

國立交通大學

經營管理研究所

博士論文

No.150

作業基礎成本制度之知識結構研究

The Intellectual Structure of Activity-based Costing



研究生：郭秀貴

指導教授：楊 千 教授

中華民國一〇一年八月

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摘 要

探索作業基礎成本制度之知識結構可以使人了解此專業系統理論的核心思想、演化和趨勢。本研究利用 1988 年至 2008 年間之文獻，採用共被引分析法建構作業基礎成本制度之知識結構模式。首先，應用共被引分析法從符合設定條件的文獻中萃取核心文章，並建立其兩兩文章間的共被引相關係數矩陣，然後以多變量分析表徵其分群模型，最終得到四個主題組成兩面向的知識結構，此結構的主題按時間先後順序發生，是一個自然、動態且有次序的演化過程。此演化過程意涵著組織執行作業基礎成本制度的四階段生命週期，本研究結果提供了管理者了解不同階段會面臨的問題，並且組織若想要成功實施作業基礎成本制度，則必須兼顧其技術面及社會面的問題，因為組織採用作業基礎成本制度不但有技術的限制，也有環境背景、組織行為和管理制度等多方面的挑戰，因此，作業基礎成本制度雖比傳統成本制度更有效益，卻沒有廣泛被組

織採用與執行。本研究結果建議學者、顧問及實務者應用這一個具宏觀且動態視野的作業基礎成本制度知識結構，迅速擴大原有的觀點或看法而活絡彼此間的相互溝通與交流，俾以更加蓬勃發展此制度。

關鍵詞：作業基礎成本制度、知識結構、共被引法、多變量統計分析、演化。



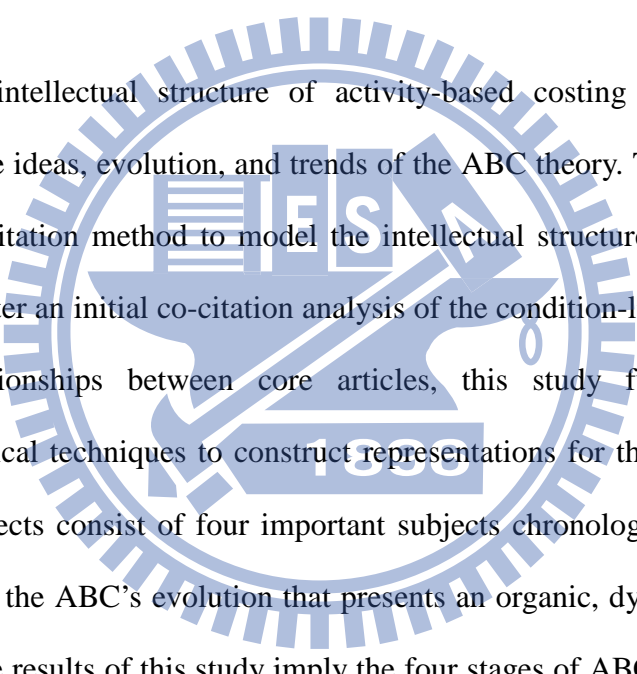
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ABSTRACT



Exploring the intellectual structure of activity-based costing (ABC) helps one understand the core ideas, evolution, and trends of the ABC theory. This study employs the document co-citation method to model the intellectual structure of ABC between 1988 and 2008. After an initial co-citation analysis of the condition-limited literature set to find the relationships between core articles, this study further implements multivariate statistical techniques to construct representations for the ABC intellectual structure. Two aspects consist of four important subjects chronologically to provide a panoramic view of the ABC's evolution that presents an organic, dynamic, and orderly integral whole. The results of this study imply the four stages of ABC implementation's life cycle that explains and predicts the challenging issues for managers. Not only technical limitations but also contextual environment, organizational behavior, and managerial system formulate the multifaceted challenge of implementing ABC in an organization. Consequently, this has led to ABC to not being widely adopted and implemented in organizations, although the benefits of ABC are more than the traditional cost system. We suggest that managers should identify the challenging issues at different stages of ABC implementation and realize the joint optimization of an

organization's technical and social aspects. In addition, the macroscopic and dynamic view of ABC's intellectual structure aids academics/consultants/practitioners in quickly and easily enlarging the coverage and viewpoints within their cluster of interest and making as bases of communication with others about the fruitful development of ABC.

Key words: activity-based costing; intellectual structure; co-citation method;
multivariate statistical analysis; evolution.



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十年前我的札記上寫著:女兒鼓勵我作新時代的新女性，千萬不要以女性年齡作為進步的限制，女人應該要獨立，要有自己的智慧去安排一生。於是我寫下人生最大願望：不想當『傳統女人』，也不想當『女強人』，只想當個『有質感的女人』。

六年半前，我戰戰兢兢、誠惶誠恐進了經管所博士班想一圓年輕時的夢～親身體驗學術研究的殿堂，但當時無論電腦操作、數量方法以及英文寫作的的能力都相當薄弱，僅憑藉著會計領域的教學與實務經驗而再當學生，實在是如履薄冰。

然而，這一路走來，非常感謝指導教授楊千老師的鼓勵、支持與協助，十幾年來，若不是您持續性的在適當時機鼓勵我進修，我不會進博士班就讀；若不是在求學期間，您不吝給我許多寶貴的時間，指導我如何演繹思考邏輯，教導我如何歸納研究主題，我不可能有信心在遭遇困頓、挫折與失敗時，有勇氣與毅力再接再厲，您勉勵我如 Steve Jobs 所說的“stay hungry, stay foolish”，您提醒我“讀書變聰明了，但不要看世事容易生氣、不快樂，要有智慧”，謝謝您!讓我分享很多很多的知識與人生智慧，讓我一生受用不盡。

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民國一〇一年八月



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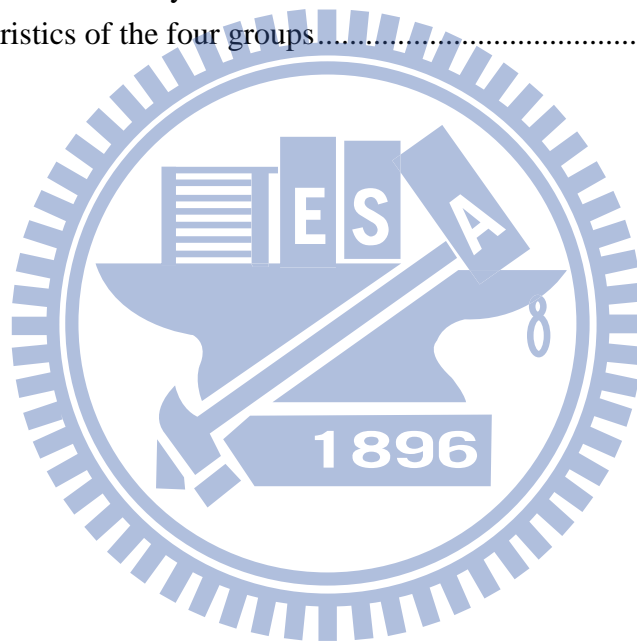
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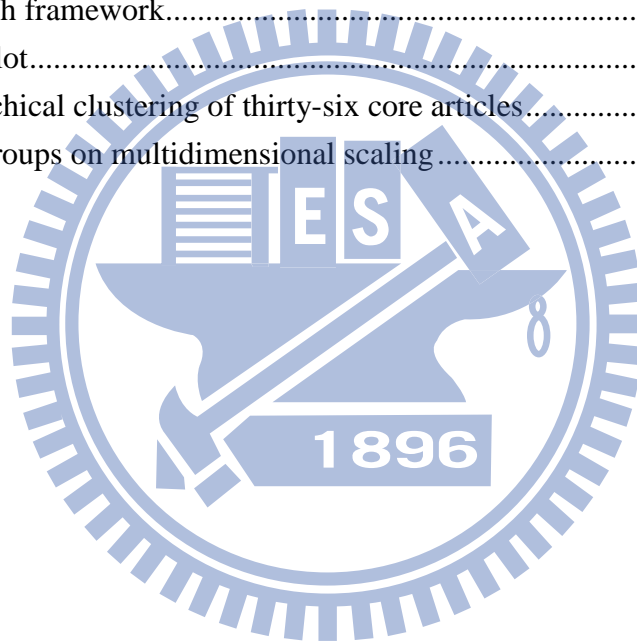
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Chapter 1 Introduction

1.1 Research background and motivation

Kaplan and Cooper (1998) proposed cost systems in a company in order to perform three primary functions: 1. Inventory valuation and to measure the cost of goods sold for external financial reporting. 2. Estimation of the costs of activities, products, services, and customers. 3. To provide economic feedback to managers and operators about process efficiency. During the industrialization era, there are limited varieties of products and processes, the competition is limited to the domestic market and indirect and support costs are a small fraction of total costs. Thus, a simple traditional cost system meets these three different functions. However, in the knowledge economy era, the traditional cost system is still fine for financial reporting, but one cost system is just not enough to provide managers with relevant information for performance measurement and product cost purposes (Cooper & Kaplan, 1988a).

Because globalization has resulted in complex economic activities, such as enterprises producing diversified products, marketing products in various channels, and offering customers highly customized service, enterprises have significantly increased the varieties of indirect and support costs. Managers need more accurate, valid cost information to aid in their strategic decisions about products, services, and customers. They also need timely and relevant information to guide operational improvement activities. A big challenge is thus how to satisfy managers' and operators' demand for these information requirements in management decisions.

Activity-based costing (ABC) in the 1980s emerged from American manufacturing, providing innovative techniques in management accounting (Jones & Dugdale, 2002; Miller & O'Leary, 1993). As shown in Figure 1.1, ABC refines a costing system by identifying individual activities as the fundamental cost objects. An activity is an event, task, or unit of work with a specified purpose for example, designing products, setting up machines, and/or operating machines. To help make strategic decisions, ABC systems identify activities within all functions of the value chain, calculate costs of individual activities, and assign costs to other cost objects such as products, services, and customers on the basis of the mix of activities needed to produce each product or service for each customer (Horngren, Datar, & Rajan, 2012). To help make operational improvements, ABC systems supply cost and non-financial information about the company's activities and processes. This information directs improvement efforts and provides feedback on what an improvement has accomplished (Turney, 1991). Compared to the traditional cost system, ABC offers two main advantages: 1. ABC provides a clear, transparent, and traceable causal relationship between cost objects and consumed resources rather than the traditional cost system that uses arbitrary allocations. 2. ABC answers what, why, how, and how much activities will be performed by the organizational resources, versus the traditional cost system answering how the organization can allocate costs for financial reporting and for departmental cost control (Kaplan & Cooper, 1998).

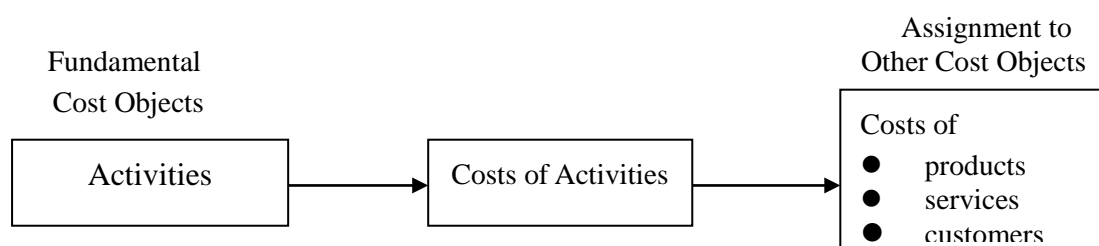


Figure 1.1 Relationships between activities and cost objects
Source: Horngren, Datar, and Rajan (2012)

Over the past two decades, ABC has experienced its emergence, construction, development, and dissemination (T. Bjørnenak & F. Mitchell, 2002; Jones & Dugdale, 2002; Lukka & Granlund, 2002). At present, ABC still occupies a very important role in the textbooks of cost accounting and management accounting. Querying the key word ‘activity-based costing’ in the Google Scholar database, there are approximately 6,000 articles in 2000, 8,600 articles between 2001 and 2005, and 12,000 articles between 2006 and 2010. This research also queries this key word in the ISI database, and Figure 1.2 indicates a significantly increasing trend, particularly in recent years. The majority of articles present ABC applied to various fields, including engineering, business economics, operations research, management science, computer science, and health care sciences services, etc.

