中文摘要

隨著世界總人口數的成長，人們對於醫療服務及儀器的需求也快速增加。根據聯合國人口統計部 (2015)的調查，目前世界總人口數約為 73 億人，他們更預計於 2050 年總人口數將成長至 98 億人。Visiongain (2015)也預估醫療相關市場市值將從 2013 年的 3000 億美金成長到 2017 年的 4000 億美金。積層製造技術的出現改變了許多傳統製造業的生產方式，其中，為了打造能滿足病患個人需求的醫療器具如假牙、牙套等等，積層製造的高度客製化特性尤其適合應用於醫療與牙科產業。本研究透過專利分析方法-自動化建構之技術功效矩陣來研究積層製造技術應用於牙科領域的專利布局情況，由於專利包含豐富的技術與創新的知識，它們可被用於技術趨勢預測、技術生命週期探討以及未來市場策略擬定。本研究的研究流程架構包含專利搜索與篩選、知識本體論建構、以及自動化產生技術功效矩陣方法與分析。另外，台灣科技部的積層製造相關研究計畫也被納入研究範圍，探討我國研究計畫與國際技術趨勢之異同。

關鍵字: 技術功效矩陣、牙科、積層製造、專利分析、專利布局

Abstract

As population grows and ages, the need of medical service and equipment grows rapidly. According to United Nations Population Division (2015), the current world population is 7.3 billion and is estimated to reach 9.8 billion by 2050. Visiongain (2015) forecasted that the medical market will expand and grow significantly in the coming decade, from 2013 to 2017, the medical devices market will grow from 300 billion US dollars to nearly 400 billion. To satisfy the demands of medical market, the growing technology-Additive Manufacturing (AM) has been viewed as a game changer in this industry and it is also applicable to several industries. Its brand new manufacturing processes and highly customized features are especially suitable for medical/dental industries since patients require products or service based on personal conditions. This research focused on the combination of dental industries and AM technologies using patent analytic approaches to study the development of industries and markets. Since patents contain rich information and innovative knowledge of technologies, they can be used to study technology trend, technology life cycle, and forecasting future market development. The patent analysis methodologies in this research include strategic patent search, manegement map analysis, and technical map analysis. After patents screening and review, the Technology-Function (TF) Matrix is constructed for studying the distribution of patents under AM technologies and dental applications. The TF

matrix is constructed automatically through text mining and key term comparison techniques, which is a new approach different from traditional hand-made TF matrix. Furthermore, the major companies, important patents, and research initiatives of Taiwan Ministry of Science and Technology (MoST) will also be discussed in analysis results. This research uses additive manufacturing applied on dental industry as a case and provides insights of development trend and market opportunities.

Keywords: *patent analysis, technology-function matrix, technology development trend, additive manufacturing, dental*