementing both programs to meet the needs of specific sectors in the fields of industry and information technology, (2) establishing online VET standards for these sectors, and (3) expanding the market size and establishing a brand for ZK's online VET programs. These strategic initiatives would not only help ZK seize opportunities in the online VET market through existing strengths, but also help ZK develop new programs in new markets to decrease its excessive dependence on partner universities and business customers in a single industry. It would also improve ZK's strategic flexibility and enhance its ability to withstand risks.

6.2.2.2 Strategic initiatives under the ST strategy

The ST strategy involves taking advantage of strengths to eliminate or reduce the impact of threats. In accordance with the above analysis, the threats faced by ZK are its high

dependence on both business customers in a single industry and a single partner university as these lead to greater market risks and limited scale expansion of its online degree programs. Thus, the strategic initiatives that ZK should formulate under the ST strategy would involve: (1) choosing online degree programs as the main business, and copying the existing business model to develop new business customers in new sectors with customized online degree programs, and (2) increasing the number of partner universities to expand online degree programs and, secondly to develop certificate programs in corresponding majors.

6.2.2.3 Strategic initiatives under the WO strategy

The WO strategy involves taking advantage of opportunities by overcoming weaknesses. As shown in Table 6.3, ZK's weaknesses are that it lacks two key complementary resources – its own official qualification for online university degree programs, and its own online learning technology platform. This makes ZK's business heavily reliant on its partner universities. These two resources are the fundamental complements essential for ZK to carry out its own online VET programs, thus lacking them is a weakness hindering ZK's ability to take advantage of new opportunities. The opportunities available to ZK are a result of the rapid growth in demand for VET, the popularization of online education, and favorable political support. Thus, the strategic initiatives that ZK should formulate under the WO strategy would involve: (1) choosing online certificate programs as the main business, and bypassing the qualification constraints of online university degree programs by increasing the scale of certificate programs, and (2) developing its own online learning technology platform and promoting it nationwide.

6.2.2.4 Strategic initiatives under the WT strategy

The WT strategy involves reducing the impact of threats by considering weaknesses. In accordance with the above analysis, ZK's weaknesses stem from its lack of two key complementary resources involving its own official qualification for online university degree programs and its own online learning technology platform. The threats faced by ZK are its high dependence on both a business customer in a single industry and a single partner university. Thus the strategic initiatives that ZK should formulate under the WT strategy would involve: (1) promoting online degree programs and certificate programs simultaneously, and increasing the number of partner universities and programs to reduce dependence on a single university and single type of programs, and (2) attracting new business customers in new sectors to reduce dependence on a single customer in a single industry.

6.3 ZK's strategic actions for the next five years

6.3.1 ZK's strategic actions under the SO strategy

In order to promote the successful implementation of the above SO strategy, ZK should make the following action plans over the next five years.

6.3.1.1 Strategic initiative 1: promote online degree programs and certificate programs simultaneously, and develop and implement both programs to meet the needs of specific sectors in the fields of industry and information technology

(1) Action 1.1 Identify sub-sectors that need to be expanded in the fields of industry and information technology

For ZK, the MIITC National Talent Training Base qualification affords greater credibility in a far larger market than the university online learning center does. Therefore, ZK should rely more on the former and identify new sub-sectors in the field of industry and information technology. This would help ZK seize greater opportunities for industry development and achieve further growth.

Indicator 1.1.1 Action goals: sense market opportunities in the fields of industry and information technology, and identify 2-3 sub-sectors that can be expanded, such as petroleum, ICT, and financial technology.

Indicator 1.1.2 Time plan: in 2022, identify 2-3 new sub-sectors that need to be expanded.

Indicator 1.1.3 Personnel and organization guarantee: (1) set up an R&D office, and add three managers for program development, (2) make full use of external expert resources from industries, universities, and related government departments.

(2) Action 1.2 Develop differentiated online VET programs targeting new sub-sectors

The development of differentiated VET programs (including online degree programs and certificate programs) targeting new sub-industries would help ZK make full use of industrial opportunities and take advantage of its dynamic capabilities and organizational strengths. This should, therefore, become one of the important actions under the SO strategy.

Indicator 1.2.1 Action goals: target the newly expanded sub-sectors in the fields of industry and information technology, develop 2-3 new online VET programs.

Indicator 1.2.2 Time plan: (1) in 2022, develop 2-3 new online VET programs; (2) from 2023 to 2026, implement new programs and increase market size.

Indicator 1.2.3 Personnel and organization guarantee: (1) jointly implement via the

program office and the newly established R&D office, (2) make full use of external expert resources from industries, universities, and related government departments.

6.3.1.2 Strategic initiative 2: establish online VET standards for sub-sectors in the fields of industry and information technology

(1) Action 2.1 Match the majors and curricula of the newly developed online VET programs with market demand and vocational standards of the corresponding sub-sectors

One of the important aspects of China's vocational education reform policy is the matching of VET program majors with related industry needs and the matching of VET program curricula with related vocational standards. This was also key to the success of ZK's previous VET programs, and what led to ZK to being accredited by MIITC as a National Talent Training Base. ZK's business practice and official qualification provide it with a good foundation to establish online VET standards in specific sub-sectors.

Indicator 2.1.1 Action goals: match 2-3 new online VET program majors and curricula with market demand and the vocational standards of the newly expanded sub-sectors.

Indicator 2.1.2 Time plan: keep updating and matching in a timely manner from 2022 to 2026

Indicator 2.1.3 Personnel and organization guarantee: (1) jointly implement via the program office and the newly established R&D office, and add two managers to the certificate program group, (2) make full use of external expert resources from industries, universities, and related government departments.

(2) Action 2.2 Establish online VET teaching standards and curricula standards in specific sub-sectors based on dominant online VET programs

With the advancement of China's vocational education reform, the development of standards and the use of standards to drive innovation have become important trends. In the development and implementation of online VET programs, ZK should rely on dominant programs with large market scale to establish online VET teaching standards and curricula standards in specific sub-sectors in the fields of industry and information technology. After becoming a standard setter, ZK will gain dual first-mover advantages in both technology and the market.

Indicator 2.2.1 Action goals: build 2-3 online VET teaching standards and curricula standards in specific sub-sectors based on 2-3 dominant online VET programs

Indicator 2.2.2 Time plan: (1) from 2023 to 2024, expand the market size of 2-3 online VET programs and highlight their vocational advantages; (2) from 2025 to 2026, establish 2-3 online VET standards in specific sub-sectors.

Indicator 2.2.3 Personnel and organization guarantee: (1) implement via the certificate program group of the program office, (2) make full use of external expert resources from industries, universities, and related government departments.

6.3.1.3 Strategic initiative 3: expand the market scale and build a brand of online VET programs

(1) Action 3.1 Expand the market scale of online degree programs and certificate programs relying on dual qualifications

Market scale is one of the basic conditions for ZK to build a VET brand. Therefore, ZK should make the most of its two qualifications as a university learning center and as a National Talent Training Base of MIITC to expand the market scale of its online degree programs and certificate programs inside and outside Sichuan province. This will be helpful for ZK with regard to promoting brand expansion.

Indicator 3.1.1 Action goals: expand the market scope from Sichuan province to the whole country, and promote online degree programs and certificate programs for business customers in specific sub-sectors in the fields of industry and information technology.

Indicator 3.1.2 Time plan: (1) from 2022 to 2026, the number of new enrollments should increase by no fewer than 20,000 every year; (2) in 2026, the number of new enrollments should increase to 100,000.

Indicator 3.1.3 Personnel and organization guarantee: set up a marketing office and add three managers to be responsible for the promotion in the eastern, central and western China.

(2) Action 3.2 Build a brand of online VET programs

A brand is a kind of identification mark and the core embodiment of excellent quality. Through brand building, ZK's strengths in the development and implementation of VET programs would earn wider recognition. Its intangible assets and market reputation would be greatly enhanced, thus providing sufficient guarantee for the implementation of ZK's differentiated strategy at more levels and in more fields.

Indicator 3.2.1 Action goals: build and promote a brand of online VET programs based on the credibility of the National Talent Training Base of MIITC.