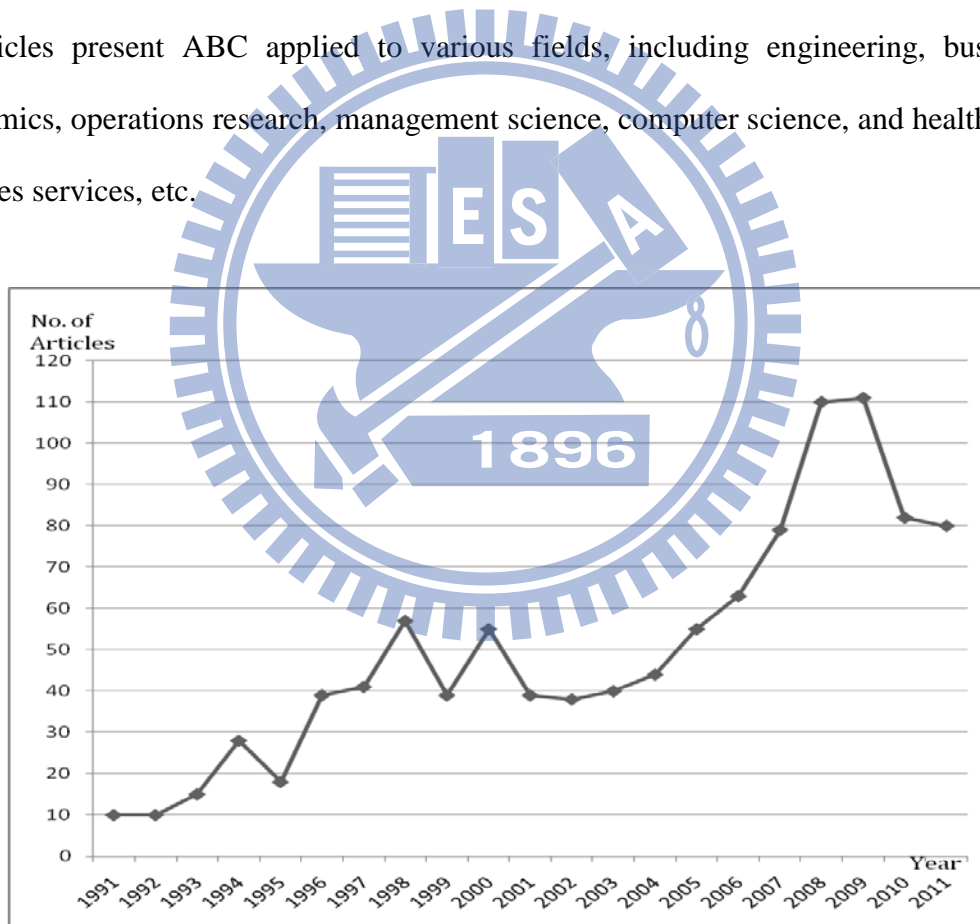


Figure 1.2 Development in the number of ABC articles in ISI

Source: this study sort out data from ISI

How about the adoption rate of ABC in practical organizations? As shown in Figure

1.3, Gosselin (1997) classified activity management into three levels: activity analysis, activity cost analysis, and activity-based costing. These three levels represent the range from simple activity analysis without cost tracing to full activity-based cost reporting. Owing to a multiplicity of terms, different definitions of terms, and different levels of adoption, prior studies reported that the adoption rates of ABC presented considerable variations (K. M. Baird, Harrison, & Reeve, 2004). Al-Omiri and Drury (2007) indicated approximately an 15% adoption rate among surveyed companies in the UK. This result is similar to the results of Innes and Mitchell (1995) and Innes et al. (2000) at around 10%~12%. Studies in the U.S. recorded higher rates: Shim and Sudit (1995) had 27%, Green and Amenkhienan (1992) saw 45%, Hrisak (1996) was at 53%. Studies in Australia generally recorded relatively low adoption rates of approximately 12% (Booth & Giacobbe, 1997), although Baird et al. (2004) and Baird (2007) had them at around 40%. Many articles have ascertained the factors that influence the adoption rate for example, collecting data entails a large amount of time and costs are a big challenge for firms (Kaplan & Anderson, 2004), implementing ABC in organizations causes employees' resistance (Malmi, 1997), and organizational factors influence the success of ABC implementation (Al-Omiri & Drury, 2007; K. Baird, 2007; K. M. Baird et al., 2004; Foster & Swenson, 1997).

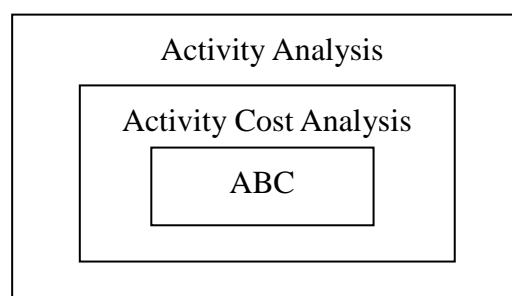


Figure 1.3 Three levels of activity management
Source: Gosselin (1997)

Over the past two decades, academics, consultants, and practitioners indeed have paid much attention to ABC and have accumulated a bulk of literature. However, Lukka and Granlund (2002) found that different discussion circles within the ABC literature show a fragmented communication structure that hinders the fruitful development of ABC knowledge, even though people in a certain discussion circle are connected by common views, values, and approaches to doing research and speak an understandable language to each other. Merchant et al. (2003) argued that ‘research progress in accounting has been significantly hindered by the fact that most researches focus their theories and perspectives on a single research discipline’. Bjørnenak and Mitchell (2002) noted that communication processes are an important topic for the development and dissemination of knowledge. From our view, we think that mutually understanding each other’s ideas is the premise of dialogue. An individual’s bounded rationality limits him/her from keeping current with the developments and trends of others’ research areas. Thus, networking among the different discussion circles of ABC is, in many cases, either quite weak or lacking. This phenomenon therefore raises the interest of this study to explore the important dimensions and key parameters in the whole picture of ABC development in terms of the literature in order to provide academics and practitioners with a macroscopic view of ABC.

1.2 Research objectives

Scholars communicate with each other through publishing and disseminating their works to form an informal conversation or invisible college focusing on common problems in common ways (Price, 1963). As an important medium of communication, accounting journals, provide a means for the body of ABC knowledge to expand and

extend its audience. The accumulated journal literature represents a unique and substantial chronological trail of evidence on ABC ideas. A researcher's concepts, ideas, and findings are often picked up by other scholars who test, refine, and extend them. In other words, each researcher conducts studies with the knowledge of prior research. Therefore, the history of exchanges between members of invisible colleges in a discipline describes the intellectual development of the field (Culnan, 1986).

The representations of intellectual development are derived from the relationships between citing and cited articles. Co-citation analysis is one of the best-known structuring methods of bibliometrics that quantitatively analyze scientific and technological literature (Borgman, 1989). Small (1973) proposed the co-citation method to objectively model the intellectual structure of scientific specialties, by assuming that a co-citation matrix is a measure of the perceived similarity or conceptual linkage between two co-cited articles. The number of identical citing articles defines the strength of co-citation between two cited articles (Small, 1973). The more often two articles are cited together, the closer is the relationship between them (White & Griffith, 1981). If those retrieved co-cited articles significantly influence the development of the discipline, then they can serve as the theoretical and empirical fundamental concepts of it (Ramos-Rodriguez & Ruiz-Navarro, 2004; Small, 1973).

Since the intellectual structure of a specific scientific specialty describes the structure of the main body of knowledge on that specialty and the structure itself grows and evolves over time as more contributions grow from the body of knowledge, we believe that this structure should have the following characteristics. First, an intellectual structure is an organic integral whole composed of interdependent and interrelated parts.

It is difficult to produce the overall advantages of the intellectual structure without any coordination between each part. Second, the knowledge structure is dynamic rather than static in an open environment. According to the needs of a changing environment, the intellectual structure should always be adjusted to enrich and improve. Third, the composition of an intellectual structure is in order. From the core to the peripheral level, it gradually and progressively accumulates knowledge.

This work employs the co-citation method to model the intellectual structure of ABC between 1988 and 2008 based on the citation database of Google Scholar. After an initial co-citation analysis of the condition-limited literature sets out to find the relationships between core articles, this study further implements multivariate statistical techniques to construct representations of the ABC intellectual structure so as to categorize articles of perceived similarity. Observing and analyzing the grouping behavior provide insights into the core ideas, evolution, and trends of the ABC theory. Thus, we target to achieve the following objectives in this study.

1. Construct an intellectual structure of ABC and its representations.
2. Illuminate the main ideas underpinning the ABC theory to gain insights into the whole picture through its pro and cons.
3. Observe and analyze how the intellectual structure grows and evolves over time as more influential articles are added to the body of knowledge.
4. Interpret the implications of this study's findings.

1.3 Research flow

This study constructs an intellectual structure and representations of ABC in terms of the literature to illuminate the core ideas underpinning its theory. Thus, we conduct

literature reviews of ABC and the co-citation method. After establishing the research framework, we collect the research data for subsequent analysis. Finally, this study discusses the research results and provides conclusions and suggestions. Figure 1.4 presents the research flow.

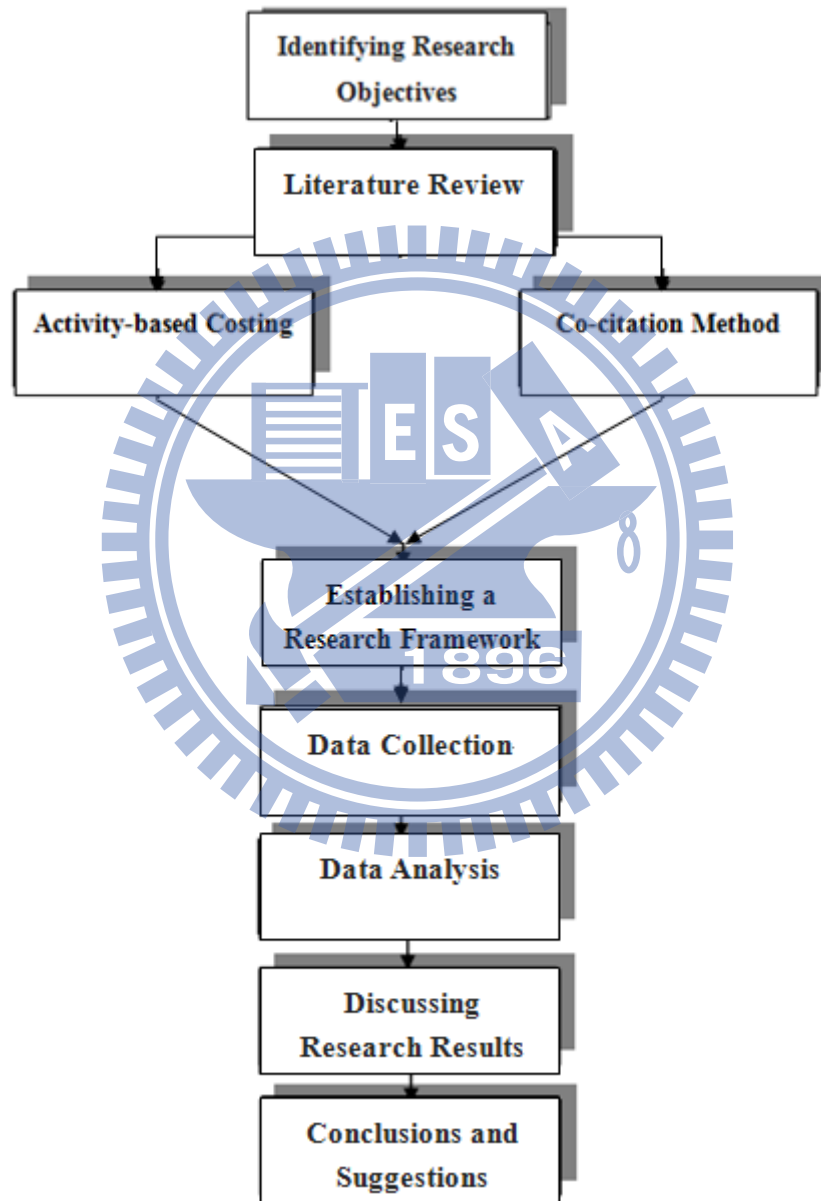


Figure 1.4 Research flow

Chapter 2 Literature Review

This chapter primarily reviews the theories and related research of activity-based costing and the co-citation method in order to explain the rationale in which this study generates the research issues and methodologies.

2.1 Activity-based costing

2.1.2 The development of ABC

In the early 1980s, Japanese manufacturing not only adopted advanced manufacturing technology, but also applied just-in time (JIT) and total quality management (TQM) to manage a firm's business. The increasing international competition from Japan threatened U.S. manufacturing. Facing this new manufacturing environment, scholars and consultants in the U.S. were supported or sponsored by some of the largest industrial organizations, big professional accountancy firms, and government agencies in order to develop the computer-aided technology and new costing systems. By the late 1980s, the first wave of ABC focusing on an accurate calculation of product costs was generated, but by 1989 the validity of this first wave was severely doubted by Eli Goldratt's theory of constraints.

After deliberative reflections by its advocates, Cooper and Kaplan, the second wave of ABC subsequently showed up between 1989 and 1992. The amended ABC is a contribution margin approach and not an attempt to get more accurate fully-allocated unit costs. It emphasizes the concept of a 'cost hierarchy' in which activities are

ordered into 'unit', 'batch', 'product-sustaining', 'customer-sustaining', and 'facility-sustaining' levels. Thus, firms understand their organization's hierarchy of costs in order to identify relevant revenues and costs and then to make strategic decisions. In addition, the second-wave ABC identifies and measures an organization's capacity, both used and unused, and then helps managers to create, deploy, and manage the capacity. The first-wave ABC originally asserted that all costs are variable, but the second-wave ABC suggests that costs are variable if and when people succeed in varying them (Jones & Dugdale, 2002).

By 1992, ABC as a socio-technical expert system had been widely disseminated across many countries. Because a new wave of management philosophies-JIT, TQM, TOC (theory of constraints), world-class manufacturing, lean production, and BPR (business process reengineering) emerged in the 1980s, the assimilation of ABC into the field fit the pattern for such philosophies. Thus, by turning activity-based thinking from 'costing technique' to 'management philosophy', consulting firms can show the close links between activity-based costing (ABC) and activity-based management (ABM). ABC supplies the information and ABM uses this information in various analyses for continuous improvement, pricing, product mix, customer selection, and supplier selection, etc. (Jones & Dugdale, 2002).

The following introduces the basic concepts of ABC illustrated by the two-dimensional model in Turney (1991) and Cooper and Kaplan's (1991b) cost hierarchy.

