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Strategic R&D transactions in personalized drug development

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Highlights

- Personalized medicine is the focus of investment in start-up companies.
- This trend is expected to generate more patents in the area.
- Number of R&D licenses is an indicator of the financing deals in the area.
- Start-ups and their investors could lead the progress of personalized medicine.

Keywords: open innovation; personalized medicine; pharmaceutical industry; strategic transactions.

Teaser: The findings of this research show, for the first time, that start-up companies and their investors have a key role in leading progress in personalized medicine.

Although external collaboration capability influences the development of personalized medicine, key transactions in the pharmaceutical industry have not been addressed. To explore specific trends in interorganizational transactions and key players, we longitudinally surveyed strategic transactions, comparing them with other advanced medical developments, such as antibody therapy, as controls. We found that the financing deals of start-ups have surged over the past decade, accelerating intellectual property (IP) creation. Our correlation and regression analyses identified determinants of financing deals among alliance deals, acquisition deals, patents, research and development (R&D) licenses, market licenses, and scientific papers. They showed that patents positively correlated with transactions, and that the number of R&D licenses significantly predicted financing deals. This indicates, for the first time, that start-ups and investors lead progress in personalized medicine.

Introduction

The pharmaceutical industry is one of the largest industries in the world. It has a high profit ratio and makes large investments in R&D. Since 2010, launching a new therapeutic has become more challenging for pharmaceutical companies despite a continuous increase in their R&D spend [1,2]. Currently, raising the productivity of R&D efforts has become a compelling challenge for the industry.

Personalized medicine is an innovative medical concept in which patients can be selected, validated using *in vitro* diagnostic kits [companion diagnosis (CoDx)], and treated with the most suitable drug [3,4]. Consequently, this concept is expected to not only provide the best treatment to patients and reduce the probability of adverse effects, but also increase the success rate and reduce R&D costs for pharmaceutical companies, which in turn, will also help cut costs of healthcare premiums faced by governments. Therefore, in theory, widespread use of this concept would be beneficial for