Indicator 3.2.2 Time plan: (1) from 2022 to 2023, emphasize the qualification of the

National Talent Training Base of MIITC in the promotion of programs to increase their reputation; (2) from 2024 to 2026, establish and promote ZK's brand in online VET programs while diluting the qualification of MIITC.

Indicator 3.2.3 Personnel and organization guarantee: set up a marketing office and add two managers for brand building and operation.

6.3.2 ZK's strategic actions under the ST strategy

In order to promote the successful implementation of the above ST strategy, ZK should take the following actions over the next five years.

6.3.2.1 Strategic initiative 1: choose online degree programs as the main business, and copy the existing business model to attract new business customers in new sectors with customized online degree programs

ZK's existing business model, namely customizing online degree programs targeting industry needs, has made the most of its organizational strengths and resulted in success. This should be reproduced in ZK's future development. Copying this model to expand into new sectors and attract new business customers would help avoid external threats from a single industry and a single customer, and improve ZK's ability to avert risks.

(1) Action 1.1 Identify the VET needs of quality business customers in new sub-sectors

Indicator 1.1.1 Action goals: identify 2-3 sub-sectors that should be expanded in the fields of industry and information technology, as well as the VET needs of the corresponding 2-3 quality business customers

Indicator 1.1.2 Time plan: implement gradually from 2022 to 2023.

Indicator 1.1.3 Personnel and organization guarantee: (1) set up an R&D office, and add three managers for program development, (2) make full use of external expert resources from industries, universities, and related government departments.

(2) Action 1.2 Develop differentiated online degree programs aimed at new business customers in the newly expanded sub-sectors

Indicator 1.2.1 Action goals: aimed at the needs of 2-3 quality business customers, customize 2-3 differentiated and new online degree programs.

Indicator 1.2.2 Time plan: from 2022 to 2026, customize 2-3 new online degree programs.

Indicator 1.2.3 Personnel and organization guarantee: (1) jointly implement via the degree program group of the program office and the newly established R&D office, (2) make full use

of external expert resources from industries, universities, and related government departments.

6.3.2.2 Strategic initiative 2: increase the number of partner universities mainly to expand online degree programs and secondly develop certificate programs in corresponding majors

Increasing the number of partner universities will not only help ZK avoid its high dependence on University "A" and reduce its operating risks, but also help ZK adapt to the expansion needs of VET programs and find more suitable partner universities. This could make full use of the disiplinary advantages of these universities, and more importantly, integrate the alumni resources of partner universities to obtain rapid growth in both online degree programs and related certificate programs.

(1) Action 2.1 Increase the number of partner universities with discipline advantages based on the corresponding majors of customized online degree programs

Indicator 2.1.1 Action goals: identify 2-3 partner universities with discipline advantages corresponding to the newly developed 2-3 programs and majors.

Indicator 2.1.2 Time plan: implement gradually from 2022 to 2023.

Indicator 2.1.3 Personnel and organization guarantee: jointly implement via the degree program group of the program office and the newly established R&D office.

(2) Action 2.2 Relying on dual qualifications, mainly to expand the scale of online degree programs, and secondly to develop certificate programs in the corresponding majors

Indicator 2.2.1 Action goals: mainly promote online degree programs while secondly promoting certificate programs for business customers in specific sub-sectors in the fields of industry and information technology.

Indicator 2.2.2 Time plan: (1) from 2022 to 2026, the number of new enrollments should increase by no fewer than 10,000 every year; (2) in 2026, the number of new enrollments should increase to 50,000.

Indicator 2.2.3 Personnel and organization guarantee: set up a marketing office and add two managers for the promotion of programs.

6.3.3 ZK's strategic actions under WO strategy

ZK's previous business model is based on online degree programs, i.e., ZK, as a university online learning center, develops and manages online degree programs tailored to industry's

needs. Although this model has achieved phased success, it relies heavily on the partner universities' qualification as a provider of online degree programs, and their online learning technology platform, which puts ZK at a disadvantage. Therefore, to overcome weaknesses and seize opportunities of online VET development, ZK should reduce its reliance on both the universities and online degree programs, and focus on the development of online certificate programs based on its qualification as a National Talent Training Base of MIITC.

In order to promote the implementation of the above WO strategy successfully, ZK should take the following actions over the next five years.

6.3.3.1 Strategic initiative 1: choose online certificate programs as the main business, and bypass the qualification constraint of university online degree programs by increasing the scale of online certificate programs

(1) Action 1.1 Develop online certificate programs aimed at industry needs in the fields of industry and information technology

Indicator 1.1.1 Action goals: Customize 2-3 new online certificate programs targeting industry needs in the fields of industry and information technology.

Indicator 1.1.2 Time plan: implement gradually from 2022 to 2023.

Indicator 1.1.3 Personnel and organization guarantee: (1) set up an R&D office, and add three managers for program development, (2) jointly implement via the program office and the newly established R&D office, and adjust the structure of the program office by increasing the number of personnel in the certificate program group while reducing that in the degree program group.

(2) Action 1.2 Take advantage of its qualification as a National Talent Training Base of MIITC, and promote online certificate programs among industry customers.

Indicator 1.2.1 Action goals: change the income structure and increase the proportion of online certificate programs.

Indicator 1.2.2 Time plan: (1) from 2023 to 2024, the proportion of income from online certificate programs should increase to 30%; (2) from 2025 to 2026, the proportion of these programs should increase to 50%.

Indicator 1.2.3 Personnel and organization guarantee: set up a marketing office and add three managers for the promotion of programs.

6.3.3.2 Strategic initiative 2: develop its own online learning technology platform and promote nationwide

(1) Action 2.1 Establish its own online learning technology platform and put it into action

Indicator 2.1.1 Action goals: entrust a third party to develop the PC and mobile terminals of the online learning technology platform, and put them into use after testing.

Indicator 2.1.2 Time plan: (1) from 2022 to 2023, develop and test the online learning technology platform, and try it out and improve on it in some online degree programs; (2) from 2024 to 2026, put the new platform into use in all programs.

Indicator 2.1.3 Personnel and organization guarantee: (1) set up an IT office and add two managers for the development and maintenance of the online learning platform, (2) make full use of external expert resources from industries, universities, and related government departments.

(2) Action 2.2 Relying on the huge training market of MIITC, promote the use of the self-built online learning platform nationwide

Indicator 2.2.1 Action goals: Promote the self-built online learning platform all around the country to reduce the average cost

Indicator 2.2.2 Time plan: implement gradually from 2024 to 2026

Indicator 2.2.3 Personnel and organization guarantee: jointly implement via the marketing office and IT office.

6.3.4 ZK's strategic actions under the WT strategy

In order to overcome weaknesses and eliminate the impact of threats, ZK should reduce its reliance on a single business customer in a single sector, a single partner university, and one type of program, and increase cooperation with more universities and industry customers. Only by actively obtaining qualifications in its own right for both the university online learning center and the National Talent Training Base of MIITC can ZK expand the scale of its online degree programs and certificate programs.

In order to promote the successful implementation of the above WT strategy, ZK should take the following actions over the next five years.

6.3.4.1 Strategic initiative 1: simultaneously promote online degree programs and certificate programs simultaneously, and increase the number of partner universities

and both programs to reduce dependence on a single university and single type of program

(1) Action 1.1 Combine the universities' discipline advantages and the needs of specific industries, increase the number of partner universities and online degree programs

Indicator 1.1.1 Action goals: add 2-3 partner universities and develop 2-3 online degree programs targeting industry needs.

Indicator 1.1.2 Time plan: implement gradually from 2022 to 2023

Indicator 1.1.3 Personnel and organization guarantee: (1) jointly implement via the degree program group of the program office; (2) make full use of external expert resources from industries, universities, and related government departments.

(2) Action 1.2 Develop corresponding online certificate programs based on the online degree programs

Indicator 1.2.1 Action goals: develop 2-3 online certificate programs

Indicator 1.2.2 Time plan: implement gradually from 2022 to 2023

Indicator 1.2.3 Personnel and organization guarantee: (1) to be implemented by the certificate program group of the program office and add 2 managers to this group; (2) make full use of external expert resources from industries, universities, and related government departments.