2.1.2 Basic concepts and model

1. The two-dimensional model in Turney (1991)

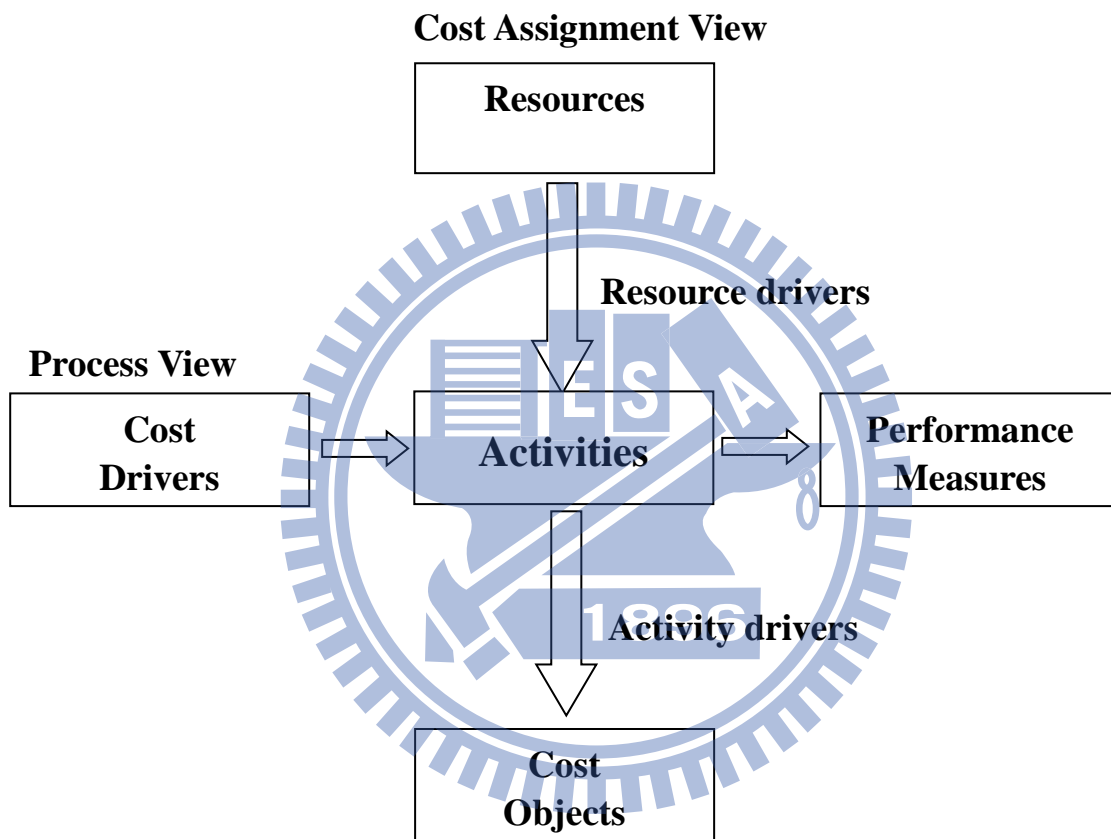


Figure 2.1 Two-dimensional model of ABC

Source: Turney (1991)

As shown in Figure 2.1, the two-dimensional model in Turney (1991) combines the cost assignment view and the process view, which contains both cost and non-financial information about activities and provides a powerful management tool for internal as well as external improvement purposes.

(1) Cost assignment view: this is the vertical part of the model shown in Figure 2.1.

The underlying assumption is that cost objects such as products, services and customers create the needs for activities, and then activities create the needs for resources. Thus, an organization assigns resource costs to activities through resource cost drivers and then assigns activities' costs to cost objects through activity cost drivers in order to analyze critical decisions such as pricing, product mix, product design, customer evaluation, and supplier selection.

(2) Process view: this is the horizontal part of the model in Figure 2.1. The underlying assumption is that a process is a series of activities linked to perform a specific goal. Each activity is a customer of another activity. In short, activities are all part of a customer chain, all working together to provide value to the outside customer. Thus, ABC provides information about cost drivers and performance measures for each activity or process in the customer chain in order to analyze operational improvement performance.

2. Cost hierarchy

Cooper and Kaplan (1991b) proposed that one of the most important attributes of ABC is to classify manufacturing activities along a cost hierarchy dimension: unit, batch, product-sustaining, and facility-sustaining.

(1) Unit-level costs : The costs of activities have to be calculated for every unit of product or service produced. The quantity of unit-level activities performed is proportional to production and sales volumes. For example: inspection for every unit of product or drilling holes in each metal part.

(2) Batch-level costs : The costs of activities have to be calculated for each batch.

For example: setting up a machine for a new production run or processing a customer order.

- (3) Product-sustaining costs : The costs of activities are calculated to enable the production of individual products to occur. The quantity of resources used in product-sustaining activities is independent of the production and sales volumes and quantity of production batches. For example: designing product, or changing engineering.
- (4) Facility-sustaining costs : The costs of activities cannot be traced to individual products or services, but rather support the organization as a whole. For example: general administration or plant maintenance.

2.1.3 Related research

There are three papers simultaneously published in 2002 that address the development of ABC from different sociological perspectives. Jones and Dugdale (2002) employed the actor-network theory and Giddens's discussion of the dynamics of modernity to expound the history of ABC construction. Using the actor-network theory to follow key actors through many intermediaries, this paper portrayed ABC as a socio-technical system that is mutually constructed by a network of human and non-human allies. In addition, they employed Giddens's discussion of the dynamics of modernity to interpret ABC as an expert system that is formed and reformed through abstract disembedding on the global level and concrete reembedding in the local contexts over time and space as shown in Figure 2.2. By binding together time and space at global and local levels, a self-contained coherent set of principles integrates theory and practice in a black box, and so ABC becomes either more powerful or more

fragile. Their paper also discourses many translations about the construction of ABC: from company practices to case studies, from case studies to expositions, from expositions to theoretical revisions and to implementations, and then the cycle begins again. They concluded that people cannot simplify the reciprocal relationships between theories and practices in ABC.

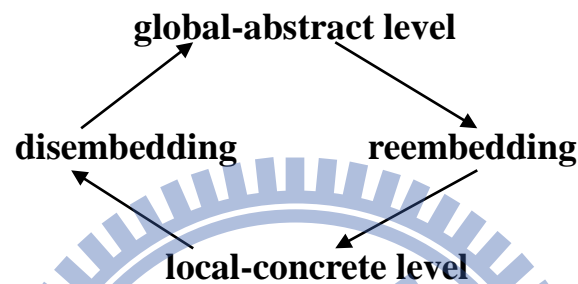


Figure 2.2 Reciprocal relationships between theories and practices
Source: Jones and Dugdale (2002)

Lukka and Granlund (2002) classified the ABC literature from the 1980s and the 1990s that separated the three phases of ABC development into three genres representing three discussion circles: consulting research, basic research, and critical research (as shown in Figure 2.3). They considered people in a certain discussion circle to be connected by common world-views, values, and approaches when conducting research and when speaking a language understandable to each other. Based on the ideas of five philosophers and sociologists, Lukka and Granlund thus analyzed and compared the interests of knowledge, research methods, styles of argumentation, and the nature of results among three discussion circles. As shown in Figure 2.3, they found that consulting research considerably affects basic research (solid arrow) but limitedly affects critical research (dotted arrow). Furthermore, basic research significantly influences critical research (solid arrow), but limitedly influences consulting research

(dotted arrow). However, critical research almost has no influence on the two other genres. They pointed out the genre of basic research with diversified interests of knowledge and methodologies, which results in limited internal communication. Consequently, Lukka and Granlund concluded that a fragmented and asymmetric phenomenon exists within internal and external communicative patterns among different discussion circles, hindering the fruitful development of ABC knowledge.

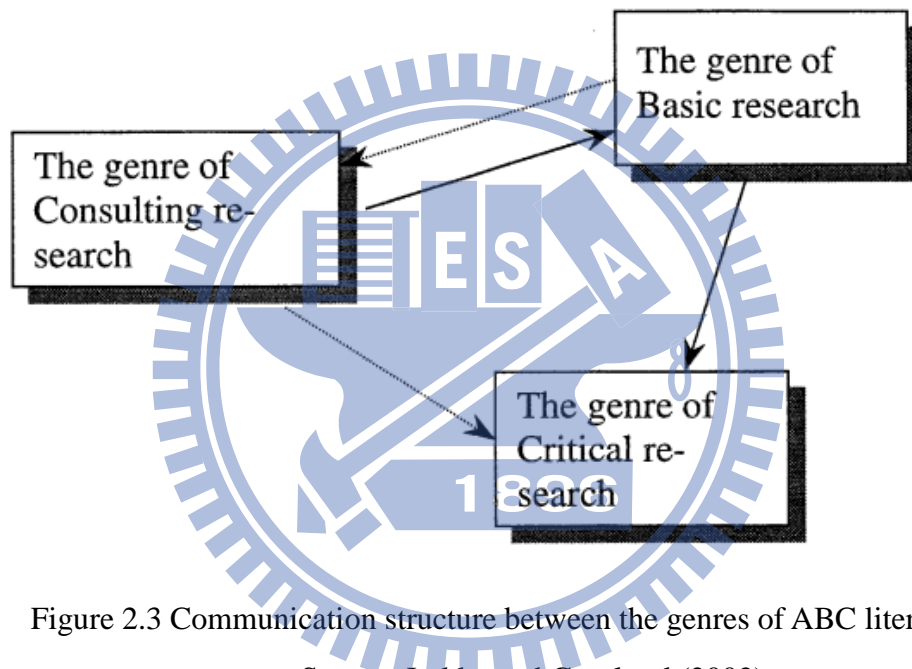


Figure 2.3 Communication structure between the genres of ABC literature
Source: Lukka and Granlund (2002)

Bjørnenak and Mitchell (2002) examined the ABC literature published in UK and U.S. accounting journals between 1987-2000, gaining insights into the development, communication, and diffusion of ABC through an analysis of volume, authorship, research method, role of content, and focus dimension. The majority of literature collected by Bjørnenak and Mitchell encompassed professional-oriented journals, which provided 80% of their total articles. They found that U.S.-based research inclined toward quantitative approaches and theory development as opposed to UK-based

research that tended toward qualitative reviews and field studies. While UK research journals contained a much more international range of authorships, U.S. research journals more commonly see academics take up consultant roles. They further addressed that ABC/ABM, which links with other managerial techniques, is extensively applied to various sectors or organizational functions. Finally, Bjørnenak and Mitchell also noted the fragmented communication structure between academics as moderators of academic research and consultants/practitioners as propagators of the technique.

2.2 Co-citation method

2.2.1 Basic concepts

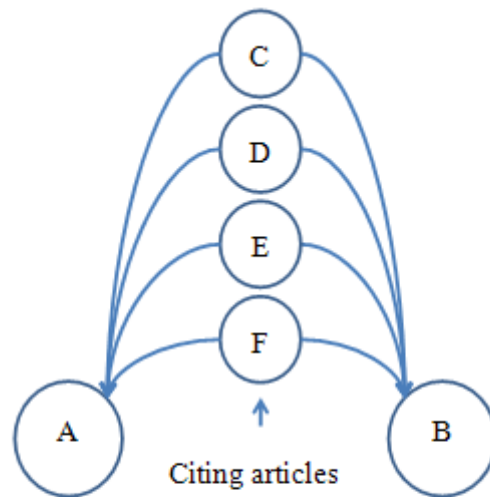
Pritchard first proposed the term 'bibliometrics' in 1969, defining it as applying mathematic and statistical methods to analyze books and other media of communication (Pritchard, 1969). He then further explained the purpose of bibliometrics as follows.

1. To shed light on the processes of written communication and of the nature and course of development by means of counting and analyzing the various facets of written communication.
2. The assembling and interpretation of statistics relating to books and periodicals...to demonstrate historical movements (Pritchard, 1972, p. 38).

The co-citation method is one of the best-known structuring methods of bibliometrics (Borgman, 1989). The concept of co-citation was respectively proposed in 1973 by H. Small in the U.S. and by Marshakova in the USSR (Marshakova, 1973; Small, 1973). Small (1973) presented the co-citation method to objectively model the intellectual

structure of scientific specialties, by assuming that a co-citation matrix is a measure of the perceived similarity or conceptual linkage between two co-cited articles. As shown in Figure 2.4, articles A and B are associated, because they are both cited, i.e., co-cited, by articles C, D, E, and F (Garfield, 2001). The number of identical citing articles defines the strength of co-citation between the two cited articles (Small, 1973). The more often two articles are cited together, the closer is the relationship between them (White & Griffith, 1981). This relationship only means that authors address similar topics, but not that they necessarily agree with each other (Acedo, Barroso, & Galan, 2006). If those retrieved co-cited articles significantly influence the development of the discipline, then they can serve as the theoretical and empirical fundamental concepts of it (Ramos-Rodriguez & Ruiz-Navarro, 2004; Small, 1973). Small (1973) stated:

When two papers are frequently co-cited, they are also necessarily frequently cited individually as well. If it can be assumed that frequently cited papers represent the key concepts, methods, or experiments in a field, then co-citation patterns can be used to map out in great detail the relationships between these key ideas. This may lead to a more objective way of modeling the intellectual structure of scientific specialties (Small, 1973, p. 266).



Article A [cited] Article B [cited]

Articles A and B are associated,
because they are both cited by
articles C, D, E, and F.

Figure 2.4 Co-citation method

Source: Garfield (2001)

2.2.2 Related research

Many researchers have employed the co-citation method to model an intellectual structure for a scientific discipline (Acedo et al., 2006; Culnan, 1986, 1987; Nerur, Rasheed, & Natarajan, 2008; Ramos-Rodriguez & Ruiz-Navarro, 2004). The most common units of analysis are documents or authors. The sources of data are Social Science Citation Index (SSCI) and Science Citation Index (SCI) in the Thomson-ISI Web of Science. After co-citation analysis of the literature, to find the relationships between core articles, researchers commonly further implement multivariate statistical analysis or social network analysis to construct representations of the intellectual structure. We list a few previous studies of the co-citation method in Table 2.1 for reference.

Table 2.1 Previous studies of the co-citation method

Authors	Research field	Sample source	Period	Analysis unit	Methods ^a
Subramani (2003)	Knowledge management	SSCI and SCI	1990-2002	Author	HAC, MDS, and FA
Acedo et al. (2006)	Resource-based theory	SSCI	1992-2001	Document	FA and MDS
Uysal, O.O. (2010)	Business ethics	EBSCO	1988-2007	Document	MDS and SNA
Di et al. (2010)	Dynamic capability	SSCI	1995-2007	Document	FA and MDS
Hsiao, C.H. and Yang, C. (2011)	Technology acceptance model	SSCI and SCI	1989-2006	Document	FA, HAC, and MDS
Chen, L.C. (2011)	E-learning	Taiwan's NDLTD and MIS journals	1996-2009	Author	HAC and MDS

^a FA factor analysis, MDS multidimensional scaling, HAC hierarchical agglomerative clustering, SNA social network analysis.

