

The Mechanism of Resource Constrained Innovation in Technological SMEs

A Case Study on the Perspective of Resource-focused Action

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Abstract—We explore how technology SMEs can improve their capabilities through resource-focused actions and break through resource constraints in this particular resource-constrain situation and become a hidden champion in the industry. By providing insight into the relation between resource-focused action and resource-constrain innovation, our analysis further replenishes the existing research on resource action, specify the role and the value of resource-focused action on the growth of technological SMEs, especially on the context of resource-constrain situation. At the same time, it serves to guide the management practice of SMEs in resource distress.

Keywords—*Esource-constrained innovation; RBV; Resource orchestration; Resource-focused action*

I. INTRODUCTION

Resource limitation is a problem that has always been faced in the process of enterprise development[1]. How to continuously improve enterprise value on the basis of limited resource stock is a long-term problem faced by managers. From the perspective of resource-based theory, there should be a negative correlation between resource constraints and firm performance[2]. Although resource constraints are a serious limitation of corporate innovation, existing research has gradually found that resource-constrained environments can even promote innovation. Baskaran and Mehta(2016) through multiple case studies of several young entrepreneurs, claims that resource limitation is an important driving force for innovation from the perspective of youth Starting from two resource-restricted situations: knowledge limitation and financial restriction[3]. Keupp and Gassmann (2013)believed that resource restriction is an important trigger for enterprise radical innovation[4].

The Resource-based theory may be cannot explain the problem of innovation in the context of resource constraints. The main reason is the RBV ignore the role of Manager's ability to act between resources and capabilities[5,6]. Basing on this, Sirmon et al. (2011) proposed the concept of resource orchestration, which argue that managers' resource-focused action is the key to organizational dynamic capabilities[7–9]. Under the guidance of this theory, rather than the resources itself, the effective organizational resource-focused action become the key to the enterprises success. Thus, in the context of resource constraints, how the resource-focused action can

break resource constraints, and What is the main mechanism to bridge the resource constraints and successful technology innovation?

Based on the research of resource-constraint innovation and resource-focused action, this study explores the different resource constrain scenarios faced by enterprises at different stages by the typical case study. The research can also explain how enterprises effectively use their resources to break through the constraints of different stages, achieve resource-constrain innovation and grow into a "hidden Champion".

II. RESEARCH DESIGN

This study aims to summarize the resource action patterns and mechanisms under RCI, which are typical “how” and “why” issues, while case studies are mainly used to explore “how” and “why” issues[10]. Therefore, we select case study methods. We also consider the availability of data and the applicability of research questions, so choose to use single case studies to explore the interaction rules and mechanisms between resource limitation scenarios, innovative behaviors and resource-focused actions at different stages of the enterprise development.

As a typical representative of the new economy, China has emerged a series of typical cases of RCI with strong representativeness and typicality. East Space Light Technology Co., Ltd. (hereinafter referred to as ESL), which located in Shenzhen of China, is a well-known enterprise in domestic PCB manufacturing equipment and testing equipment. ESL has replaced those well-known companies from Japan and Germany and become a “hidden Champion” of photoplotter and flying probe test equipment manufacturer.

III. HOW RESOURCE-FOCUSED ACTION BREAKS THROUGH THE DUAL RESOURCE CONSTRAIN - THE AUXILIARY ROLE OF INDUSTRIAL COLLABORATION

Faced with the dual resource constraints, small and medium-sized technology companies need to break through the resource constraints of different stages of their own development, and to meet the low-cost requirements of resource constraints at the market level. Under the dual resource constraints, enterprise resource action is the biggest balance of corporate behavior under two constraints. In the

process of breaking through restrictions and achieving frugal innovation, enterprise resource-focused action needs to simultaneously achieve market thrift requirements through industry collaboration at different stages. The cooperation of resource-focused action and industry collaboration has broken through the resource limitation situation from both the enterprise and market levels, and thus realized the RCI under the special situation of dual resource constrains.

A. Technological Breakthrough Stage

In this stage of technology-- market the dual resource constrains, the company relies on the "focusing" resource action model to passively assemble existing technology and talents, and achieve key technological breakthroughs based on limited resources through efficient technical research teams. Meanwhile, in order to reduce the cost of products as much as possible, the resource-focused actions are closely dependent on vertical industrial collaboration which mainly focused on synergies with front-end suppliers in the industry chain. In the process of innovation ideas to the realization of innovation results, vertical front-end industrial collaboration on the one hand complements the resource stock limit in the early stage of enterprise development, supports the realization of "focus" resource action; on the other hand, it greatly reduces external collaboration The cost of the enterprise's innovative products at the production level meets the requirements of resource constraints at the market level.