6.3.4.2 Strategic initiative 2: develop new business customers in new sub-sectors to reduce dependence on a single customer in a single industry

(1) Action 2.1 Identify sub-sectors and business customers that can be expanded in the fields of industry and information technology

Indicator 2.1.1 Action goals: identify 2-3 new sub-sectors in the fields of industry and information technology and related business customers.

Indicator 2.1.2 Time plan: implement gradually from 2022 to 2023

Indicator 2.1.3 Personnel and organization guarantee: (1) to be implemented by the program office; (2) make full use of external expert resources from industries, universities, and related government departments.

(2) Action 2.2 Give full rein to the role of qualifications involving both the university online learning center and the National Talent Training Base of MIITC and simultaneously promote online degree programs and certificate programs

Indicator 2.2.1 Action goals: increase market size based on the two qualifications and two types of customized programs

Indicator 2.2.2 Time plan: implement gradually from 2023 to 2026

Indicator 2.2.3 Personnel and organization guarantee: (1) to be implemented by the program office; (2) add 2 managers to the certificate program group of the program office; (3) make full use of external expert resources from industries, universities, and related government departments.

6.3.5 Summary of ZK's strategic actions

Based on the above analysis, Table 6.4 summarizes the actions under the various strategic plans of ZK as follows.

Table 6.4 Summary of ZK's strategic initiatives and actions

Type of strategy	Strategic initiatives	Strategic actions	Indicators of strategic actions Action goals	Time plan	Personnel and organization guarantee
SO strategy	1. Promote online degree programs and certificate programs simultaneously, and develop and implement both programs to meet the needs of specific sectors in the fields of industry and information technology.	1.1 Identify sub-sectors that need to be expanded in the fields of industry and information technology.	Sense market opportunities in the fields of industry and information technology, and identify 2-3 sub-sectors that can be expanded	Implement in 2022	(1) Set up a R&D office, and add three managers for program development; (2) Make full use of external expert resources from industries, universities, and related government departments.
		1.2 Develop differentiated online VET programs targeting new sub-sectors	Targeting the newly expanded sub-sectors in the fields of industry and information technology, develop 2-3 new online VET programs.	In 2022, develop 2-3 new online VET programs From 2023 to 2026, implement new programs and expand the market size	(1) Jointly implement via the program office and the newly established R&D office; (2) Make full use of external expert resources from industries, universities, and related government departments.
	2. Establish online VET standards for sub-sectors in the fields of industry and information technology	2.1 Match the majors and curricula of newly developed online VET programs with market demand and the vocational standards of the corresponding sub-sectors	Match 2-3 new online VET programs in majors and curricula with market demand and the vocational standards of the newly expanded sub-sectors	Keep timely updating and matching from 2022 to 2026	(1) Jointly implement via the program office and the newly established R&D office, and add two managers to the certificate program group; (2) Make full use of external expert resources from industries, universities, and related government departments.
		2.2 Establish online VET teaching standards and curricula standards in specific sub-sectors based on dominant online VET programs	Build 2-3 online VET teaching standards and curricula standards in specific sub-sectors based on 2-3 dominant online VET programs	From 2023 to 2024, expand the market size of 2-3 online VET programs and highlight their vocational advantages From 2025 to 2026, establish 2-3 online VET standards in specific sub-sectors	(1) Implement by certificate program group of program office; (2) Make full use of external expert resources from industries, universities, and related government departments.

SO strategy	3. Expand the market scale and build a brand of online VET programs	3.1 Expand the market size of online degree programs and certificate programs relying on dual qualifications	Expand the market scope from Sichuan province to the whole country, and promote online degree programs and certificate programs for business customers in specific sub-sectors in the fields of industry and information technology.	From 2022 to 2026, the number of new enrollments should increase by no fewer than 20,000 every year. In 2026, the number of new enrollments should increase to 100,000.	Set up a marketing office and add three managers for the promotion in eastern, central and western China.
		3.2 Build a brand of online VET programs	Build and promote a brand of online VET programs based on the credibility of the National Talent Training Base of MIITC.	From 2022 to 2023, emphasize the qualification of MIITC in the promotion of programs to increase reputation From 2024 to 2026, establish and promote ZK's brand while diluting the qualification of MIITC.	Set up a marketing office and add two managers for brand building and operation.
ST strategy	1. Choose online degree programs as the main business, and copy the existing business model to develop new business customers in new sectors with customized online degree programs	1.1 Identify the VET needs of quality business customers in new sub-sectors	Identify 2-3 sub-sectors that should be expanded in the fields of industry and information technology and the corresponding 2-3 quality business customers about their VET needs.	Implement gradually from 2022 to 2023.	(1) Set up an R&D office, and add three managers for program development; (2) Make full use of external expert resources from industries, universities, and related government departments.
		1.2 Develop differentiated online degree programs aimed at new business customers in newly expanded sub-sectors	Aimed at the needs of 2-3 quality business customers, customize 2-3 differentiated and new online degree programs.	Implement gradually from 2022 to 2023.	(1) Jointly implement via the degree program group of the program office and the newly established R&D office; (2) Make full use of external expert resources from industries, universities, and related government departments.

ST strategy	2. Increase the number of partner universities to mainly to expand online degree programs and secondly develop certificate programs in corresponding majors	2.1 Increase the number of partner universities with discipline advantages based on the corresponding majors of customized online degree programs	Identify 2-3 partner universities with discipline advantages corresponding to the newly developed 2-3 programs and majors.	Implement gradually from 2022 to 2023.	Jointly implement via the degree program group of the program office and the newly established R&D office
		2.2 Relying on dual qualifications, mainly expand the scale of online degree programs, and secondly develop certificate programs in the corresponding majors	Mainly promote online degree programs while secondly promoting certificate programs for business customers in specific sub-sectors in the fields of industry and information technology.	From 2022 to 2026, the number of new enrollments should increase by no fewer than 10,000 every year in 2026, the number of new enrollments should increase to 50,000.	Set up a marketing office and add two managers for the promotion of programs
WO strategy	1. Choose online certificate programs as the main business, and bypass the qualification constraint of university online degree programs by increasing the scale of online certificate programs	1.1 Develop online certificate programs aimed at industry needs in the fields of industry and information technology	Customize 2-3 new online certificate programs targeting industry needs in the fields of industry and information technology.	Implement gradually from 2022 to 2023.	(1) Set up an R&D office, and add three managers for program development; (2) Jointly implement via the program office and the newly established R&D office, and adjust the structure of the program office by increasing the number of personnel in the certificate program group while reducing that in the degree program group.
		1.2 Take advantage of the qualification of National Talent Training Base of MIITC, and promote online certificate programs among industry customers.	Change the income structure and increase the proportion of online certificate programs.	From 2023 to 2024, the proportion of income from online certificate programs to increase to 30%. From 2025 to 2026, the proportion of these programs to increase to 50%.	Set up a marketing office and increase three managers for the promotion of programs

WO strategy	2. Develop own online learning technology platform and promote nationwide	2.1 Establish its own online learning technology platform and put it into use	Entrust a third party to develop the PC and mobile terminals of the online learning technology platform, and put them into use after testing	From 2022 to 2023, develop and test the online learning technology platform, and try it out and improve on it in some online degree programs. From 2024 to 2026, put the new platform into use in all programs.	(1) Set up an IT office and increase two managers for the development and maintenance of online platform; (2) Make full use of external expert resources from industries, universities, and related government departments.
		2.2 Relying on the huge training market of MIITC, promote the use of the self-built online learning platform nationwide	Promote the self-built online learning platform to the whole country	Implement gradually from 2024 to 2026	Jointly implement by marketing office and IT office
WT strategy	1. Promote online degree programs and certificate programs simultaneously, and increase the number of partner universities and both programs to reduce dependence on a single university and single type of program	1.1 Combining the discipline advantages of universities and the needs of specific industries, increase the number of partner universities and online degree programs	add 2-3 partner universities and develop 2-3 online degree programs targeting industry needs.	Implement gradually from 2022 to 2023	(1) Implement by the degree program group from program office; (2) Make full use of external expert resources from industries, universities, and related government departments.
		1.2 Develop corresponding online certificate programs based on online degree programs	Develop 2-3 online certificate programs	Implement gradually from 2022 to 2023	(1) Implement by the certificate program group of program office and increase 2 managers in this group, (2) Make full use of external expert resources from industries, universities, and related government departments.