2.3 Commentary

ABC is a quintessentially innovative technique in management accounting. From the 1980s to 1990s, ABC as an expert system became a famous vogue like JIT, TQM, and TOC etc. Although ABC helps manager gain control in the modern world, the system itself has created new forms of risks. Thus, researchers who explore the phenomenon of modern management accounting like to take ABC as an example, such as Jones and Dugdale (2002) who expounded how the theories and practices of management accounting have come into being, and Lukka and Granlund (2002) who examined the communication structures within the management accounting academia. The aim of

Bjørnenak and Mitchell (2002) is more blurred than the two other articles but they found the differences of authorship and research methods between U.S.-based and UK-based journals. In short, these three articles let us understand that the existence of theories and practices of ABC needs a thorough continuous communication of actors and related networks as well as recursive cycles of the global-abstract level and local-concrete level (Jones & Dugdale, 2002). However, the difference of authorship, interests of knowledge, research methods, styles of argumentation, and the nature of results hinder the communication between different discussion circles. The communication process is very important for cultivating a fruitful development of knowledge, but it is more important that the language and ideas are understandable to each party in communication. Thus, this work explores the main ideas underpinning the ABC discipline in terms of the literature to gain insights into the whole picture of its intellectual structure. On the one hand, we hope the research results can be as the bases of dialogue between each different discussion circle. On the other hand, it contributes to the development of management accounting.

Exploring the intellectual structure of ABC, we can employ the co-citation method. This objective and quantitative approach is very different from the methods of the three above-mentioned articles. While Jones & Dugdale (2002) and Lukka and Granlund (2002) qualitatively discussed ABC solely based on philosophical and sociological theories. Bjørnenak and Mitchell (2002) used descriptive statistics to form the basis of their arguments. The literature bears witness to the development process of knowledge, and bibliometrics can study the structure and process of scholarly communication by connecting documents with each other in the form of citations and co-citations (Borgman & Furner, 2002). Among the three different units of co-citation analysis -

document co-citation analysis, author co-citation analysis, and journal co-citation analysis - this present study focuses on documents, i.e., individual articles published in journals, as the units of co-citation analysis.

Why are we using cited documents rather than authors as the unit of co-citation analysis in this study? Obviously, any article has both subject and author(s). McCain(1990) pointed out that author co-citation analysis is closely related to document co-citation analysis in their assumptions and techniques, except that the former selects a set of author names, rather than document names, as a starting point. An author co-citation analysis and social network analysis are designed to explore the formation of various areas of scholarship and the relationships among them. An author co-citation analysis requires the researcher to have some prior knowledge of the field and a strong preference to the authors in the initial author list selection. Document co-citation analysis and multivariate statistical analysis aim to examine the various areas of subject and findings of knowledge and the relationships between them. Other than the clustering algorithms and the co-citation thresholds, document co-citation analysis does not require any prior knowledge of subject fields. In fact, it can more objectively analyze the group behavior of the evolution of the subject areas. In other words, we primarily zoom in on what ABC is, rather than who is developing it. Therefore, we select the cited documents rather than authors as the unit of co-citation analysis.

Chapter 3 Research Method

3.1 Research framework

The research framework of this study can be divided into two main parts as shown in Figure 2.1. The left part develops a co-citation correlation matrix of core articles from setting the scope and conditions of retrieving core articles to conducting a co-citation analysis of it. The right part of Figure 2.1 implements three approaches of a multivariate statistical technique to obtain the representations of intellectual structure in order to analyze the core ideas, evolution, and trends and to explain the implications.

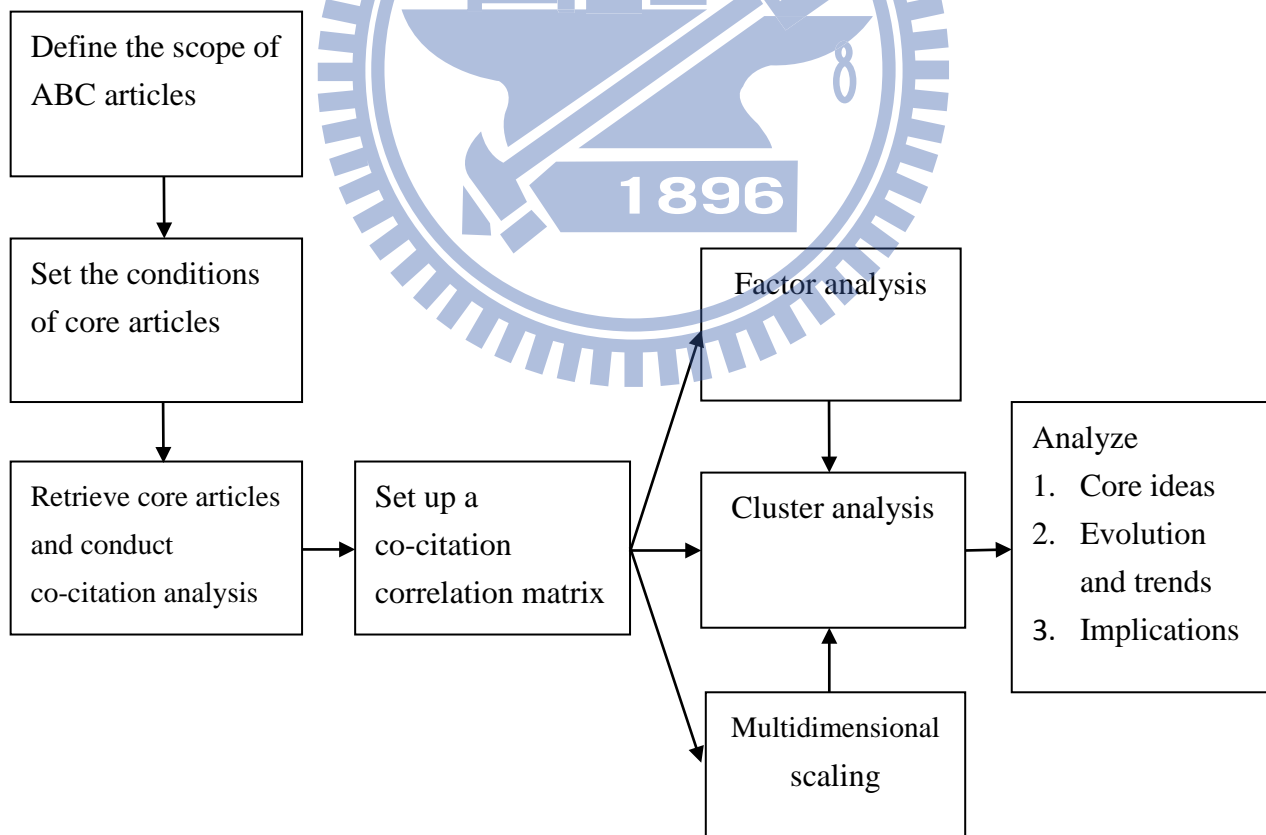


Figure 3.1 Research framework

3.2 Define the scope of ABC articles

For the purpose of modeling an intellectual structure, any study based on the co-citation method must first establish a set of source documents in order to filter the core articles (Callon, Courtial, & Penan, 1993). Thus, we need a prior delimiting of journals through which the ABC theory is formed and then qualified articles are retrieved. To cover all the developments within the ABC theory, these articles should appear in academic and professional accounting journals and Harvard Business Review based on the following reasons. Lukka and Granlund (2002), Bjørnenak and Mitchell (2002), and Jones and Dugdale (2002) all included academic and professional accounting journals, whereas only Jones and Dugdale (2002) included HBR.

Lukka and Granlund (2002) outlined three phases of research literature that has emerged in the development process of ABC knowledge. At the starting phase of the ABC theory, the initial core ideas form pilot versions of theory and are disseminated to readers of journals. Therefore, practical ‘consulting research’ was the first type of research to emerge. In the second phase, the nature, functioning, effects, and diffusion of ABC are analyzed from the actual field of practice in order to more deeply describe, understand, and explain it. These articles, termed ‘basic research’, employ diverse methodologies to explore the objective facts of implementing ABC. In the third phase, the core value of the ABC theory is examined critically within a wider organizational and social context in order to further examine its ideology. These studies, termed ‘critical research’, create the explicit links between ABC and social change. Accordingly, the collective set of literature emerging in the three phases over the development of the ABC theory includes both academic-oriented and professional-oriented articles.

Bjørnenak and Mitchell (2002) examined the ABC literature published in UK and U.S. accounting journals between 1987-2000. They analyzed a set of literature retrieved from both academic and professional journals in which 80% of total articles were from *Management Accounting (UK)*, *Management Accounting (U.S.)*, and *Journal of Cost Management*.

Jones and Dugdale (2002) stated that the way in which ABC knowledge has evolved is through recursive cycles of reembedding from the abstract to the concrete, and then disembedding from the concrete to the abstract over time and space. They emphasized that no privilege is given to either theory or practice as the fount of ABC accounting knowledge. Through the so-called “Giddens’ discussion of the dynamics of modernity”, they also stated that the development of ABC as a disembedded global expert system is inscribed in many texts, including hundreds of academic papers and professional articles.

When Jones and Dugdale (2002) traced the development history of ABC, they additionally pointed out that one cannot neglect the important role and contributions of the Harvard network. In the 1980s, Harvard University was an important place for a number of academics concerned about the impact of global change on U.S. manufacturing. A colloquium at Harvard Business School in 1986 created an alliance among Cooper, Kaplan, and Johnson owing to the presentation of similar findings from field research as a means of developing a new accounting theory within the new manufacturing environment. Jones and Dugdale (2002) pointed out that the Cooper-Kaplan-Johnson network is one of the origins of ABC and shaped ABC over the subsequent few years. In addition, they disseminated this emergent costing system

through three prominent practitioner-oriented journals - *Harvard Business Review*, *Management Accounting (U.S.)*, and *Journal of Cost Management* - instead of academic accounting journals. Therefore, we add HBR into the set of source documents in this study.

3.3 Set the conditions of core articles

Based on the three aforementioned articles simultaneously published in 2002, we select a set of source documents on ABC from academic and professional accounting journals and HBR between 1988 and 2008. We choose this 20-year period, because the words “activity-based costing” began to appear in the accounting literature in 1988 (Jones & Dugdale, 2002). In addition, McCain (1990) stated that “the major controls exerted by the researchers are the selection of citation and co-citation thresholds above which papers will be retrieved”. Thus, this study restricts the frequency of citation for the included articles to be equal or greater than 20. The reason behind the threshold value 20 is that we assume an influential article over the last 20 years should have been cited at least once per year.

3.4 Collect data and conduct co-citation analysis

Inputting the key words “activity-based costing” into Google Scholar’s database, this study obtained sixty-one journal articles with 3023 cited references as a source set that is consistent with the aforementioned conditions. Google Scholar counts citations from many sources, including books, working papers, conference proceedings, and so forth. Hence, we must filter the cited references of each retrieved article only published in journals so as to avoid repeatedly computing identical research published in different

forms, e.g., both in thesis and paper.

These sixty-one articles are next paired with each other and the co-citation frequency of each pair is computed from referring to the cited references, yielding a 61×61 matrix. We delete articles where a whole row or column in the matrix is zero, because these articles are never co-cited with the others. The co-citation frequency matrix is then transformed to a Pearson correlation matrix.

The correlation coefficient $\rho_{X,Y}$ between two random variables X and Y with expected values μ_X and μ_Y and standard deviations σ_X and σ_Y is defined as:

$$\rho_{X,Y} = \text{corr}(X, Y) = \frac{\text{cov}(X, Y)}{\sigma_X \sigma_Y} = \frac{E[(X - \mu_X)(Y - \mu_Y)]}{\sigma_X \sigma_Y},$$

Where E is the expected value operator, *cov* means covariance, and, *corr* a widely used alternative notation for Pearson's correlation.

Compared to a co-citation frequency matrix, the Pearson correlation matrix offers at least two advantages: 1. Data standardization prevents scale effects from the greater difference of citation numbers between two similar articles. 2. Articles that are not significantly related to any other ones can be deleted (McCain, 1990; Ramos-Rodriguez & Ruiz-Navarro, 2004). Because the Pearson correlation coefficient is used as the measure of similarity of article-pairs, the higher the positive correlation is, the more similar the two articles are in the perception of citers (McCain, 1990). Thus, we filter out the non-significant related articles with others. The final reduced Pearson correlation matrix is a 36×36 one based on 1866 cited references, showing the relationship among the core articles of the ABC theory. Please see Table 3.1's 36×36 co-citation frequency matrix and Table 3.2's 36×36 co-citation correlation matrix.

