

Chapter 8

Research Trends in Forensic Sciences: A Scientometric Approach

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ABSTRACT

This chapter outlines how scientometric tools and techniques are increasingly used to find the growth and direction of research. Forensic sciences are the application of science and technology in the administration of law and justice. Forensic Sciences encompass a wide range of subspecialties which are applied in adjudication of civil and criminal legal issues. Five subspecialties, viz., Forensic Anthropology (FA), Forensic Genetics (FG), Forensic Medicine (FM), Forensic Psychology (FP), and Forensic Toxicology (FT) were comparatively analyzed to find the growth of literature, source documents contributing to the literature growth and also the keywords used to find the research trends in these subspecialties. Data pertaining to these subspecialties documented from 2006 to 2015 were retrieved from the Science Direct platform and studied using MS-Excel and VOSviewer. The cumulative growth of literature showed a linear trend. The study found Forensic Science International as the top contributing journal. Significant association was observed between FA, FG, FM and FT literature while FP was not.

INTRODUCTION

Research is careful investigation or inquiry especially through search for new facts in any branch of knowledge (Advanced Learner's Dictionary of Current English, 1952). Scientific research is an extraordinary endeavor and so the substance of it is highly complex. It requires specialized skills and tools because personal knowledge and experience alone are not enough to measure the trends and quantify the results.

Research funding agencies, whether governmental or non-governmental need to evaluate a research project quantitatively as well as qualitatively. Standard bibliometric or scientometric tools are being increasingly used to evaluate research. Recently, scientometrics is used as a quantitative analysis method for scientific research. The statistics derived from the scientometric analyses that measure the contribu-

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tion of scientific publications within a given topic could represent the current research trends and can also be used to identify the course of future research.

Bibliometric and scientometric studies of scientific disciplines and the rendering of results as knowledge domain visualizations aim to find the answers for some pertinent questions related to the major research areas, experts, institutions, regions, nations, grants, publications, journals in a specific research field, the relationships between domains of knowledge, their dynamics and impact (Börner, Chen, & Boyack, 2003; Cronin & Atkins, 2000; White & McCain, 1989; Murray, Ke & Börner, 2006).

Domain visualisation is an emerging field of study. Visualisation techniques are used to map the ever-growing domain structure of scientific disciplines. They also support information classification and retrieval. In domain visualisation interrelationships between research fronts are represented through spatial representations. Such spatial representations allow users to navigate the scientific literature based on the spatial patterns depicted. Domain visualisation aims to reveal realms of scientific communication as reflected through scientific literature and citation paths interwoven by individual scientists in their publications.

The field of domain visualisation is also called scientography (Garfield, 1994), though not widely used. Garfield (1994) introduced the concept of longitudinal mapping. In longitudinal mapping, a series of chronologically sequential maps can be used to detect the advances of scientific knowledge. Domain experts use longitudinal maps to forecast emerging trends for a subject domain. Scientometrics is a distinct discipline that has emerged from citation-based domain visualisation. Scientometrics is the quantitative study of scientific communications, which applies the principles and techniques of bibliometrics to scientific literature. This bibliometric mapping concept has been further developed by researchers in the Netherlands, particularly, Noyons and Van Raan.

Visualisation provides an ability to comprehend huge amounts of data on large scale as well as small scale. It gives a better understanding of a complex data set. Data-set can be seen in from several different perspectives simultaneously. Visualisation exploits visual perceptions and therefore can enable visual comprehension. It is an effective source of communication. The process of analyzing and transforming non-spatial data into an effective visual form can improve the interaction with large amount of data.

These bibliometric, scientometric, mapping, and visualization studies are generally conducted based on bibliographic data downloaded from digital libraries or bibliographic and abstract databases. In order to map a specific discipline, keyword based searches for relevant phrases are run or cited reference search is used to retrieve all papers that are cited by or are citing a set of seminal papers (Murray, Ke & Börner, 2006).

FORENSIC SCIENCE AND ITS SPECIALTIES

Forensic science can be defined as the application of scientific principles in the adjudication of law and justice. Forensic science is a wondrous intersection where science, medicine and the law meet, with the final disposition being the adjudication of criminal cases (Pyrek, 2007). Forensic science uniquely shares its applications to legal issues for resolution in a public forum (James & Nordby, 2003). Forensic science operates in the service of the public, represented through the rule of law by the courts. Different functions, but all necessary for the common good (Inman & Rudin, 2001).

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