WT strategy	2. Develop new business customers in new sub-sectors to reduce dependence on a single customer in a single industry	2.1 Identify sub-sectors and business customers that can be expanded in the fields of industry and information technology	Identify 2-3 new sub-sectors in the fields of industry and information technology and related business customers.	Implement gradually from 2022 to 2023	(1) Implement by program office; (2) Make full use of external expert resources from industries, universities, and related government departments.
		2.2 Give full play to the role of both qualifications involving the university online learning center and National Talent Training Base of MIITC and promote online degree programs and certificate programs simultaneously	Increase market size based on two qualifications and two types of customized programs	Implement gradually from 2023 to 2026	(1) Implement by program office; (2) Make full use of external expert resources from industries, universities, and related government departments.

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Chapter 7: Conclusion and Discussion

7.1 Conclusion

With the advance of China's economic development, the VET industry is experiencing rapid growth and change. In this industry, small private institutions are market-oriented and flexible, and play an active role in linking the demand and supply of VET programs which are mainly provided by vocational colleges and universities, and firms' internal training centers. However, these small, private institutions have always faced the dual dilemma of a shortage of educational resources and little or no market reputation and, consequently, have struggled to develop and expand. Therefore, in today's rapidly changing industrial environment, it is of important research significance to explore how these small private VET institutions found ways round the double dilemma to gain competitive advantages by constructing dynamic capabilities.

This thesis takes ZK as its research object. As a representative small private VET institution, ZK faced the aforementioned dual dilemma from the moment it was first established. However, ZK has successfully found ways round it by building dynamic capabilities to implement differentiation strategies. ZK's economic indicators, market reputation and government recognition have all been excellent compared to other small private VET institutions. The development and final success of ZK demonstrates the dynamic process of building dynamic capabilities and gaining competitive advantages. It was for this reason that ZK was chosen for this thesis, and a descriptive case study was conducted to analyze its past, present and future development and to explore the evolutionary process of ZK's dynamic capabilities.

The thesis uses strategic management theory and analysis tools to carry out the descriptive case study of ZK. Firstly, the thesis outlines the historical development of ZK since its establishment and divides the process into three stages. This thesis describes how ZK transformed from an ordinary offline VET organization providing IT training for multiple industries (in the first stage) to a differentiated online institution providing online degree programs and certificate programs targeting the electric-power industry (in the second and third stages). During this process, ZK successfully got round the dual dilemma of the shortage of educational resources and little or no market reputation by obtaining access to two important

qualifications involving the learning center for online university degree programs (in the second stage) and the National Talent Training Base accredited by MIITC (in the third stage). This introduction provides background for the descriptive case study based on the dynamic capabilities framework.

Secondly, by using analytical tools involving PEST analysis and the five-force model, and macro-level, industry-level data and interview data, the thesis analyzes ZK's external environment from an evolutionary perspective. The research content includes (1) how the external scenario has evolved since the start of ZK, (2) what the current external strategic context and competitive scenario is, and (3) the expected changes to the external scenario that would likely affect the future development of ZK.

Based on this analysis of the external environment, the thesis concludes that the three key opportunities available to ZK are as follows: (1) the economic transformation in China that is driving VET market expansion, (2) the popularization of online education that is greatly enhancing market demand for VET, and (3) VET policies focusing on industry demand, and guiding the development goals of standardization and high-quality to promote the healthy development of the industry. Accompanying the above opportunities, are two key threats that ZK faces (1) ZK's high dependence on a single business customer in a single industry leads to potentially high market risk, and (2) ZK's high dependence on one partner university limits the scale of expansion of its online degree programs.

Thirdly, combining the interview data with the dynamic capabilities theory reviewed in Chapter 2, the thesis conducts a descriptive case study on ZK's dynamic capabilities and micro-foundations, and draws conclusions as to the strengths and weaknesses of ZK. This shows that ZK's success lies in its transformation from a representative small private VET institution to a learning center for online university degree programs and a National Talent Training Base of MIITC. And this transformation, which was the result of ZK's dynamic capabilities of sensing opportunities and threats, seizing opportunities, and managing threats and reconfiguring resources in VET industry, as well as the micro-foundations of these capabilities, has enabled ZK to get round the dual dilemma and gain a competitive advantage.

The descriptive case study on ZK shows that its dynamic capability of sensing opportunities and threats in different segments of the VET industry has two micro-foundations, namely entrepreneurship and social capital at both the individual and organizational level. These provide strong support for ZK to seize opportunities and manage threats. ZK's dynamic capability of seizing opportunities involves four micro-foundations: its business design model based on the value chain; integrating resources including complements; organizational

flexibility; and commitment and implementation. The micro-foundations of ZK's dynamic capability of managing threats and reconfiguring resources are organizational learning and knowledge management.

Based on analyses of ZK's dynamic capabilities and micro-foundations, the thesis summarizes the strengths and weaknesses of ZK and concludes that the strengths of ZK are: (1) ZK has the dynamic capability of sensing and managing opportunities and threats, and is good at developing and updating differentiated VET programs based on the changing market environment; (2) it has the dynamic capability of seizing opportunities and is good at using the official qualifications of universities and MIITC to enhance its market reputation, and (3) it has the dynamic capability of integrating and reconfiguring resources and is good at designing and implementing new business models to expand its market scale. With regard to the weaknesses of ZK, it is concluded that it lacks two key complementary resources, namely the official online university degree program qualification in its own right, and its own online learning technology platform.

Finally, based on the analyses of the external environment and internal organization focusing on dynamic capabilities and their micro-foundations, the thesis uses the SWOT matrix to identify the main strategic issues and propose ZK's future strategic initiatives and related actions. Combining ZK's strengths and weaknesses with the opportunities and threats it faces, the thesis proposes four strategic clusters, which are: the SO strategy, the ST strategy, the WO strategy and the WT strategy.

Specifically, the thesis shows that to take advantage of opportunities through existing strengths, ZK's strategic initiatives under the SO strategy should be to (1) promote online degree programs and certificate programs simultaneously, and develop and implement both programs to meet the needs of specific sectors in the fields of industry and information technology, (2) establish online VET standards for these sectors, and (3) expand the market scale of ZK's online VET programs and establish a brand for them.

To take advantage of strengths to eliminate or reduce the impact of threats, ZK's strategic initiatives under the ST strategy should be to (1) choose online degree programs as the main business, and copy the existing business model to develop new business customers in new sectors with customized online degree programs, and (2) increase the number of partner universities to first of all expand online degree programs and secondly develop certificate programs in corresponding majors.

To take advantage of opportunities by overcoming weaknesses, ZK's strategic initiatives under the WO strategy should be to (1) choose online certificate programs as the main business,

and bypass the qualification constraint of online university degree programs by increasing the scale of certificate programs, and (2) develop its own online learning technology platform and promote it nationwide.

To reduce the impact of the threats that could be compounded by weaknesses, ZK's strategic initiatives under the WT strategy should be to (1) promote online degree programs and certificate programs simultaneously, and increase the number of partner universities and programs to reduce its dependence on a single university and single type of program, and (2) develop new business customers in new sectors to reduce dependence on a single customer in a single industry.