Table 3.1 36×36 co-citation frequency matrix

	V01	V02	V03	V04	V05	V06	V07	V08	V09	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23	V24	V25	V26	V27	V28	V29	V30	V31	V32	V33	V34	V35	V36				
V01	0																																							
V02	23	0																																						
V03	7	3	0																																					
V04	14	8	22	0																																				
V05	16	13	2	5	0																																			
V06	3	1	7	2	2	0																																		
V07	26	13	7	13	4	1	0																																	
V08	9	9	23	27	7	3	11	0																																
V09	5	7	31	23	5	9	6	21	0																															
V10	5	5	26	22	2	3	9	13	31	0																														
V11	5	6	19	23	4	6	7	21	18	13	0																													
V12	9	5	16	47	4	2	6	20	20	14	18	0																												
V13	5	5	24	13	2	5	6	28	17	10	15	13	0																											
V14	3	0	8	6	1	15	3	6	10	7	7	6	4	0																										
V15	7	4	3	4	4	0	5	4	2	3	4	1	5	1	0																									
V16	8	4	21	18	3	1	8	32	9	10	9	13	19	4	3	0																								
V17	7	3	3	3	4	0	4	6	4	2	2	3	4	0	5	3	0																							
V18	7	4	19	11	3	0	7	26	9	9	9	7	19	2	3	22	4	0																						
V19	13	11	4	0	2	1	25	2	3	3	0	1	3	1	3	2	0	3	0																					
V20	2	4	10	6	2	0	3	22	6	3	6	4	9	0	2	9	0	14	1	0																				
V21	6	2	3	4	2	5	4	5	7	2	4	5	4	15	1	4	0	2	2	0	0																			
V22	8	3	13	14	3	1	9	21	8	8	6	12	9	3	3	17	3	9	2	4	3	0																		
V23	7	7	19	16	4	1	8	27	11	10	11	11	18	3	4	21	3	15	1	8	3	21	0																	
V24	1	0	3	3	0	5	1	3	8	4	5	3	2	2	0	0	0	3	0	1	1	0	0	0																
V25	6	4	4	2	0	0	3	6	2	2	3	0	4	0	2	4	2	1	1	4	1	5	6	0	0															
V26	0	0	4	2	0	3	1	2	2	0	0	2	3	1	3	1	0	0	0	0	0	1	4	1	0	1	0													
V27	3	0	4	3	1	2	1	3	4	2	4	3	5	4	7	2	6	0	1	0	4	2	2	1	1	1	1	0												
V28	6	1	2	1	0	0	3	0	1	1	1	0	0	0	11	0	1	0	6	1	0	2	1	0	0	1	3	0												
V29	0	2	2	6	1	0	1	5	2	2	1	5	4	0	5	3	1	4	0	1	0	4	4	0	1	1	1	1	0											
V30	3	3	1	1	1	0	2	1	0	1	1	1	0	0	2	1	2	0	1	0	1	1	1	1	0	1	0	0	1	1	0									
V31	4	0	5	5	1	1	2	4	5	5	5	4	1	2	4	4	1	0	0	1	4	4	0	2	0	6	1	2	1	0										
V32	2	2	0	1	6	0	1	1	1	0	1	1	0	0	1	0	0	3	0	1	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
V33	0	1	1	1	0	0	1	1	1	1	0	0	2	0	4	1	7	0	0	2	0	1	1	0	2	0	4	3	0	0	2	0	0	0	0	0	0	0		
V34	8	6	17	15	4	0	9	28	9	12	11	11	18	3	5	22	4	19	2	8	3	20	27	0	5	3	2	0	7	0	3	2	1	0						
V35	13	4	6	9	7	3	13	9	5	7	8	4	8	4	14	7	6	6	5	2	4	7	9	2	1	0	9	6	3	2	4	3	3	9	0					
V36	3	2	4	4	1	2	5	9	6	3	9	5	5	4	2	2	0	4	4	4	4	2	3	2	1	0	2	1	0	0	0	0	1	3	4	0				

3.5 Multivariate statistical analysis

For observing and analyzing the grouping behavior of the evolution of subject areas in the intellectual structure of ABC, this study further employs multivariate statistical techniques to analyze the 36×36 co-citation correlation matrix, which serves as a matrix of inter-article proximities. First, we conduct factor analysis to reduce thirty-six variables, representing thirty-six core articles, into a much smaller number of derived variables, i.e., common factors. This reveals the underlying subject matter of thirty-six core articles perceived by citers and the contribution of each article to common factors.

Second, we use cluster analysis to group thirty-six core articles in order to gain insights into the intellectual organization of ABC. Because cluster analysis is mainly based on real distances of data, each of the 36 articles has a one-to-one mapping to its own group. Comparing the results of cluster analysis and ones of factor analysis, we properly name groups derived from the factors of factor analysis.

Third, to provide a visual aid to view the underlying structure of these groups based on cluster analysis, we use multidimensional scaling (MDS) to display the perceptual mapping of multivariate data in a two-dimensional space and measure its stress value and R-square to test the goodness of fit.

This work, in short, uses factor names of factor analysis to label groups derived from cluster analysis and visualizes the thirty-six articles in a two-dimensional map. Thus, factor analysis and MDS complement and enrich the information of cluster analysis.

Chapter 4 Research Results

This chapter first presents the descriptive statistics of the research results and then explains the inferential statistics of it, including factor analysis, cluster analysis, and multidimensional scaling.

4.1 Descriptive statistics

From the viewpoint of the number of cited times as shown in Table 4.1, Cooper and Kaplan (1988b) and Cooper and Kaplan (1991a) are respectively cited 178 and 108 times as the largest numbers. Twelve articles are cited between 99 and 50 times. Twenty-two articles are cited from 49 to 20 times. For the publication year as shown in Table 4.2, these articles are distributed from 1988 to 2004, apart from 1996 and 2003. Owing to the time frame and co-citation methodology of this study, the results present an archival view of ABC that favors ideas represented by older articles. In other words, an article with a short time span would normally accumulate less reference counts than older articles, and so there is no way that a recently published journal article can be qualified as a core article. From the publication journal's viewpoint as shown in Table 4.3, all core articles are published in nine famous journals, including both professional and academic-oriented journals. JMAR, MAR, and AOS occupy the top three of the nine journals. Among the nine journals, seven are SSCI, based upon 2011 journal citation reports.

Table 4.1 Number of cited times for the 36 core articles

Number of cited times	Number of core articles
More than 100 times	2
90-99 times	1
80-89 times	3
70-79 times	1
60-69 times	3
50-59 times	4
40-49 times	8
30-39 times	6
20-29 times	8

Table 4.2 Publication year for the 36 core articles

Publication year	Number of core articles	Publication year	Number of core articles
1988	2	1997	5
1989	1	1998	2
1990	1	1999	3
1991	2	2000	1
1992	2	2001	2
1993	2	2002	3
1994	3	2003	0
1995	6	2004	1
1996	0		

Table 4.3 Publication journal for the 36 core articles

	2008	Groups				Subtotal
		JCR	1	2	3	
<i>Journal of Management Accounting Research</i>		1		6		7
<i>Management Accounting Research</i>	SSCI			5	1	6
<i>Accounting Organizations and Society</i>	SSCI			3	3	6

<i>Harvard Business Review</i>	SSCI	2	2			4
<i>Accounting Review</i>	SSCI		3	1		4
<i>Accounting Horizons</i>	SSCI	1	1	1		3
<i>Journal of Accounting and Economics</i>	SSCI	1	1			2
<i>Journal of Accounting Research</i>	SSCI			2		2
<i>Journal of Cost Management</i>		1	1			2
Subtotal		6	8	18	4	36

4.2 Factor analysis

This study uses principal components analysis with a varimax rotation to extract common factors above an eigenvalue of 1, which is the most common method for co-citation analysis (McCain, 1990). Consequently, it produces four uncorrelated factors representing four subjects to explain 85.47% of total variance as shown in Figure 4.1. Most articles have a high loading on only one factor as shown in Table 4.4.

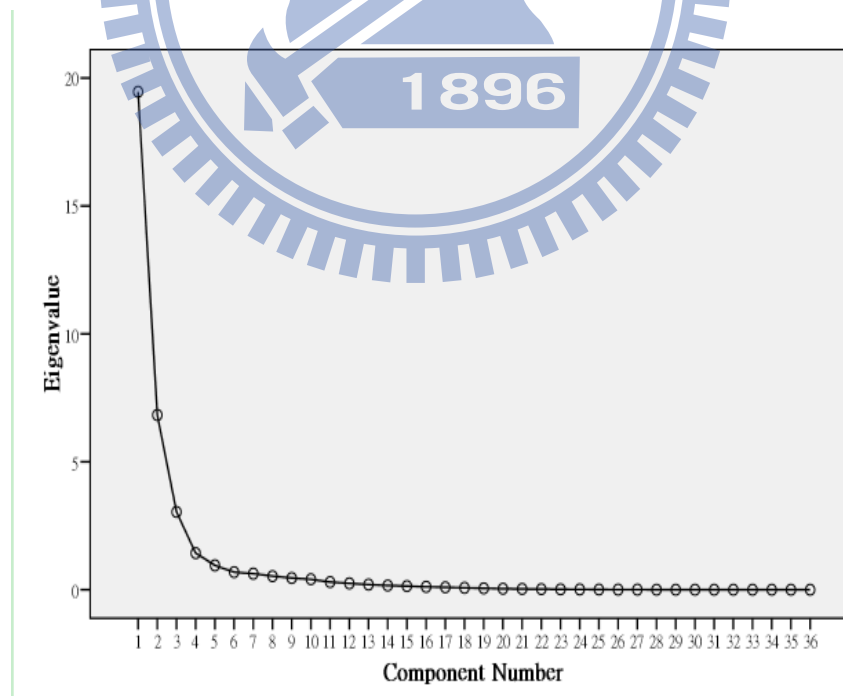


Figure 4.1 Scree plot

Table 4.4 Results of factor analysis

Variables	Factors ^a	1 ^b	2 ^c	3 ^d	4 ^e
31McGowan, A. S., & Klammer, T. P. (1997)		.973			
27Krumwiede, K. R. (1998)		.970			
36Swenson, D. (1995)		.968			
01Anderson, S. W. (1995)		.963			
18Foster, G., & Swenson, D. (1997)		.958			
03Argyris, C., & Kaplan, R. S. (1994).		.951			
23Ittner, C. D., Lanen, W. N., & Larcker, D. F. (2002)		.934			
02Anderson, S. W., & Young, S. M. (1999)		.931			
35Shields, M. D. (1995)		.918			
29Malmi, T. (1997)		.854			
19Gosselin, M. (1997)		.846			
22Innes, J., Mitchell, F., & Sinclair, D. (2000)		.813			
21Innes, J., & Mitchell, F. (1995)		.790			
30Malmi, T. (1999)		.789			
32Ness, J. A., & Cucuzza, T. G. (1995)		.770			
08Bjørnenak, T. (1997)		.754	.548		
28Maher, M. W., & Marais, M. L. (1998)		.743			
16Drake, A. R., Haka, S. F., & Ravenscroft, S. P. (1999)		.703			
05Babad, Y. M., & Balachandran, B. V. (1993)		-.647			
04Armstrong, P. (2002)			.878		
09Briers, M., & Chua, W. F. (2001)			.877		
20Granlund, M. (2001)			.830		
06Banker, R. D., & Johnston, H. H. (1993)			-.796		
24Jones, T. C., & Dugdale, D. (2002)			.733		
07Bhimani, A., & Pigott, D. (1992)		.643	.690		
15Datar, S., & Gupta, M. (1994)			-.641		
26Kee, R. (1995)			-.510		
13Cooper, R., & Kaplan, R. S. (1991a)				.914	
14Cooper, R., & Kaplan, R. S. (1992)				.886	
10Cooper, R. (1988)				.869	
17Foster, G., & Gupta, M. (1990)				.620	
33Noreen, E. (1991)				.616	
25Kaplan, R. S., & Anderson, S. R. (2004)			-.525	.578	

11Cooper, R. (1989)			.554	-.501
12Cooper, R., & Kaplan, R. S. (1988b)				-.740
34Noreen, E., & Soderstrom, N. (1994)				.718
Eigenvalue	15.936	7.362	5.360	2.112
% of variance	44.267	20.449	14.890	5.867
Cumulative %	44.267	64.715	79.605	85.473

Notes:

^a Factor loading above ± 0.5 is listed.

^b Factor 1 labeled as “implementation and diffusion” .

^c Factor 2 labeled as “benefits and risks”.

^d Factor 3 labeled as “fundamental concepts”.

^e Factor 4 labeled as “methodology and validation”.

The purpose of factor analysis is to extract common factors representing the underlying subject matter of thirty-six core articles perceived by citers. We use varimax rotation to produce four uncorrelated factors with high loading on only one factor for most articles in order to facilitate the distinction between different subjects. A factor loading indicates an article’s contribution to a factor. A positive loading likely indicates a positive relationship with a factor, whereas a negative loading likely indicates a negative (reverse) relationship with a factor. A negative loading is as important as a positive loading. In general, only articles with loadings greater than ± 0.7 are generally useful in interpreting or naming a factor, and factor loadings above ± 0.4 or ± 0.5 are listed. Table 4.4 lists those factor loadings above ± 0.5 . On the one hand, we can use a few articles with higher loadings (either positive or negative) to name a factor. On the other hand, we also can identify the breadth of contributions of an article, i.e., whether it has a cross loading (Acedo et al., 2006; McCain, 1990).

Acedo et al. (2006) stated “articles with positive loads and those with negative loads in the same factor exhibit a disparity or divergence of theoretical developments or

discussion topics, so other researchers do not tend to cite them together”. In other words, an article with a negative loading on a factor indicates that it reverses or disagrees with other articles of the same factor, although they are discussing the same subject.

Factor 1 accounts for the largest variance of 44.27%. It has higher positive loadings on McGowan and Klammer (1997), Krumwiede (1998), Swenson (1995), Anderson (1995), Foster and Swenson (1997), Argyris and Kaplan (1994), Ittner, Lanen, and Larcker (2002), Anderson and Young (1999), and Shields (1995). Since these articles primarily explore how ABC effectively circulates and disseminates in an organization, this factor can be labeled as “implementation and diffusion”.

Factor 2 in this analysis explains 20.45% of the total variance, with higher positive loadings on Armstrong (2002), Briers and Chua (2001), and Granlund (2001). These articles study the impacts of technical innovation and introduction on society and social behavior so as to bring not only benefits, but also risks. Thus, we name this factor “benefits and risks”.

Factor 3 explains 14.90% of the total variance and has higher positive loadings on Cooper and Kaplan (1991a, 1992) and Cooper (1988). These articles mainly address the fundamental concepts of the ABC technique. We name this factor “fundamental concepts”.

