

Research on Commercial Potential Evaluation of Emerging Technology

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Introduction

With the rapid development of science and technology worldwide, emerging technologies have mushroomed up gradually. Nevertheless, those emerging technologies which can bring huge economic benefits have accounted for only a small proportion of those. Therefore, an important issue is how to identify the emerging technologies with significant commercial potential for a nation.

This paper proposes an emerging technology commercial potential evaluation framework. Based on bibliometric and economic data, we try to assess the technology maturity, identify technology opportunities and analyze the competitive environment. Taken together, these three components combine to help evaluate the commercial potential of a target emerging technology. China's solar cells industry is employed as the case study.

Research Questions

Development of a rational approach to identify the core technology subsystems of certain emerging technologies and to evaluate the commercial potential of these key technologies scientifically by using different kinds of data is one of the main objectives of this research. In detail, this research focus will be divided into three parts:

- (1) How to assess the stage of development of certain emerging technologies;
- (2) How to identify the core technology areas and their relative opportunities;
- (3) How to evaluate market environment and technology competition.

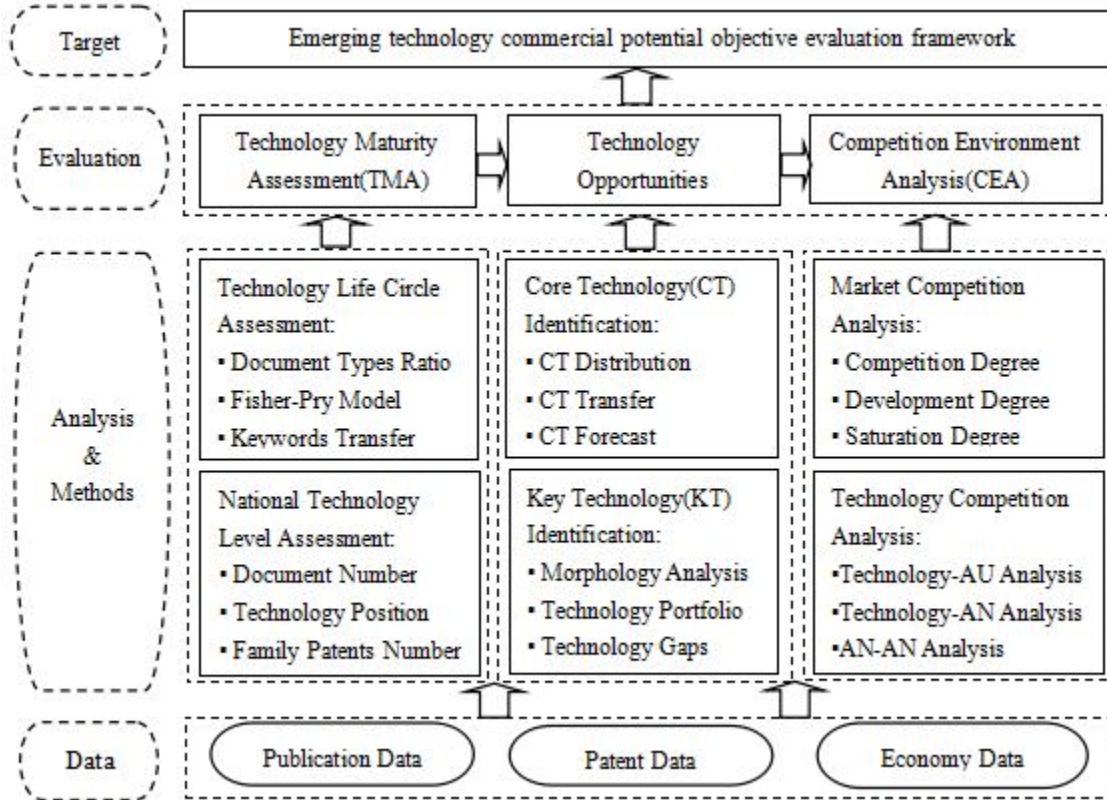
Data

This paper combines bibliometric and economic data for analysis. Economic data are used for market competition analysis; Publication data and patent data are used to uncover the extent of technological development. Economic data can be obtained from industry reports and economic databases; Bibliometric data from Web of Science(WOS) and Derwent Innovations Index(DII).

Methodology

In order to evaluate the commercial potential of certain emerging technologies objectively, three component processes should be addressed: Technology Maturity Assessment (TMA), Technology Opportunities Identification (TOI), and Competitive Environment Analysis (CEA). The research framework is constructed as Figure 1.

Figure 1: Emerging technology commercial potential evaluation framework



The evaluation of emerging technology commercialization includes three phases. The first phase is TMA. From the perspective of this paper, only those emerging technologies that have passed through the stage of technology “slow crawl” and entered the fast development phase can be taken as the preferential objects for a country. In this stage, technology life circle assessment and national technology level assessment are essential methods. After obtaining the general understanding, the second phase--TOI will remove some technologies with less importance or excessive attention, and figure out the core technologies by combining bibliometric and morphological analysis, including cluster analysis, comparative analysis, portfolio analysis, correlation analysis, etc.. CEA is the third phase, and market competition analysis and technology competition analysis are used to identify competition environment of targeted technology focus in certain country.

Discussion

Emerging technology enables to create new industry or deeply affect current industry structure, but no one knows which emerging technology can be converted into development potential. This paper presents an emerging technology commercial potential evaluation framework by combining measurement of technology maturity, technology opportunities, and competitive environment. We hope that this will benefit decision makers in prioritizing R&D investment opportunities. However, commercial potential evaluation is a complicated management activity. Developing a comprehensive model to evaluate the commercialization potential of emerging technologies, by combining subjective and objective methods, is our future research aim.