The implication of this thesis with regard to management practice is as follows. The results accrued from this research applying the theory of dynamic capabilities to VET institutions, and conducting a descriptive case study on a representative small private VET institution in China (ZK), will benefit similar VET institutions, local regulators and other stakeholders in the VET industry in China, as well as any foreign institutions interested in the Chinese VET industry. In practice, with the acceleration of China's economic transformation, the VET industry has developed greatly. The rapidly changing environment has promoted the development of dynamic capabilities for VET institutions. Studying this process of dynamic evolution, therefore, helps to deepen our understanding of the changes in the VET industry, as well as the dynamic capabilities and micro-foundations of the VET institutions. This thesis focuses on the evolutionary path ZK as it built its dynamic capabilities in order to get round the dual dilemma of the shortage of VET resources and little or no market reputation to finally gain competitive advantage. As well as revealing the strengths and weaknesses of ZK and the opportunities and threats ZK faces, it puts forward strategic choices for the future development of ZK. This research not only provides a good reference for the construction of dynamic capabilities and micro-foundations of similar VET institutions in China, but also helps local regulators to understand the basic demands of these VET institutions and improve related policies. It also helps other stakeholders to fully understand the typical characteristics of this type of VET institution and achieve better cooperation. In addition, this thesis also has important practical significance for any foreign institutions interested in the Chinese VET industry by helping them understand the dynamic environment and main stakeholders of China's VET industry and the way small private VET institutions evolve.

7.2 Research limitations and future research

The research objects and methods of the thesis have limitations. This thesis chose to conduct a single case study on ZK, a representative small private VET institution, based on its evolution over three development stages. Although this case has characteristics that are both common and descriptive, ZK is only one object. ZK shares many commonalities with similar VET institutions, but also has its own individual characteristics such as its founder's entrepreneurship and social capital. These factors provide ZK with important micro-foundations upon which to build a dynamic capability of seizing opportunities and threats, which may be difficult for other similar institutions to replicate. Thus, there are limitations to using a single case study on ZK to reveal the relationship between the dynamic capabilities, competitive advantages, and strategy selection of all small private VET institutions.

In this regard, the research conclusions reached in this thesis not only need to be verified in a larger sample of the VET industry, using methods of multi-case study or quantitative models, but also need to be extended to more industries and countries. First of all, given the limitations of a single case study, future research could use a multi-case study to compare and refine different types of representative cases. Second, future research could use more data and build structural equation models to test the relationship between dynamic capabilities and competitive advantage. The data could include the primary data obtained through questionnaires and interviews, or reliable secondary data. Finally, future research could be expanded beyond the VET industry in China to consider a research sample involving other industries and countries.

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Annex A: Interview Guide

Part I: Interview guide for ZK's top managers including the founder/dean, vice dean and administrative director

1. Since the establishment of ZK, what changes have taken place in the VET market environment, especially the policy and technology environment?
2. How did ZK sense opportunities and threats of the VET market?
   (1) What are the personal characteristics of the founder? What social capital does he have? What role did these two aspects play in sensing opportunities and threats of the VET market?
   (2) What are the characteristics of the electric-power company's VET demand? How did ZK position itself in VET segment of the electric-power industry?
   (3) Compared with the past, present and future, what has changed in ZK's opinions of opportunities and threats of the VET market?
3. How did ZK seize the opportunities of the VET market to design a new business model?
   (1) In the face of new market opportunities, how did ZK target the VET demand of electric-power industry and redesign its business model?
   (2) How did ZK integrate internal and external resources to provide support for new business model? Specifically, how did ZK lock in SGCC Sichuan company that is a State-owned monopoly? How did ZK establish cooperative relationship with public universities and become their online learning center? How did ZK become a National Talent Training Base for MIITC?
   (3) What were the main difficulties facing ZK in this process? How did ZK overcome them?
   (4) What role did the founder's personal characteristics and social capital play in ZK's seizing market opportunities?
4. How did ZK manage threats and reconfigure resources to develop and refine the new business model?
   (1) How did ZK manage threats and reconfigure its resources to develop a new business models? What were the main difficulties during the process? How did ZK overcome them?

(2) As an online learning center, how did ZK manage the stakeholders including corporate customer, public universities and government department? How did these management help refine the new business model?

(3) How did ZK align exsiting capabilities and develop new capabilities through knowledge management?

(4) What are the potential risks of ZK's current business model? What is the possible solution?

5. For the future development of ZK, how important are the dynamic capabilities of sensing, seizing and reconfiguring? How does ZK rank in each of these dynamic capabilities?
6. For the future development of ZK, how important are the microfoundations of sensing capabilities such as entrepreneurship and social capital? How important are the microfoundations of seizing capabilities such as designing business model by innovation, integrating resources including complements, organization flexibitliy, and commitment and implementation? How important are the microfoundations of managing threats and reconfiguring capabilities such as organization flexibitliy, managing cospecialization, organizational learning and knowledge management? How does ZK rank in each of microfoudnations mentioned above?
7. Which future challenges will ZK likely face in terms of changing customer requirements, technology, regulation and competition?

Part II: Interview guide for project managers of ZK's online learning programs

1. What are the characteristics of ZK's online learning programs? What are the strengths and weaknesses compared to similar programs?
2. What are the administration support, technology support, faculty and student support for ZK's online learning programs? How effective are these support measures?
3. Have ZK's online learning programs established a quality evaluation system? Has it been effectively implemented?
4. During the process of program implementation, how to manage the relationships with external stakeholders including corporate customer, students, cooperation universities, and government department?
5. How did external stakeholders evaluate ZK's online learning programs?
6. What are the main challenges facing ZK's online learning programs? What would be the possible solution?

7. For the future development of ZK, how important are the dynamic capabilities of sensing, seizing and reconfiguring? How does ZK rank in each of these dynamic capabilities?
8. For the future development of ZK, how important are the microfoundations of sensing capabilities such as entrepreneurship and social capital? How important are the microfoundations of seizing capabilities such as designing business model by innovation, integrating resources including complements, organization flexibitliy, and commitment and implementation? How important are the microfoundations of managing threats and reconfiguring capabilities such as organization flexibitliy, managing cospecialization, organizational learning and knowledge management? How does ZK rank in each of microfoudnations mentioned above?
9. Which future challenges will ZK likely face in terms of changing customer requirements, technology, regulation and competition?

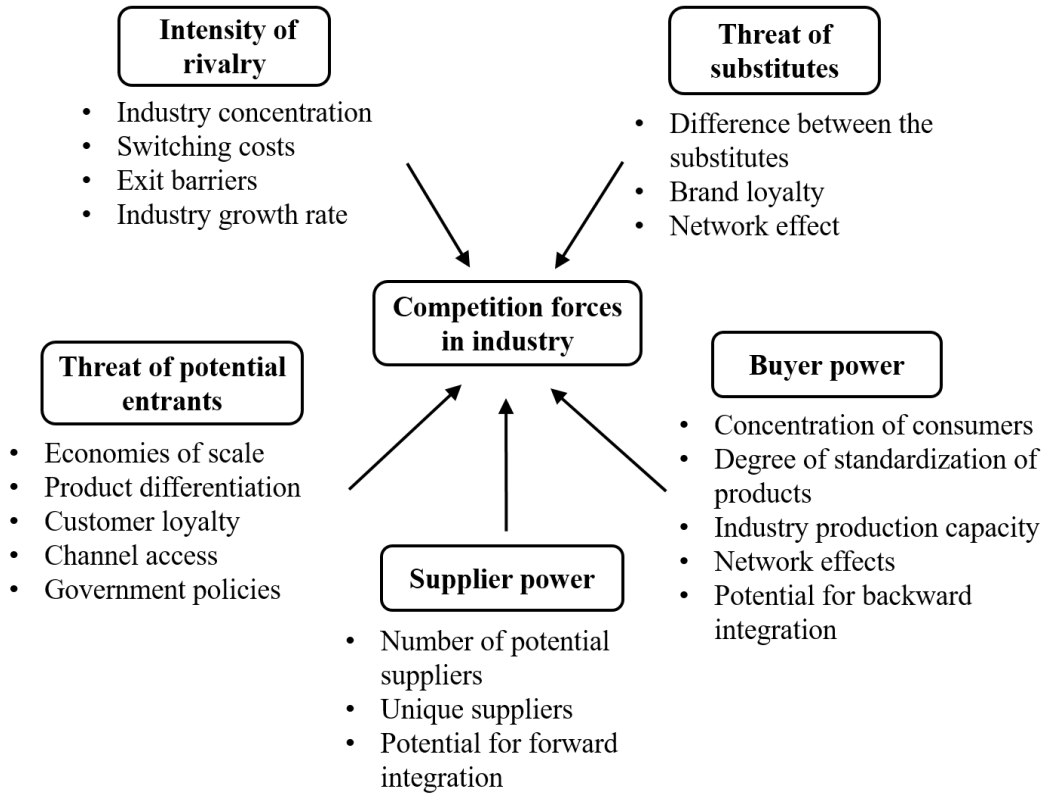
Part III: Interview guide for external stakeholders from corporate customer, cooperation universities, government department and students