Factor 4 only explains 5.87% of total variance, although its eigenvalue is greater than 1.0. It has a higher negative loading on Cooper and Kaplan (1988b) who advocated ABC, providing more accurate cost information to assist management decision-makings. In addition, this factor has a higher positive loading on Noreen and Soderstrom (1994)

who challenged the assumption of ABC for overhead costs strictly in proportion to activity. Both of these two articles male up a critical type of methodology and validation of ABC even though they expressed a divergent theoretical development. Thus, we name this factor ‘methodology and validation’.

We finally remind readers that these factors might be somewhat differently named by terms and somewhat differently interpreted by persons due to subjective professional judgments.

4.3 Cluster analysis

Using cluster analysis to group articles can provide insights into the intellectual organization of ABC (McCain, 1990). We use squared Euclidean distance and Ward’s method to present the cluster dendrogram as shown in Figure 4.2, which identifies different groups of thirty-six core articles based on their homogeneity of being cited. Based on a larger distance between four and six groups, this work determines its number of groups to be four. Deliberately comparing the results of cluster analysis and ones of factor analysis, we name groups derived from the factors of factor analysis. It is interesting that Group 2 is formed exactly by five articles with negative loadings that respectively reverse Factors 1 or 2 as well as three articles in Factor 4. Therefore, we respectively name Groups 1, 2, 3, 4 as “fundamental concepts”, “methodology and validation”, “implementation and diffusion”, and “benefits and risks”.

Based on hierarchical clustering as shown in Figure 4.2, we lastly name Cluster I as “technical aspect”, which includes Groups 1 and 2. Cluster II is the “social aspect” combining Groups 3 and 4. Table 4.5 shows the results of cluster analysis, with the

contents of each group examined in the following discussion section.

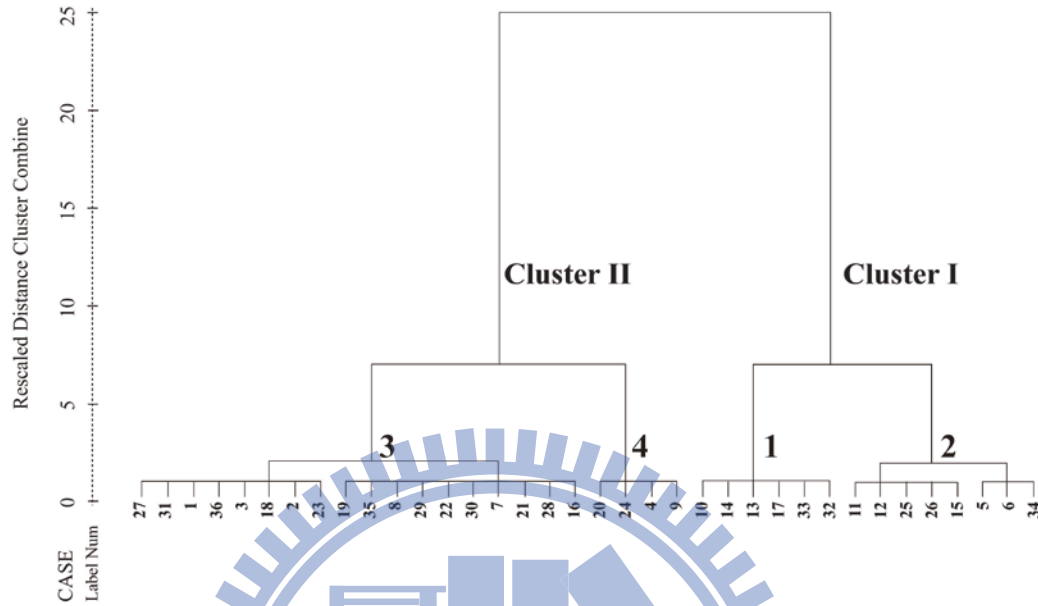


Figure 4. 2 Hierarchical clustering of thirty-six core articles

Table 4.5 Results of cluster analysis

Cluster I: Technical Aspect

Group 1: Fundamental Concepts

- 10 Cooper, R. (1988). *Journal of Cost Management*
- 14 Cooper, R., & Kaplan, R. S. (1992) *Accounting Horizons*
- 13 Cooper, R., & Kaplan, R. S. (1991a). *Harvard Business Review*
- 17 Foster, G., & Gupta, M. (1990). *Journal of Accounting and Economics*
- 33 Noreen, E. (1991). *Journal of Management Accounting Research*
- 32 Ness, J. A., & Cucuzza, T. G. (1995). *Harvard Business Review*

Group 2: Methodology and Validation

- 11 Cooper, R. (1989). *Journal of Cost Management*
- 12 Cooper, R., & Kaplan, R. S. (1988b). *Harvard Business Review*
- 25 Kaplan, R. S., & Anderson, S. R. (2004). *Harvard Business Review*
- 26 Kee, R. (1995). *Accounting Horizons*
- 15 Datar, S., & Gupta, M. (1994). *Accounting Review*
- 05 Babad, Y. M., & Balachandran, B. V. (1993). *Accounting Review*
- 06 Banker, R. D., & Johnston, H. H. (1993). *Accounting Review*

34 Noreen, E., & Soderstrom, N. (1994). *Journal of Accounting and Economics*

Cluster II: Social Aspect

Group 3: Implementation and Diffusion

27 Krumwiede, K. R. (1998). *Journal of Management Accounting Research*

31 McGowan, A. S., & Klammer, T. P. (1997). *Journal of Management Accounting Research*

01 Anderson, S. W. (1995). *Journal of Management Accounting Research*

36 Swenson, D. (1995). *Journal of Management Accounting Research*

03 Argyris, C., & Kaplan, R. S. (1994). *Accounting Horizons*

18 Foster, G., & Swenson, D. (1997). *Journal of Management Accounting Research*

02 Anderson, S. W., & Young, S. M. (1999). *Accounting Organizations and Society*

23 Ittner, C. D., Lanen, W. N., & Larcker, D. F. (2002). *Journal of Accounting Research*

19 Gosselin, M. (1997). *Accounting Organizations and Society*

35 Shields, M. D. (1995). *Journal of Management Accounting Research*

08 Bjørnenak, T. (1997). *Management Accounting Research*

29 Malmi, T. (1997). *Management Accounting Research*

22 Innes, J., Mitchell, F., & Sinclair, D. (2000). *Management Accounting Research*

30 Malmi, T. (1999). *Accounting Organizations and Society*

07 Bhimani, A., & Pigott, D. (1992). *Management Accounting Research*

21 Innes, J., & Mitchell, F. (1995). *Management Accounting Research*

28 Maher, M. W., & Marais, M. L. (1998). *Journal of Accounting Research*

16 Drake, A. R., Haka, S. F., & Ravenscroft, S. P. (1999). *Accounting Review*

Group 4: Benefits and Risks

20 Granlund, M. (2001). *Management Accounting Research*

24 Jones, T. C., & Dugdale, D. (2002). *Accounting Organizations and Society*

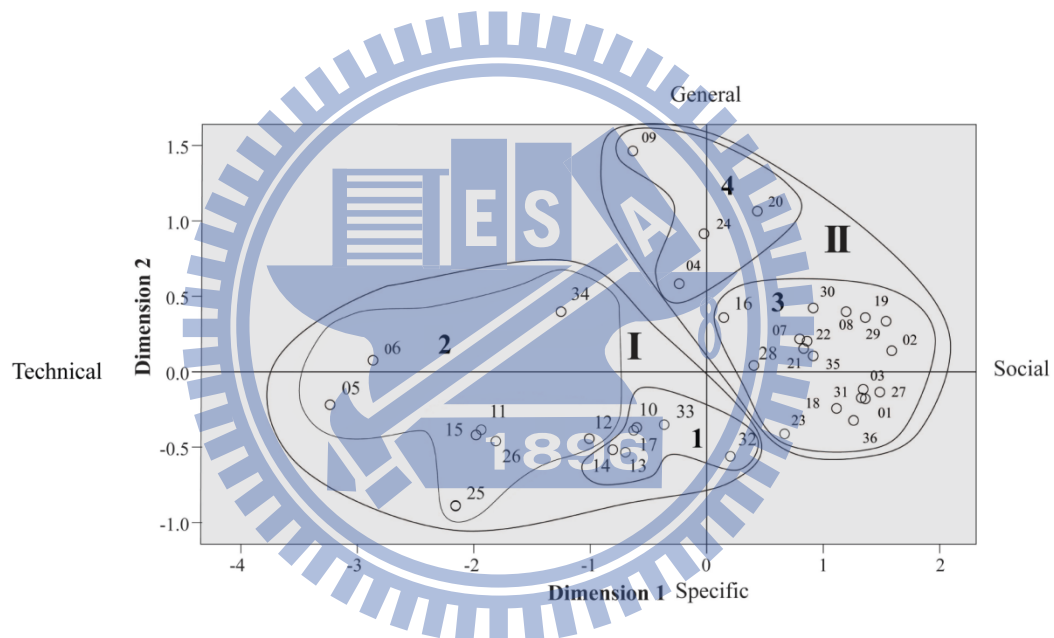
04 Armstrong, P. (2002). *Accounting Organizations and Society*

09 Briers, M., & Chua, W. F. (2001). *Accounting Organizations and Society*

4.4 Multidimensional scaling analysis

This study employs MDS analysis to perceptually map thirty-six articles in a two-dimensional map as shown in Figure 4.3, visualizing conceptual distances between one other. We further depict the four groups based on cluster analysis in order to gain insight into the position and attributes of each group. Points with high similarities are placed close together in intellectual space, while points with high dissimilarities are

placed farther apart. However, owing to the simplification of reducing its space for the purpose of visualization, such a depiction necessarily distorts the original data somewhat and cannot account for all the variance in the proximity matrix (McCain, 1990). For example, point 12 is shown to be in Group 2, but appears to be in very close proximity to Group 1. McCain (1990) suggested that a higher stress value, but usually less than 0.2, is considered an acceptable trade-off for a two- or three-dimensional solution if the R Square is high. In this present study, the stress value of 0.1582 and RSQ of 0.9445 indicate an acceptable goodness of fit for the co-citation matrix.



Note:

- 1 indicates Group 1: Fundamental Concepts
- 2 indicates Group 2: Methodology and Validation
- 3 indicates Group 3: Implementation and Diffusion
- 4 indicates Group 4: Benefits and Risks
- I indicates Cluster I, technical aspect
- II indicates Cluster II, social aspect

Figure 4. 3 Four groups on multidimensional scaling

Chapter 5 Discussions

After conducting the co-citation analysis and multivariate statistical analysis, we obtain a model of intellectual structure and its various representations of thirty-six core articles of ABC as shown in Table 4.5 and Figure 4.3, consisting of the four groups located on a two-dimensional map. Within the map, the proximity of the core articles (points) or groups reflects the perceived similarity on some dimensions, including subject areas, research specialties, schools of thought, shared intellectual styles, or temporal period (McCain, 1990). Points or groups with high similarities are placed close together in intellectual space, while points or groups with high dissimilarities are placed farther apart. After in-depth studies on the features of the articles within groups, we respectively name Group 1 as ‘fundamental concepts’, Group 2 as ‘methodology and validation’, Group 3 as ‘implementation and diffusion’, and Group 4 as ‘benefits and risks’. Groups 1 and 2 can then be further grouped as Cluster I ‘technical aspect’ and Groups 3 and 4 grouped as Cluster II ‘social aspect’. The four groups are oriented along a horizontal ‘research perspective’ and a vertical ‘research domain’ as shown in Figure 4.3. The horizontal axis represents moving (left to right) from technical to social construction of reality. The vertical axis represents moving (bottom to top) from specific to general contextual continuum. Table 5.1 concisely lists the characteristics of each group, including publication year, publication journal, research method, and research content. We discuss in detail and compare these characteristics within and between groups in order to find the evolution and trends of ABC and interpret the implications for academics and practitioners.

Table 5.1 Characteristics of the four groups

Groups Dimensions	Technical aspect		Social aspect	
	Fundamental Concepts	Methodology and Validation	Implementation and Diffusion	Benefits and Risks
Publication year	1988, 1990, 1991(2)*, 1992, 1995	1988, 1989, 1993(2), 1994(2), 1995, 2004	1992, 1994, 1994-2002 (16)	2001(2), 2002(2)
Publication journal	Professional-oriented (3) Academic-oriented (3)	Professional-oriented (3) Academic-oriented (5)	Academic-oriented (18)	Academic-oriented (4)
Research method	Conceptual analysis (4) Statistical studies (1) Mathematical modeling (1)	Conceptual analysis (3) Statistical studies (2) Mathematical modeling (3)	Conceptual research (1) Statistical studies (14) Case studies (3)	Case studies (4)
Research contents	Expounding upon the meanings, nature, and functions of the ABC technique	Validating and arguing ABC hypotheses that appear with positive and negative sentiments	Discussing how ABC effectively circulates in an organization and is widely disseminated	Discussing social behaviors of ABC's development process and criticizing the benefits and risks from a sociological perspective

* The number inside the parenthesis indicates the number of core articles.

5.1 Discussion between and within groups

In Group 1: Fundamental Concepts, six articles are close to each other and located near the center of the map, which represent the central ideas that are commonly co-cited by other groups. These articles were mainly published in professional-oriented journals, particularly in *Journal of Cost Management* and *Harvard Business Review* in the late 1980s and early 1990s. Robin Cooper and Robert S. Kaplan, both academics and consultants, are the most influential writers of ABC fundamental concepts. Cooper (1988) argued the obsolescence of traditional volume-based costing and proposed ABC as being able to calculate more accurate product costs by tracing activities based on the demands within the diversity and complexity of the product mix. Cooper and Kaplan (1991a, 1992) presented that the important characteristics of ABC are the clarification of cost hierarchical structure and measurement of the costs of resource usage.

