



## Method of Technology Forecasting using Patent Data: A Qualitative Perspective

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A patent is an exclusive right granted for an invention in either product or technique. This innovation might be incremental or radical in product or technique which was already delivered or used. Patents benefit inventors by providing them with legal protection of their inventions, and this legal protection provides monopoly rights to innovator. Through assigning the patent to market players innovator can get economic advantage of innovation while the assignee can get the 1<sup>st</sup> mover advantage or can establish the product branding through market rights to use the innovative technology.

Patent database contains record of registered and granted patents. The registered patents are patent which are filed to get grant from patent filling office while the patent granted represent the patent which is granted by patent filling office and considered an innovative product, or technique, while the patent assignee represent the patent which is assigned to any firm or market player to take application of product or technique for deliver innovative.

### Technology forecasting

The technology can be forecasted using patent data based on forward and backward citation, family size and patent power concept. To estimate the future course of inventions, technology forecasting examines diffusion speed, forward and backward citations, patent families, and technology curves. A patent family analysis looks at a technology's level of protection in several jurisdictions to determine its commercial viability and worldwide reach. Citations that are both forward- and backward-looking shed light on the fundamental components of a technology and its impact on subsequent advancements. One can determine the major technologies that will probably influence the future and any up-and-coming trends that might become popular by looking at these citations. A technology's diffusion speed is a measure of how rapidly it is embraced by different industries, showing its readiness for the market and potential for quick commercialization. The technology curve, which is sometimes shaped like an S-curve, shows how well a technology performs and is adopted over time. It is useful for identifying a technology's lifecycle stage and forecasting future growth or decline. When these components are integrated, full forecasting is made possible, which helps businesses and policymakers decide when to invest in R&D, develop market strategies, and adopt new technologies. A previous patent application that is referred by an examiner while the subject application is being examined is known as a "backward citation". A later patent application that cites the subject application in the examination is referred to as a "forward citation".

Patent power is the ratio of total number of IPC codes included in retrieved patents to the total number of patents. Patents with higher citation counts are typically fundamental or very influential. To find important patents in a certain technology subject, keep track of the quantity of forward citations. Examine the rate at which patents receive citations. Technologies with quickly rising citation counts could be indicators of high-impact, quickly-

moving sectors. To ascertain a technology's life cycle stage, use citation data. Citation counts that are high and rising point to growth, whereas counts that are falling point to maturity or decline.

An examination of technological trends over time yields additional insights about the present and potential applications of any given technology. Patent documents are viewed as nodes in citation network analysis, which displays the network as links between patent documents. A thorough examination of the patent's forward and backward citations enables the investigation of technological developments and collaboration in a particular field. The trend of technological growth and the underlying technology or numerous applications of that basic technology across time are indicated by the backward citations. A more valuable patent is more likely to be utilized in later production or research, which raises the possibility that it will be mentioned. The idea of a patent family and citation according to patent values can be used to assess the caliber of technology and its capacity to capture markets. Because of its greater market potential, the technology with the broader patent family is given more weight during analysis when two patents have the same forward citation.

## Conclusion

Patents serve as an objective gauge for technology predictions. Additionally, they offer current and trustworthy information for spotting technological trends. Forward citations are those that a patent has accumulated since it was first issued. Forward citations are seen as crucial indicators of innovation performance and aid in technological forecasting. Technology scope criteria primarily evaluate technological breadth. A great breadth of technology indicates a significant degree of relationship between the technology and many other technologies. Technology Life Cycle is divided into initiation, growth, and saturation phases, with investment being most beneficial during the growth stage. Two metrics are used to quantify the extent of technology: patent power and expansion potential. The ratio of the total number of patents examined for diffusion to the total number of forward citations is known as the technology diffusion speed. To forecast the technology the concept of forward citation and patent family are much important. The patent having largest forward citation and patent family is considered is most promising technology for future.

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