1. What are the characteristics of ZK's online learning programs? What are the strengths and weaknesses compared to similar programs?
2. What is the management quality of ZK's online learning programs? Have these programs achieved the expected goal?
3. Is it possible to keep cooperation with ZK in the future? why?
4. For the future development of ZK, how important are the microfoundations of sensing capabilities such as entrepreneurship and social capital? How important are the microfoundations of seizing capabilities such as designing business model by innovation, integrating resources including complements, organization flexibitliy, and commitment and implementation? How important are the microfoundations of managing threats and reconfiguring capabilities such as organization flexibitliy, managing cospecialization, organizational learning and knowledge management?
5. How does ZK perform in each of dynamic capabilities (sensing, seizing and reconfiguring) and each of microfoudnations (entrepreneurship, social capital, designing business model by innovation, integrating resources including complements, organization flexibitliy, commitment and implementation, organizational learning and knowledge management)?
6. Which future challenges will ZK likely face in terms of changing customer requirements, technology, regulation and competition?

Annex B: Tables and Figures

Annex B.1 Projected use of training providers in China (share of training)

Source: World Economic Forum (2018)



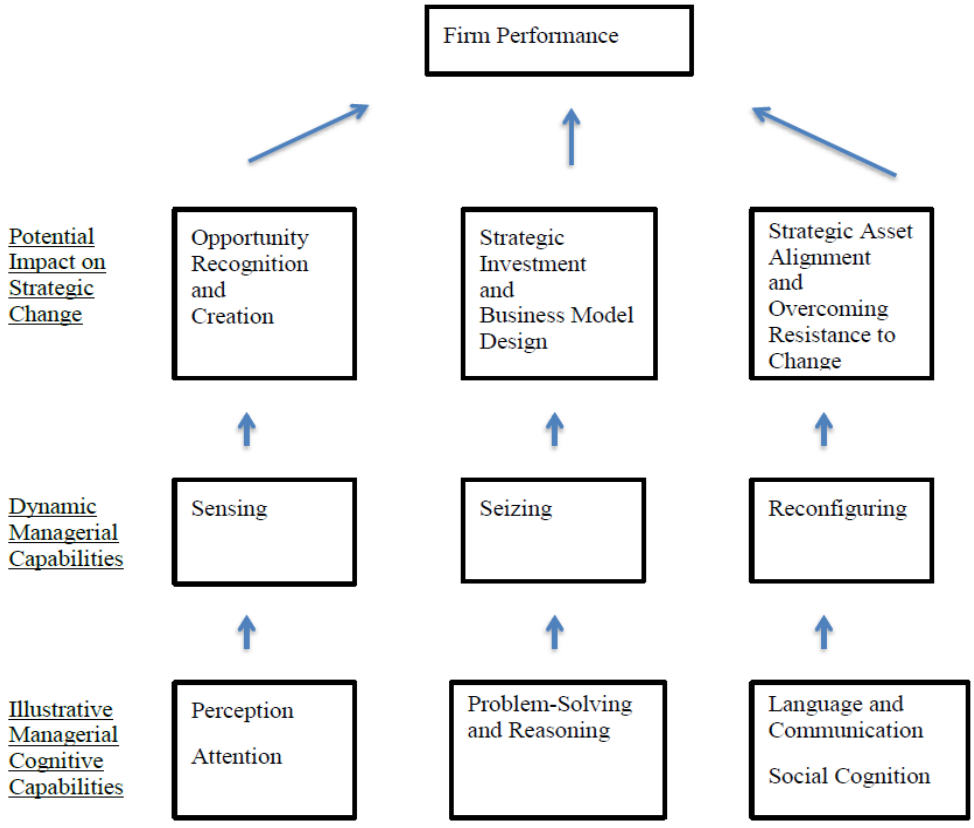
Annex B.2 Porter's Five Forces framework

Source: Adapted from Porter (1980).

Annex B.3 VRIO framework and its application

Is a resource or capability:					
Valuable?	**Rare?**	**Costly to imitate?**	**Exploited by organization?**	**Competitive implications**	**Strength or weakness**
No	—	—	No	Competitive disadvantage	Weakness
Yes	No	—	↕	Competitive parity	Strength
Yes	Yes	No	↕	Temporary competitive advantage	Strength and distinctive competence
Yes	No	Yes	Yes	Sustained competitive advantage	Strength and sustainable distinctive competence

Note: competitive parity means that a firm creates the same economic value as their rivals.
Source: Barney and Hesterly (2015)



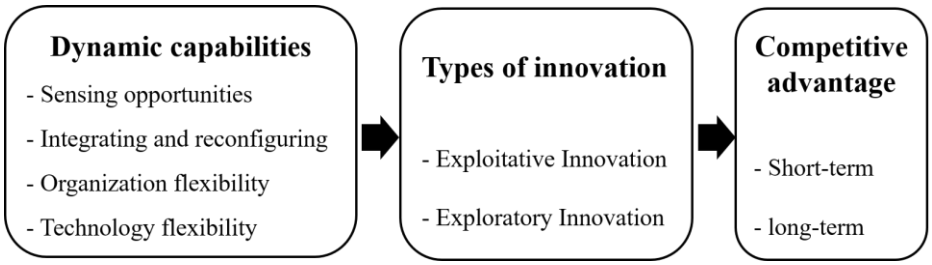
Annex B.4 Microfoundations of dynamic managerial capabilities in Helfat and Martin (2015)

Source: Helfat and Martin (2015)

Annex B.5 Microfoundations of dynamic capabilities in Dixon et al. (2014)

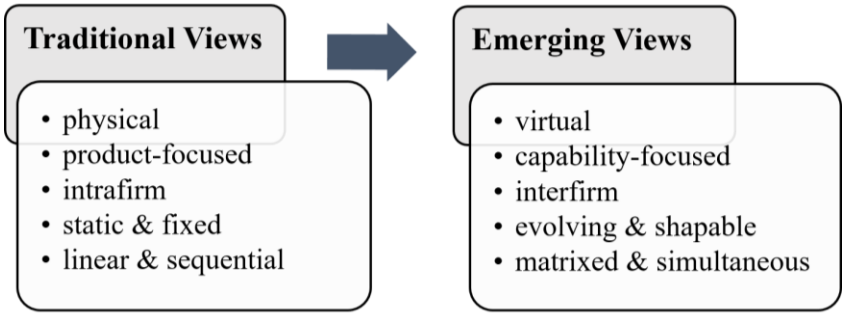
Dynamic Capabilities	*Second-order Capability*	*Microfoundations*
Adaptation	Exploitation	(1) Knowledge acquisition, (2) Knowledge internalization, (3) Knowledge dissemination
	Deployment	(1) Resource reconfiguration, (2) Resource divestment, (3) Resource integration
	⇩	
	Operational capabilities (Catch-up and survival)	
Innovation	Exploration	(1) Search, (2) Experimentation, (3) Risk-taking
	Path creation	(1) Project selection, (2) Project funding, (3) Project implementation
	⇩	
	Unique capabilities, Potential competitive advantage	

Source: Dixon, Meyer, and Day (2014)