Noreen (1991) noted that ABC systems provide relevant costs for decisions of product drop and product design under three conditions: 1. Total cost can be partitioned into cost pools, each of which depends solely upon one activity. 2. The cost in each cost pool must be strictly proportional to the level of activity in that cost pool. 3. Each activity can be partitioned into elements that depend solely upon each product. Ness and Cucuzza (1995) showed how Chrysler and Safety-Kleen, early ABC successful adopters, rolled out ABC/ABM into their organizations. Foster and Gupta (1990) suggested that ABC systems appropriately identify cost drivers that adequately capture the complexity and efficiency concepts of manufacturing overhead. In short, these articles of Group 1 advocate the emergence of the ABC technique and explain its meanings, natures, and functions.

In Group 2: Methodology and Validation, the articles are dispersedly located among each other owing to the dissimilarity of stances or approaches about the validation of ABC methodologies. Cooper and Kaplan (1988b) co-wrote the article titled “Measure Costs Right, Make the Right Decision”, which advocated ABC as providing more accurate cost information than tradition costing systems to decide a competitive strategy. Cooper (1989) and Babad and Balachandran (1993) both suggested the methods of determining cost drivers in an ABC system. Banker and Johnston (1993) empirically demonstrated that strategic operations-based cost drivers significantly affect the costs of U.S. airline companies. Kee (1995) integrated the theories of both ABC and TOC (theory of constraints), which had previously battled seriously in opposition. However, Datar and Gupta (1994) argued that the assumptions of more cost pools and better specifications in ABC systems did not necessarily result in more accurate product costs, due to the trade-off among aggregation error, specification error, and measurement errors of overhead costs and product-specific units of allocation bases. Noreen and Soderstrom (1994) empirically demonstrated that most of the overhead accounts in hospital service departments are not in accordance with the proportionality hypothesis between costs and activities of ABC. After the mid-1990s, few papers about ABC’s technique improvement were published to deal with some of the unsolved problems - particularly, large and complex firms encountered difficulties justifying large time and costs to collect data based on questionnaires and interviews with employees. Until the 2000s, Kaplan and Anderson (2004) proposed time-driven ABC and a more flexible cost model, which solved this long-standing problem to become the latest improvement of the ABC technique.

In Group 3: Implementation and Diffusion, there are eighteen articles that all were

published in academic journals after 1994. They are located across the x-axis and to the right of the y-axis. The close distances between the points indicate a high degree of similarity among these articles. These authors primarily explored and analyzed a variety of actually occurring phenomena of implementing ABC in organizations.

We further divide this subject into four topics to discuss them. First, the introduction and implementation of ABC in an organization might cause employee resistance. Bhimani and Pigott (1992) illustrated the unanticipated behavioral consequences within an enterprise, because ABC's implementation shifted the authority and organizational power base of different line managers. Argyris and Kaplan (1994) suggested the strategies for overcoming participants' resistance of implementing ABC to be education, sponsorship, and incentive alignment in the initial processes and creating internal commitment in the subsequent process. Malmi (1997) revealed that economic rationale, political motives, and organization culture are the fundamental structural reasons for employee resistance to accounting change.

Second, the successfully influential factors of ABC implementation in organizations are identified. Shields (1995) emphasized ABC as both technical and administrative innovation and provided empirical evidence on 143 firms' degree to which various behavioral organizational and technical factors were associated with the success of ABC implementation, particularly top management support, link to competitive strategies, link to performance evaluation and compensation, training, ownership by non-accountants, and adequate resources. Anderson (1995) developed a framework for evaluating ABC implementation and hypotheses about influential factors by means of studying General Motors Corporation's experimentation with it from 1986 to 1993. Krumwiede (1998) found that the direction and level of

importance for contextual and organization factors vary at ten stages of the ABC implementation process. Drake et al. (1999) noted that ABC focuses attention on activities and resources under the control of multiple workers so as to link with group-based incentives that provide high motivation to cooperate. Anderson and Young (1999) tested a structural model of associations between evaluations of ABC systems, contextual factors, and factors related to the ABC implementation process.

Third, the uses and performances of ABC implementation are examined. Swenson (1995) studied the effect of ABC implementation on manufacturing firms through interviewing managers' satisfaction and evaluating the uses of ABC. McGowan and Klammer (1997) empirically examined employees' satisfaction levels associated with ABCM implementation and their perceptions of the factors across four sites. Foster and Swenson (1997) argued the methodology of empirical research about how the success of activity-based cost management should be measured. Malmi (1997) claimed that the success of ABC does not depend on whether one takes consequential actions, but rather on the ability to correctly diagnose strategic decision-making. Maher and Marais (1998) argued that linear ABC may not provide reliable information to aid in decision-making when resources are supplied on a joint and indivisible basis. Ittner et al. (2002) empirically demonstrated that extensive ABC use increases product quality and decreases cycle time so as to indirectly reduce manufacturing costs.

Fourth, the status of ABC diffusion was surveyed in different countries. Gosselin (1997) examined the strategic posture and organizational structure impact from the adoption and implementation of the activity management approach in Canadian manufacturing firms. Malmi (1999) empirically identified how the efficient-choice,

forced selection, fad, and fashion perspectives discriminatively influenced Finnish firms at various stages of diffusion. Bjørnenak (1997) studied the characteristics of adopters and expansion types of diffusion among Norwegian companies. Innes and Mitchell (1995) and Innes et al. (2000) respectively surveyed the adoption rate and the reasons for adoption and non-adoption of ABC in the UK's largest companies. In short, the results of studies in Finland, Canada, Norway, and the UK indicate that ABC is disseminated in many industries among many countries, but it has not been widely adopted and implemented despite the theoretical benefits of ABC.

In Group 4: Benefits and Risks, four articles all were published in the 2000s when ABC had already existed for a long time. Jones & Dugdale (2002) studied the formation and reformation process of ABC theories and practices by a network of human and non-human allies as well as the recursive cycles of local reembedding and global disembedding over time and space. Briers and Chua (2001) studied the change processes of implementing ABC in an Australian manufacturing firm by a heterogeneous actor-network of local actors and cosmopolitans as well as the mediation of five boundary objects. Granlund (2001) found that it is difficult to change management accounting systems in spite of the tremendous pressure from the operating environment owing to the intertwining of human, institutional, and economic factors. Armstrong (2002) argued that the accountably routine activities imposed by ABC hinder the non-routine initiatives of the staff department, which target its competitive advantage. In short, the articles discuss the complex relationship between human thought and the social context within which ABC is constructed, developed, transmitted, and maintained. These authors thus criticize that ABC originally was a very popular modern tool, but subsequently it may have turned out to be an untrustworthy system. In other word, they cautioned that as ABC becomes more

powerful, it also becomes more fragile.

5.2 Evolution and trends

Based on the results of the above demonstration and discussions, we present the past evolution and future trends of ABC as follows.

First, we find that four important subjects - fundamental concepts, methodology and validation, implementation and diffusion, and benefits and risks - chronologically provide a panoramic view of the evolution of ABC. From the late 1980s to the early 1990s, some articles that expounded upon the meanings, nature, and functions of the ABC technique established its fundamental concepts, as shown in Group 1. Nearly all these articles have been published in practitioner journals, particularly in *Journal of Cost Management* and *Harvard Business Review*. After a large number of firms implemented the ABC technique in the real world, many researchers engaged in analyzing a variety of phenomena from the technical, behavioral, organizational, contextual, and diffusion perspectives by means of scientific research from a neutral position. Consequently, subsequent articles as shown in Group 2 regarding validating and arguing ABC hypotheses appeared with positive and negative sentiments in the first half of the 1990s. After the mid-1990s, a large number of articles, as shown in Group 3 “Implementation and Diffusion”, discussed how ABC effectively circulates in an organization and is widely disseminated. Until the 2000s, when ABC had already been developed for a long time, as shown in Group 4, academics discussed society and social behaviors of ABC’s development process and criticized the benefits and risks from a sociological perspective.

Second, the intellectual structure consists of much more discussion-oriented

technical and social aspects, including positive and negative points of view that imply the sophistication of implementing ABC. Particularly, many articles are in Group 3, which explains the challenges of implementing ABC due not only to technical limitations, but more so in the contextual environment, organizational behavior, and managerial system requirements. Accordingly, we agree with Jones and Dugdale (2002) who portrayed ABC as a socio-technical expert system. We believe that successfully implementing ABC is a large and complex challenge. With this intellectual structure, we are able to more clearly describe why ABC's adoption rate has been lower than expected despite its theoretical benefits. Implementing ABC in fact is the joint optimization of an organization's technical and social aspects. Managers who want to improve ABC's realization to reflect a better managerial accounting practice must provide sufficient support on both technical and social aspects.

Third, looking to the future, the MDS representation of ABC consisting of four subjects in two aspects still exists, but it faces more implementation challenges, because the environments in which firms operate have transformed the fundamental nature of competition. The ABC technique originated due to the need for more accurate cost information aid in order to improve the competitiveness of the American manufacturing industry in the 1980s. Therefore, at that time the core articles of this study tend to discuss the issues created in the context of firms' competitive strategies aimed at altering their position in the industry vis-à-vis competitors and suppliers. However, the current era of the knowledge economy faces more diversity and a greater complexity of virtual business models and supply chain management. A new strategy theory suggests that firms should develop organizational dynamic capabilities rather than exploit market power (Teece, Pisano, & Shuen, 1997). Capabilities have

the intermediary ability to transform resources into objectives and as such are somewhat less tangible and less visible process-oriented resources (Gorman & Thomas, 1997; Yang & Chen, 2007). Firms will face more implementation challenges regarding how to measure the cost of resources consumed by less visible activities and how to integrate the ABC technique with workforce knowledge and managerial systems as the firm's knowledge-based resource capabilities.

5.3 Implications

The findings of this study include the classification, core ideas, and evolution of the ABC literature published in the past two decades. For academic researchers, the results of this study, on one hand, can benefit them in conducting future studies that systematically build upon prior research. On the other hand, we provide this dynamic and macroscopic view of ABC as the basis of communication among different discussion circles. For the accounting profession, the intellectual structure herein presents a consultant/practitioner in a sub-field of the ABC domain with the knowledge to quickly and easily enlarge the coverage and viewpoints or perspectives within his/her cluster of interest. The core articles of each subject in the two-dimensional map allow them to master those factors that need a joint consideration to ensure the success of ABC implementation. For a company new to implementing an ABC system, the evolution stages of Figure 4.3 will let it know what issues lay ahead so that it can prepare resources and efforts to overcome those issues. As one veteran ABC manager pointed out, the evolution of the four groups in Figure 4.3 indeed depicts the industry reality. Especially valuable is his comment warning that a company evolving at stage four will face a certain trade-off in using ABC as a tool, because the complexity of customer types, product-mix, and process variations

makes the calculation of standard ABC costs difficult. Figure 4.3 explains and predicts the stages of ABC implementation's life cycle.



Chapter 6 Conclusions and Suggestions

6.1 Conclusions

This study offers six contributions to the ABC literature. This work employs document co-citation analysis and multivariate statistical analysis to construct the first-ever intellectual structure of ABC that illuminates the main ideas underpinning this discipline. We find that four subjects - fundamental concepts, methodology and validation, implementation and diffusion, and benefits and risks - chronologically provide a macroscopic and dynamic view of the ABC's evolution that presents an organic, dynamic, and orderly integral whole.

Second, the evolution implies the four stages of ABC implementation's life cycle that explains and predicts the challenging issues for managers. ABC is still an important technique to clarify the costs of organizational resources' consumption and to aid a firm's strategy management in the future environment. No matter at what stage, we suggest that managers identify relevant issues and readily prepare resources to overcome those issues.

Third, the core articles present a variety of viewpoints, both positive and negative, for each subject of this intellectual structure. They detail the multifaceted requirements of implementing ABC in an organization. There are not only technical limitations, but also considerations within the contextual environment, organizational behavior, and managerial system for implementing ABC as a socio-technical system. Therefore, we suggest that the realization of ABC in fact is the joint optimization of

an organization's technical and social aspects.

Fourth, the results of this study aid academics/consultants/practitioners in breaking through the plights of bounded rationality in order to keep current with the developments and trends of the ABC discipline. In other words, the findings of this study quickly broaden an academic/consultant/practitioner's ABC knowledge so as to more effectively and efficiently conduct his/her own works.

Fifth, this macroscopic and dynamic view of the evolution of ABC provides different discussion circles of ABC as the bases of communication with others about the fruitful development of ABC.

Sixth, this study shows the empirical feasibility that the library science can be applied to exploring a macroscopic and dynamic view of the ABC discipline. Due to the advent of digital documents along with the development of electronic databases, we suggest that this methodology can be extended and applied to other disciplines.

6.2 Suggestions for future research

Although the co-citation method is one of the best-known structuring methods of bibliometrics, it does have a limitation. Because the results of this study present an archival view of ABC that favors the ideas represented by older articles, an article with a short time span normally accumulates less reference counts than older articles. Therefore, there is almost no way that a recently published journal article could qualify as a core article. We suggest to periodically reexamine the intellectual structure of ABC, because the structure itself grows and evolves overtime as more contributions grow from the body of knowledge.

ABC originated in U.S. manufacturing as the industry there was facing a challenging new manufacturing environment in the 1980s. At that time, Kaplan as both scholar and consultant is a very influential advocator of ABC. Subsequently, Kaplan and Norton jointly develop the balanced scorecard (BSC) in the early 1990s. BSC that links strategy and operations to achieve performance results is a famous strategy management tool. It describes strategy via strategy maps and scorecards to help organizations align resources and activities in the strategy. Because a strategy is a set of hypotheses about cause and effect, the measurement system should make the relationships among objectives in the various perspectives explicit so that they can be managed and validated. Thus, BSC consists of a linked series of objectives and measures that are both consistent and mutually reinforcing.

Today, knowledge economy era environment has transformed the fundamental nature of competition from firm vis-à-vis firm to supply chain vis-à-vis supply chain. Both manufacturing and service organizations requires new capabilities of mobilizing and exploiting its tangible or invisible assets to create competitive advantage for competitive success. Performance evaluation within the framework of the BSC will identify and highlight which activities or processes are critical for strategic success, in particular, many non-routine or less visible activities that are easily dropped or neglected in ABC systems might target a firm's competitive advantage. Thus, we propose that integration of BSC and ABC is future research direction.

