

國立臺灣大學文學院圖書資訊學系

碩士論文

Department of Library and Information Science

College of Liberal Arts

National Taiwan University

Master's Thesis

數學與經濟學領域中「睡美人」與「曇花一現」現象之研究

A Study of the “Sleeping Beauties” and “Flash-in-the-pan”

Phenomena in Mathematics and Economics

周文薏

Wen-Yi Chou

指導教授：黃慕萱 博士

Advisor: Mu-Hsuan Huang, Ph.D.

中華民國 113 年 2 月

February 2024

摘要

本研究以書目計量法分析數學與經濟學領域之睡美人與曇花一現，探討其文獻分布與特性、作者與合著情形、出版期刊與學科領域等層面，以及睡美人與喚醒文獻之間的引用與喚醒機制，比較不同領域之差異，藉以瞭解睡美人與曇花一現之喚醒或產生原因。本研究以 JCR 資料庫中，出版於 1933 至 2012 年間的數學與經濟學出版期刊收錄之 324,467 筆資料為研究對象，經 B 係數與 K 指標分別辨識出睡美人與曇花一現，再以喚醒年與共被引分析判定對應睡美人之喚醒文獻，最終辨識出 1,489 筆睡美人、9,514 筆喚醒文獻，以及 2,411 筆曇花一現。

研究結果顯示，睡美人與曇花一現分別為總文獻的 0.46% 與 0.74%，在數學與經濟學領域分布上，二者分別為總睡美人之 65.41% 與 34.59%，以及曇花一現之 61.76% 與 38.24%，顯示數學領域具有相對較多睡美人與曇花一現現象。多數數學與經濟學睡美人皆出現於 1964 年至 1988 年，曇花一現則主要於 1966 年出現，但僅有數學曇花一現在近期有逐年增加的趨勢。文獻特性方面，睡美人在睡眠長度、睡眠深度、喚醒強度等特性上，經統計結果顯示皆具有不同領域之顯著差異，然曇花一現在引文活躍期、引文熱度與衰退程度等則皆未達顯著，顯示睡美人更容易因學科領域的不同而產生差異。另外，研究結果也發現當一篇睡美人具有越多喚醒文獻時，其睡眠長度相對越短，睡眠深度與喚醒強度相對越大。

國家分布方面，數學與經濟學之睡美人、喚醒文獻與曇花一現皆來自於美國，中國僅出現在喚醒文獻與曇花一現，顯示中國學術發展在近代有大幅增加的趨勢；作者方面，睡美人之平均作者數與合著率皆較低，顯示當作者越少時，越可能會降低出版後被發現的機會而陷入沉睡，越多的作者則容易提高研究出版後的觸及率與曝光度。部分睡美人之間具有主題上的延伸或連貫，顯示睡美人現象可能並非僅限於單一文獻，而是涉及同作者或同系列主題之研究；另外，有 76.93% 的曇花一現具自我引用情形，每篇平均有 3.45 次自我引用，顯示自我引用是產生曇花一現的重要因素。

出版期刊方面，經濟學睡美人與喚醒文獻皆出版於高影響力期刊，顯示出版期刊權威性並非造成其沉睡的主因，而多數數學喚醒文獻的出版期刊影響力高於睡美人，顯示數學睡美人透過高權威性期刊之喚醒文獻的引用，增加被喚醒的可能性。學科領域方面，數學領域主要以數學與應用數學為主，經濟學則以經濟學為主，而部分經濟學睡美人與數學領域相關；喚醒文獻與曇花一現有相對更多應用導向或跨領域特徵之學科，且喚醒文獻會透過將睡美人的理論或架構，應用至實務上並建立實徵研究，促使喚醒機制的產生，是重要的喚醒機制。

關鍵字：睡美人、曇花一現、數學、經濟學、書目計量

Abstract

This study employs bibliometric analysis to examine the phenomena of “Sleeping Beauty (SB)” and “Flash-in-the-pan (FP)” in Mathematics and Economics. It investigates their distribution, characteristics, authorship and co-authorship patterns, publishing journals, disciplinary domains, and how SBs were cited and awakened by their “awakers”. The study compares differences in the two disciplines to understand the factors contributing to the awakening or emergence of SBs and FPs. The scope of this study is the journal articles published from 1933 to 2012 in Mathematics and Economics found in the Journal Citation Reports (JCR), totaling 324,467 articles. SBs and FPs were identified with the Beauty coefficient (B coefficient) and K Value Indicator, respectively. Ultimately, 1,489 SBs, 9,514 awakers, and 2,411 FPs were identified.

Results indicated that the SBs and FPs separately account for 0.46% and 0.74% of the articles in scope. The distribution of SBs between mathematics and economics is 65.41% and 34.59%, while for FPs, the distribution is 61.76% and 38.24%. Most SBs in mathematics and economics were published between 1964 and 1988. Conversely, FPs emerged in both fields since 1966, with mathematics FPs gradually increasing in recent years. Regarding the characteristics of SBs, significant differences were observed in length of sleep, depth of sleep, and awake intensity between economics and mathematics. However, FPs did not exhibit significant differences in the awakening period, citation popularity, or falling levels between the two disciplines. This suggests that SBs are more likely to be varied by discipline while FPs are not. Additionally, the study found a significant correlation between the characteristics of an SB and its number of awakers. When an SB has more awakers, its sleep tends to be shorter, deeper, and awake intensity greater.

In terms of country, SBs, their awakers, and FPs were mainly published in the United States in both mathematics and economics. China was among the top 10 publishing countries for awakers and FBs, indicating a significant growth in China's academic development in recent years. With regard to authorship, the average number of authors and the co-authorship rate for SBs were lower than for the other two categories. This suggests that post-publication, fewer authors may reduce the chances of discovery. Additionally, thematic extension or coherence was found among some SBs, indicating that the phenomenon may not be confined to individual papers but involve studies by the same authors or on the same series of topics. Furthermore, 76.93% of FPs are identified with self-citation, with an average of 3.45 self-citations per article, highlighting the significance of self-citation in the occurrence of FPs.

In respect of journal, economics SBs and their awakers were predominantly published in high-impact journals, suggesting that the authority of the journal is not the primary factor in inducing SBs to remain dormant. However, most mathematics awakers have higher Journal Impact Factor (JIF) values than mathematics SBs. This indicates that a mathematics SB increases its likelihood of awakening and recognition when its awaker is published in a high-impact journal. In terms of disciplinary domains, mathematics SBs and FPs were primarily in mathematics and applied mathematics. Economics ones were also mainly in economics with some SBs involving mathematics. More awakers and FPs are involved in applied or interdisciplinary research. A transition in disciplinary domains was observed between most SBs and their awakers, where awakers applied the theories of the SBs to a practical setting, conducting empirical research to validate their findings, and thereby awaken the SBs.

Keyword : Sleeping beauty, Flash-in-the-pan, Mathematics, Economics, Bibliometrics