

Using social network analysis to explore the trend of patent citation relationship – the case of smartphone

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ABSTRACT

The smartphone industry has emerged as an exciting and fast-changing field. Smartphone companies are now facing strong competition from other companies. Recently, competitive relationship among companies is extended to the patent war. Owning more patents can not only protect a company's, the intellectual property rights but also can earn infringement revenue through suing infringement competitors. However, most patent analysis methods and researches reveal two main problems. First, most patent analysis research used quantity of patents being cited or citing as a method to judge the patent strength of a company, and neglected to consider relation among patent citation. Second, most patent analysis researches focus on a single time period (or a static state time period) instead of multi-time periods.

In order to bridge the patent analysis gap, this study proposes a social network analysis (SNA) based approach to analyze patent citation relation in multiple periods. This research defines the patent research and development degree (PRD) and patent network relationship (PNR) to explore company's research and development (R&D) strength and patent citation relation strength between companies. Further, this research uses correlation coefficient to analyze company's trend in PRD and PNR in multi-periods. In addition, build forecast model by liner regression methods to help managers (or users) forecast smartphone company's PRD and PNR in the next time period.

This study applied PRD and PNR to explore twenty smartphone companies. It is found that Samsung and LG get higher PRD in each year which indicates Samsung and LG get stronger research and development strength in multiple periods. Furthermore, Samsung and LG also get higher PNR indicating they have higher probability of conducting patent cooperation with other companies. The Nokia and Qualcomm have highest correlation coefficient on PRD. Therefore, patent research and development of smartphone patents about communications and information technology, semiconductor,

wireless telecommunications has higher probability increase in next period. IBM and Blackberry have highest correlation coefficient on PNR. Therefore, IBM and Blackberry will have higher probability of getting higher patent cooperation with other companies in next period.

Keyword: Social network analysis 、 Patent analysis 、 Multi period prediction analysis 、 Patent citation