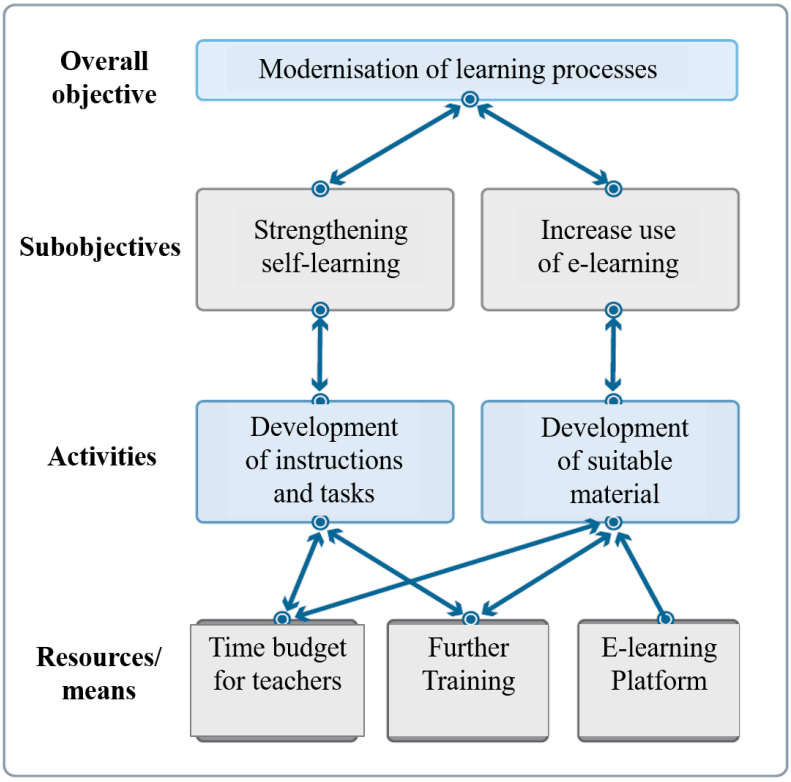
Annex B.6 Dynamic capabilities, innovation and competitive advantage in Jiao (2011)

Source: Jiao (2011)



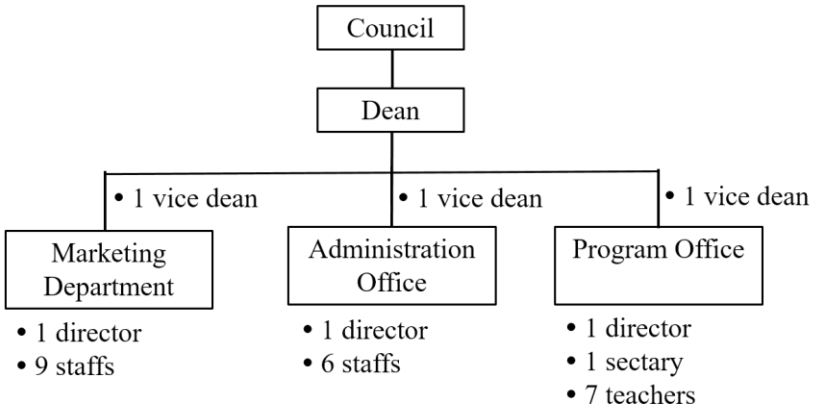
Annex B.7 The evolution of the value chain analysis

Source: Freeman and Liedtka (1997)

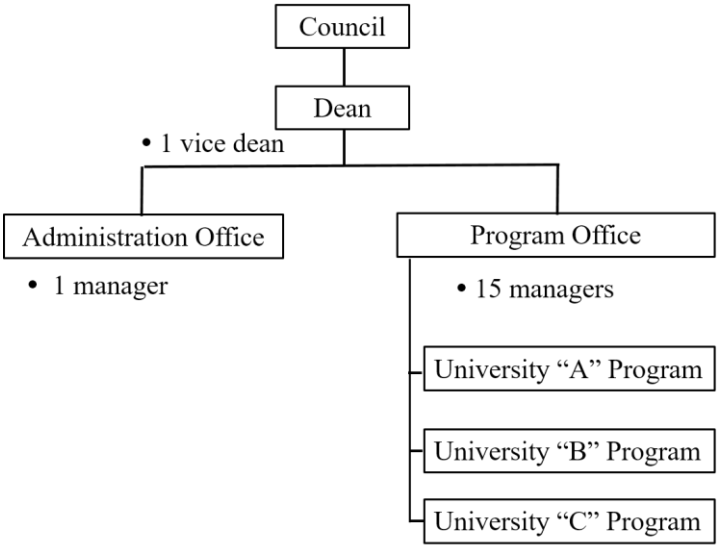


Annex B.8 An example of strategic planning of VET institutions

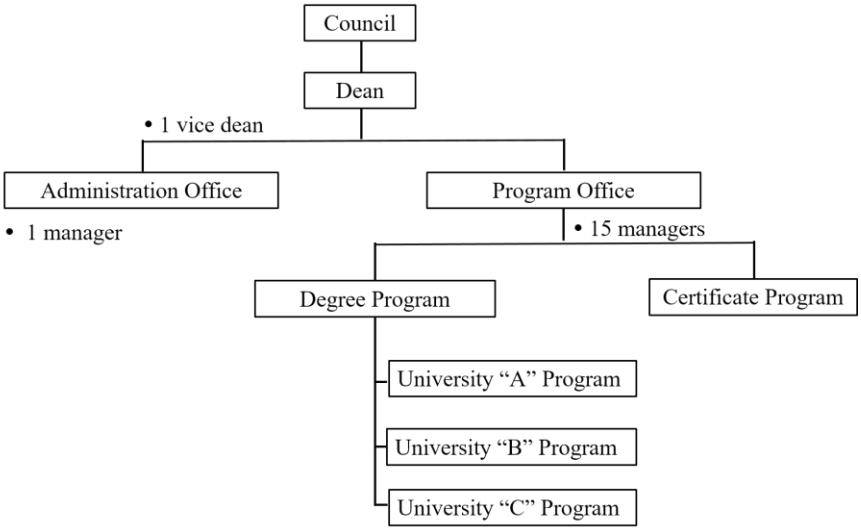
Source: Cedefop (2015)



Annex B.9 ZK's organizational structure and personnel composition in Stage I

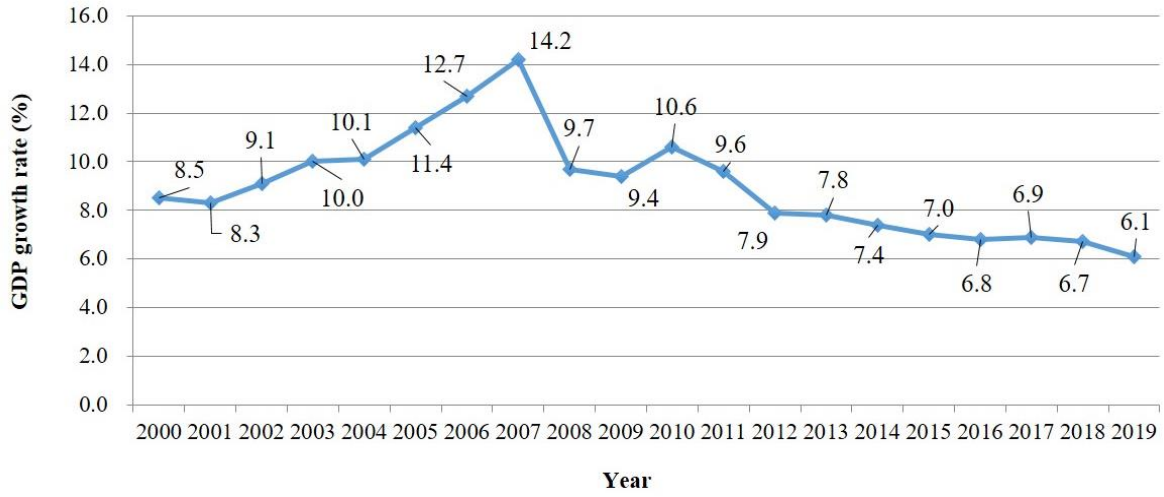


Annex B.10 ZK's organizational structure and personnel composition in Stage II



Note: The University "C" program has been omitted from 2017 because ZK cancelled this program.