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Appendix: References and content explanations of the 36 core articles

No.	References and content explanations
01	<p>Anderson, S. W. (1995). A framework for assessing cost management system changes: the case of activity based costing implementation at General Motors, 1986-1993. <i>Journal of Management Accounting Research</i>, 7, 1-51.</p> <p>Explanation:</p> <p>Anderson developed a framework for evaluating ABC implementation and hypotheses about influential factors by means of studying General Motors Corporation's experimentation with it from 1986 to 1993.</p>
02	<p>Anderson, S. W., & Young, S. M. (1999). The impact of contextual and process factors on the evaluation of activity-based costing systems. <i>Accounting Organizations and Society</i>, 24(7), 525-559.</p> <p>Explanation:</p> <p>Anderson and Young tested a structural model of associations between evaluations of ABC systems, contextual factors, and factors related to the ABC implementation process.</p>
03	<p>Argyris, C., & Kaplan, R. S. (1994). Implementing new knowledge: the case of activity-based costing. <i>Accounting Horizons</i>, 8, 83-83.</p> <p>Explanation:</p> <p>Argyris and Kaplan suggested the strategies for overcoming participants' resistance of implementing ABC to be education, sponsorship, and incentive alignment in the initial processes and creating internal commitment in the subsequent process.</p>

04	<p>Armstrong, P. (2002). The costs of activity-based management. <i>Accounting Organizations and Society</i>, 27(1-2), 99-120.</p> <p>Explanation:</p> <p>Armstrong argued that the accountably routine activities imposed by ABC hinder the non-routine initiatives of the staff department, which target its competitive advantage.</p>
05	<p>Babad, Y. M., & Balachandran, B. V. (1993). Cost driver optimization in activity-based costing. <i>Accounting Review</i>, 68(3), 563-575.</p> <p>Explanation:</p> <p>Babad and Balachandran used the optimization model to determine the number of drivers and identify the representative cost drivers.</p>
06	<p>Banker, R. D., & Johnston, H. H. (1993). An empirical-study of cost drivers in the United-States airline industry. <i>Accounting Review</i>, 68(3), 576-601.</p> <p>Explanation:</p> <p>Banker and Johnston empirically demonstrated that strategic operations-based cost drivers significantly affect the costs of U.S. airline companies.</p>
07	<p>Bhimani, A., & Pigott, D. (1992). Implementing ABC: a case study of organizational and behavioral consequences. <i>Management Accounting Research</i>, 3(2), 119-132.</p> <p>Explanation:</p> <p>Bhimani and Pigott illustrated the unanticipated behavioral consequences within an enterprise, because ABC's implementation shifted the authority and organizational power base of different line managers.</p>
08	<p>Bjørnenak, T. (1997). Diffusion and accounting: the case of ABC in Norway. <i>Management Accounting Research</i>, 8(1), 3-17.</p>

	<p>Explanation:</p> <p>Bjørnenak studied the characteristics of adopters and expansion types of diffusion among Norwegian companies.</p>
09	<p>Briers, M., & Chua, W. F. (2001). The role of actor-networks and boundary objects in management accounting change: A field study of an implementation of activity-based costing. <i>Accounting Organizations and Society</i>, 26(3), 237-269.</p> <p>Explanation:</p> <p>Briers and Chua studied the change processes of implementing ABC in an Australian manufacturing firm by a heterogeneous actor-network of local actors and cosmopolitans as well as the mediation of five boundary objects.</p>
10	<p>Cooper, R. (1988). The rise of activity-based costing- part one: what is an activity-based cost system? <i>Journal of Cost Management</i>, 2(2), 45-54.</p> <p>Explanation:</p> <p>Cooper argued the obsolescence of traditional volume-based costing and proposed ABC as being able to calculate more accurate product costs by tracing activities based on the demands within the diversity and complexity of the product mix.</p>
11	<p>Cooper, R. (1989). The rise of activity-based costing-part three: how many cost drivers do you need, and how do you select them? <i>Journal of Cost Management</i>, 2(4), 34-46.</p> <p>Explanation:</p> <p>Cooper proposed that measurement costs, the correlation of the cost drivers to actual consumption of the activities, and the behavioral effects of various cost drivers affect the selection of cost drivers.</p>

12	<p>Cooper, R., & Kaplan, R. S. (1988b). Measure costs right: make the right decisions. <i>Harvard Business Review</i>, 66(5), 96-103.</p> <p>Explanation:</p> <p>Cooper and Kaplan co-wrote the article titled “Measure Costs Right, Make the Right Decision”, which advocated ABC as providing more accurate cost information than tradition costing systems to decide a competitive strategy.</p>
13	<p>Cooper, R., & Kaplan, R. S. (1991a). Profit priorities from activity-based costing. <i>Harvard Business Review</i>, 69(3), 130-135.</p> <p>Explanation:</p> <p>Cooper and Kaplan presented that ABC clarifies cost hierarchy about the relationship between activities and the consumption of resources .</p>
14	<p>Cooper, R., & Kaplan, R. S. (1992). Activity-based systems: Measuring the costs of resource usage. <i>Accounting Horizons</i>, 6(3), 1-13.</p> <p>Explanation:</p> <p>Cooper and Kaplan emphasized that one of the important characteristics of ABC to be able to estimate the cost of resource used in organizational processes to produce outputs.</p>
15	<p>Datar, S., & Gupta, M. (1994). Aggregation, specification and measurement errors in product costing. <i>Accounting Review</i>, 69(4), 567-591.</p> <p>Explanation:</p> <p>Datar and Gupta argued that the assumptions of more cost pools and better specifications in ABC systems did not necessarily result in more accurate product costs, due to the trade-off among aggregation error, specification error, and measurement errors of overhead costs and product-specific units of</p>

	allocation bases.
16	<p>Drake, A. R., Haka, S. F., & Ravenscroft, S. P. (1999). Cost system and incentive structure effects on innovation, efficiency and profitability in teams. <i>Accounting Review</i>, 74(3), 323-345.</p> <p>Explanation:</p> <p>Drake et al. noted that ABC focuses attention on activities and resources under the control of multiple workers so as to link with group-based incentives that provide high motivation to cooperate.</p>
17	<p>Foster, G., & Gupta, M. (1990). Manufacturing overhead cost driver analysis. <i>Journal of Accounting and Economics</i>, 12(1-3), 309-337.</p> <p>Explanation:</p> <p>Foster and Gupta suggested that ABC systems appropriately identify cost drivers that adequately capture the complexity and efficiency concepts of manufacturing overhead.</p>
18	<p>Foster, G., & Swenson, D. (1997). Measuring the success of activity-based costing management and its determinants. <i>Journal of Management Accounting Research</i>, 9, 109-141.</p> <p>Explanation:</p> <p>Foster and Swenson argued the methodology of empirical research about how the success of activity-based cost management should be measured.</p>
19	<p>Gosselin, M. (1997). The effect of strategy and organizational structure on the adoption and implementation of activity-based costing. <i>Accounting Organizations and Society</i>, 22(2), 105-122.</p> <p>Explanation:</p> <p>Gosselin examined the strategic posture and organizational structure impact</p>

	<p>from the adoption and implementation of the activity management approach in Canadian manufacturing firms.</p>
20	<p>Granolund, M. (2001). Towards explaining stability in and around management accounting systems. <i>Management Accounting Research</i>, 12(2), 141-166.</p> <p>Explanation:</p> <p>Granolund found that it is difficult to change management accounting systems in spite of the tremendous pressure from the operating environment owing to the intertwining of human, institutional, and economic factors.</p>
21	<p>Innes, J., & Mitchell, F. (1995). A survey of activity-based costing in the U.K.'s largest companies. <i>Management Accounting Research</i>, 6(2), 137-153.</p> <p>Explanation:</p> <p>Innes and Mitchell surveyed the adoption rate and the reasons for adoption and non-adoption of ABC in the UK's largest 1000 companies.</p>
22	<p>Innes, J., Mitchell, F., & Sinclair, D. (2000). Activity-based costing in the U.K.'s largest companies: a comparison of 1994 and 1999 survey results. <i>Management Accounting Research</i>, 11(3), 349-362.</p> <p>Explanation:</p> <p>Innes et al. compared and assessed that have occurred in the ABC adoption status of the UK's largest companies from 1994 to 1999.</p>
23	<p>Ittner, C. D., Lanen, W. N., & Larcker, D. F. (2002). The association between activity-based costing and manufacturing performance. <i>Journal of Accounting Research</i>, 40(3), 711-726.</p> <p>Explanation:</p> <p>Ittner et al. empirically demonstrated that extensive ABC use increases product quality and decreases cycle time so as to indirectly reduce manufacturing</p>

	costs.
24	<p>Jones, T. C., & Dugdale, D. (2002). The ABC bandwagon and the juggernaut of modernity. <i>Accounting Organizations and Society</i>, 27(1-2), 121-163.</p> <p>Explanation:</p> <p>Jones & Dugdale studied the formation and reformation process of ABC theories and practices by a network of human and non-human allies as well as the recursive cycles of local reembedding and global disembedding over time and space.</p>
25	<p>Kaplan, R. S., & Anderson, S. R. (2004). Time-driven activity-based costing. <i>Harvard Business Review</i>, 82(11), 131-138.</p> <p>Explanation:</p> <p>Kaplan and Anderson proposed time-driven ABC and a more flexible cost model, which solved this long-standing problem to become the latest improvement of the ABC technique.</p>
26	<p>Kee, R. (1995). Integrating activity-based costing with the theory of constraints to enhance production-related decision-making. <i>Accounting Horizons</i>, 9, 48-61.</p> <p>Explanation:</p> <p>Kee integrated the theories of both ABC and TOC (theory of constraints), which had previously battled seriously in opposition.</p>
27	<p>Krumwiede, K. R. (1998). The implementation stages of activity-based costing and the impact of contextual and organizational factors. <i>Journal of Management Accounting Research</i>, 10, 239-277.</p> <p>Explanation:</p> <p>Krumwiede found that the direction and level of importance for contextual and</p>

	organization factors vary at ten stages of the ABC implementation process.
28	<p>Maher, M. W., & Marais, M. L. (1998). A field study on the limitations of activity-based costing when resources are provided on a joint and indivisible basis. <i>Journal of Accounting Research</i>, 36(1), 129-142.</p> <p>Explanation:</p> <p>Maher and Marais argued that linear ABC may not provide reliable information to aid in decision-making when resources are supplied on a joint and indivisible basis.</p>
29	<p>Malmi, T. (1997). Towards explaining activity-based costing failure: accounting and control in a decentralized organization. <i>Management Accounting Research</i>, 8(4), 459-480.</p> <p>Explanation:</p> <p>Malmi claimed that the success of ABC does not depend on whether one takes consequential actions, but rather on the ability to correctly diagnose strategic decision-making.</p>
30	<p>Malmi, T. (1999). Activity-based costing diffusion across organizations: An exploratory empirical analysis of Finnish firms. <i>Accounting Organizations and Society</i>, 24(8), 649-672.</p> <p>Explanation:</p> <p>Malmi empirically identified how the efficient-choice, forced selection, fad, and fashion perspectives discriminatively influenced Finnish firms at various stages of diffusion.</p>
31	<p>McGowan, A. S., & Klammer, T. P. (1997). Satisfaction with activity-based cost management implementation. <i>Journal of Management Accounting Research</i>, 9, 217-238.</p>

	<p>Explanation:</p> <p>McGowan and Klammer empirically examined employees' satisfaction levels associated with ABCM implementation and their perceptions of the factors across four sites.</p>
32	<p>Ness, J. A., & Cucuzza, T. G. (1995). Tapping the full-potential of ABC. <i>Harvard Business Review</i>, 73(4), 130-138.</p> <p>Explanation:</p> <p>Ness and Cucuzza showed how Chrysler and Safety-Kleen, early ABC successful adopters, rolled out ABC/ABM into their organizations.</p>
33	<p>Noreen, E. (1991). Conditions under which activity-based cost systems provide relevant costs. <i>Journal of Management Accounting Research</i>, 3, 159-168.</p> <p>Explanation:</p> <p>Noreen noted that ABC systems provide relevant costs for decisions of product drop and product design under three conditions: 1. Total cost can be partitioned into cost pools, each of which depends solely upon one activity. 2. The cost in each cost pool must be strictly proportional to the level of activity in that cost pool. 3. Each activity can be partitioned into elements that depend solely upon each product.</p>
34	<p>Noreen, E., & Soderstrom, N. (1994). Are overhead costs strictly proportional to activity? Evidence from hospital departments. <i>Journal of Accounting and Economics</i>, 17(1-2), 255-278.</p> <p>Explanation:</p> <p>Noreen and Soderstrom empirically demonstrated that most of the overhead accounts in hospital service departments are not in accordance with the</p>

	<p>proportionality hypothesis between costs and activities of ABC.</p>
35	<p>Shields, M. D. (1995). An empirical analysis of firms' implementation experiences with activity-based costing. <i>Journal of Management Accounting Research</i>, 7(3), 148-161.</p> <p>Explanation:</p> <p>Shields emphasized ABC as both technical and administrative innovation and provided empirical evidence on 143 firms' degree to which various behavioral organizational and technical factors were associated with the success of ABC implementation, particularly top management support, link to competitive strategies, link to performance evaluation and compensation, training, ownership by non-accountants, and adequate resources.</p>
36	<p>Swenson, D. (1995). The benefits of activity-based cost management to the manufacturing industry. <i>Journal of Management Accounting Research</i>, 7, 167-180.</p> <p>Explanation:</p> <p>Swenson studied the effect of ABC implementation on manufacturing firms through interviewing managers' satisfaction and evaluating the uses of ABC.</p>