B. Technological Upgrade Stage

Faced with the dual resource constraints from the customer-market, the company relies on the "deepening" resource action model to optimize the internal processes of the organization on the basis of technological innovation and achieve efficient interaction between the internal and external resources of the organization. the interaction between enterprise and customers gradually gained market recognition and accumulated stable customer resources. The continuous enrichment of customer resources and close interaction with customers also provide a large amount of material information for enterprise technology updates, which accelerate the speed of enterprise technology iterative update.

Meanwhile, at this stage, the reason why the resource-focused action of the enterprise can achieve efficient coordination between internal and external, is the vertical coordination in the industry chain. The enterprise relies on the vertical cooperation of the suppliers in the front suppliers and the end users of the industry chain, which not only supports the requirements of enterprise technology update but also supports the rapid interaction of internal and external resources of the organization. The vertical synergy of the industry maximizes the production efficiency of the enterprise and thus better meets the requirements of market resource constraints.

C. Technological Transfer Stage

With the accumulation of customer resources, the company has gradually become a leader with the advantage of cost performance. At the same time, the limitation of industry capacity has become another resource limitation situation for enterprises. The "ceiling" of the industry has severely restricted

the size of the enterprise, so breaking the constraints of the industry has become the core of the enterprise resource action at this stage. However, for SMEs, due to the size of the enterprise, enterprises can only carry out technology transfer and transformation based on their existing technology and market resources. By the horizontal "expanding" resource-focused action, enterprises seek to expand the internal field of the industry and technology extension of the external industry in the process of technological innovation to break through the limits of industry resources.

At this stage, in the process of technology transfer, it is also necessary to meet the resource constrain requirements in the new industry. Therefore, the resource action of horizontal expanding of enterprises needs to rely on cross-industry industry collaboration. Through horizontal cross-industry collaboration, enterprises can still guarantee the cost advantage in the new industry, and greatly satisfy the breakthrough of their own level resources constrains and the requirements for "good enough" products under market-level resource constraints.

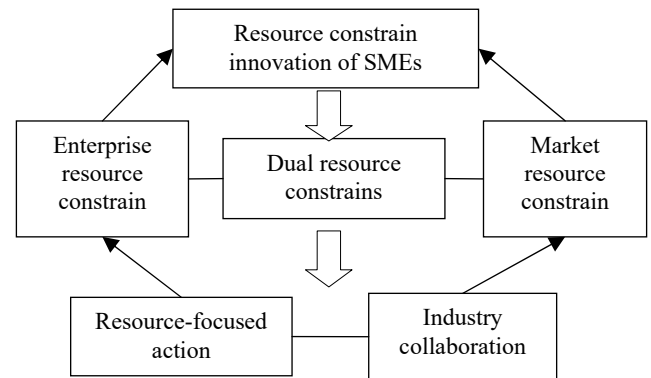


Fig. 1. The relation between RCI, dual resource constrains and resource-focused action.

IV. CONCLUSION

A. The Resource Limitation Situation of Resource Limitation Innovation Process has Dual Characteristics.

RCI emphasizes technological innovation for resource-constrained customers. The resource constraints of technology SMEs who conduct RCI show the characteristics of "duality" from both the enterprise and market levels. The market-level restrictions are mainly reflected in the low-cost restrictions under the resource constraints of the BOP market customers highlighted by RCI; the enterprise level is reflected in the resource constraints faced by different stages of SME growth.

B. Resource-focused Action Characteristics in the RCI Process of Technology SMEs

The resource-focused action of enterprises is more obvious in the context of resource limitation. Therefore, exploring the resource action mode under the resource restriction situation is important guide for enterprises to adapt to and get rid of resource constraints. This study summarizes three different resource action patterns through the resource limitation scenarios of different stages. In the initial stage of enterprise

development “technology-market” dual resource constrains, the resource-focused action of enterprises mainly manifests as the “focusing”. Under the dual resource constraints of “customer-market”, the resource-focused action of the enterprise is mainly manifests as the “deepening”; under the dual resource constraints of “industry-market” restriction, the resource-focused action of the enterprise mainly manifests as the “expanding”.

C. The Influence Mechanism of Resource-focused Action on RCI Under Dual Constrains

Under the dual resource constraints, the resource-focused actions of enterprises mainly break through the resource constraints at their own level, and the industrial collaboration mainly breaks through the resource constraints at the market level. Technology SMEs realize the RCI under the dual constraints through the cooperation of resource-focused action and industry collaboration and finally grow into the “hidden champion” in the industry.

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