Annex B.11 ZK's organizational structure and personnel composition in Stage III



Annex B.12 Annual GDP growth rate from 2000 to 2019 in China

Source: National Bureau of Statistics of China (2020a)

Annex B.13 Composition of educational attainment of the labor force and employed population in 2010

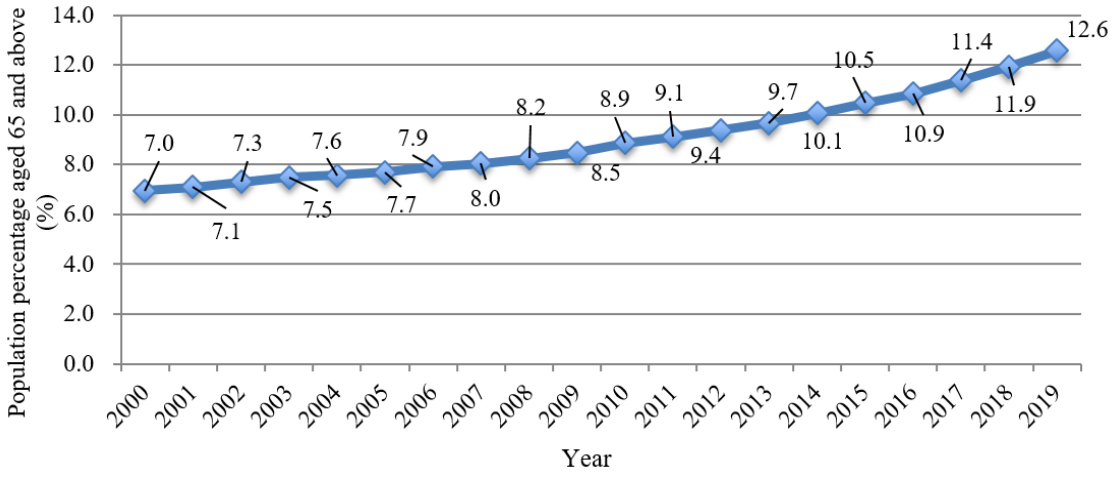
Composition ratio of educational attainment (%)	High school and below	College students	Undergraduates	Postgraduates
The labor force	89.0	6.3	4.3	0.4
The employed population	89.9	6.0	3.7	0.4
Among them: Manufacturing	90.2	6.4	3.1	0.3
Industry of electricity production and supply	63.3	23.4	12.5	0.9

Source: National Bureau of Statistics of China (2012)

Annex B.14 Industrial and employment structure of the secondary and tertiary industries in 2000-2019

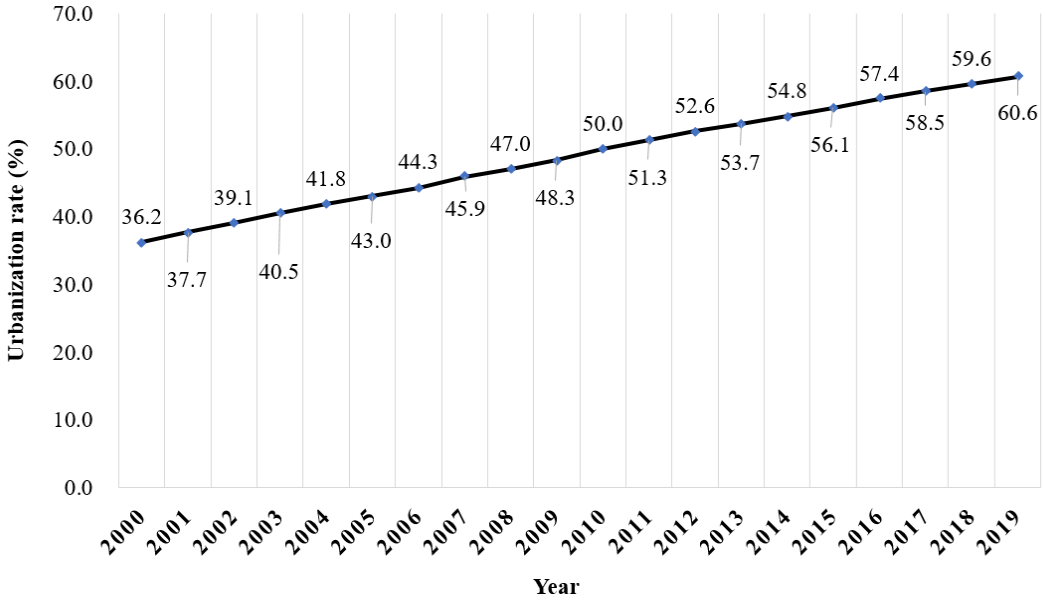
Year	Contribution ratio of industry to GDP growth (%)		Ratio of employees in industry (%)	
	Secondary industry	Tertiary industry	Secondary industry	Tertiary industry
2000	45.5	39.8	22.5	27.5
2001	44.8	41.2	22.3	27.7
2002	44.5	42.2	21.4	28.6
2003	45.6	42.0	21.6	29.3
2004	45.9	41.2	22.5	30.6
2005	47.0	41.3	23.8	31.4
2006	47.6	41.8	25.2	32.2
2007	46.9	42.9	26.8	32.4
2008	47.0	42.9	27.2	33.2
2009	46.0	44.4	27.8	34.1
2010	46.5	44.2	28.7	34.6
2011	46.5	44.3	29.5	35.7
2012	45.4	45.5	30.3	36.1
2013	44.2	46.9	30.1	38.5
2014	43.1	48.3	29.9	40.6
2015	40.8	50.8	29.3	42.4
2016	39.6	52.4	28.8	43.5
2017	39.9	52.7	28.1	44.9
2018	39.7	53.3	27.6	46.3
2019	39.0	53.9	27.5	47.4

Source: National Bureau of Statistics of China (2020a)



Annex B.15 Ratio of population aged 65 and over to total population in China (%)

Source: National Bureau of Statistics of China (2020a)



Annex B.16 Urbanization rate in China from 2000 to 2019 (%)

Source: National Bureau of Statistics of China (2020a)

Annex B.17 Technical input and output of industrial enterprises above designated size

Year	Percentage of enterprises having R&D activities (%)	Percentage of expenditure on R&D to sales revenue (%)	Number of patent applications (10,000 pieces)
2011	11.5	0.7	38.6
2012	13.7	0.8	49.0
2013	14.8	0.8	56.1
2014	16.9	0.8	63.1
2015	19.2	0.9	63.9
2016	23.0	0.9	71.5
2017	27.4	1.1	81.7
2018	28.0	1.3	95.7

Note: Industrial enterprises above designated size are all enterprises with annual revenue from principal business over 20 million yuan. Due to the inconsistency of statistical calibers before 2011, this table only presents data since 2011.

Source: National Bureau of Statistics of China (2020a)

Annex B.18 Telecommunication services available and Internet development since 2000

Year	Popularization rate of mobile telephone (set/100 people)	Number of Internet Users (10000 people)	Popularization rate of Internet (%)
2000	6.7	2250	-
2001	11.5	3370	-
2002	16.1	5910	4.6
2003	21.0	7950	6.2
2004	25.9	9400	7.3
2005	30.3	11100	8.5
2006	35.3	13700	10.5
2007	41.6	21000	16
2008	48.5	29800	22.6
2009	56.3	38400	28.9
2010	64.4	45730	34.3
2011	73.6	51310	38.3
2012	82.5	56400	42.1
2013	90.3	61758	45.8
2014	94.0	64875	47.9
2015	92.5	68826	50.3
2016	95.6	73125	53.2
2017	102.0	77198	55.8
2018	112.2	82851	59.6
2019	114.4	-	-

Note: Popularization rate of Internet use refers to the proportion of Internet users in the total population
Source: National Bureau of Statistics of China (2020a)

Annex B.19 Competitors in Sichuan vocational training market in Stage I

Year	2003	2004	2005	2006	2007	2008	2009
Higher education institution	62	68	72	76	76	78	92
Secondary vocational school	-	-	-	-	587	571	556
Private VET institution	-	-	459	391	637	365	338

Note: The higher education institutions include universities and higher vocational colleges.
Source: Sichuan Provincial Bureau of Statistics (2020)