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TEXTUAL INSIGHTS INTO SUPPLY CHAIN FINANCE: A SYSTEMATIC REVIEW

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Original Article

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Abstract

Supply Chain Finance (SCF) is evolving rapidly, driven by innovative technological solutions that enhance transparency and flexibility while seamlessly integrating capital and logistics flows within the financial service sector. This paper aims to advance SCF research by applying the TF-IDF technique and exploring various SCF dimensions in relation to SCF solution implementation.

Drawing from a comprehensive review of over 250 academic databases, this study showcases the importance of Frequency-Inverse Document Frequency (TF-IDF) in information retrieval through text mining. Emphasizing the SCF mechanism and technological innovation as pivotal factors, we analyse keyword frequencies and assess term relevance within this document collection, focusing on the financial liquidity and feasibility of SCF.

Our findings provide valuable insights into capital gain, sustainability, and feasible replenishments within SCF. In conclusion, this paper identifies potential research avenues based on the current framework and data analysis, offering a roadmap for future exploration in this dynamic field.

Keywords: TF-IDF; Academic Databases; SCF Mechanism; Technological Innovation

Introduction

Text mining, a burgeoning field at the intersection of statistical analysis and natural language processing (NLP), involves the extraction and analysis of keywords from a multitude of publications [1]. In our research endeavour, we harness the power of text mining to manage the diverse wealth of data emanating from various publications. This exploration is anchored in the context of Supply Chain Finance (SCF), an area that has significantly contributed to the ever-expanding corpus of systematic literature reviews, offering multifaceted perspectives on the intricate amalgamation of technology and social science issues inherent to text mining and supply chain processes (SCP).

Supply Chain Finance (SCF) stands as a linchpin in the realm of working capital management and liquidity optimization within the intricate tapestry of supply chain processes [2]. By fostering symbiotic relationships between vendors and customers, SCF emphasizes the art of liquidity creation made possible by transformative technologies like FnConn.com [3].

This study endeavours to unravel the profound significance and utility of these terms—or words—within the context of document collection, employing the frequency-inverse document frequency (TF-IDF) technique. Our objective is to enrich SCF research by applying TF-IDF through word mining analysis, thereby paving the way for future advancements in this field. Additionally, our study covers a wide range of SCF topics, showing how they interact with putting SCF

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solutions into action and providing an important viewpoint with clear instructions for making supply chain relationships work together.

Literature Review

This article delves into two pivotal subjects in depth: the intricate mechanics of Supply Chain Finance (SCF) and the integration of cutting-edge technologies such as blockchain within tech-driven platforms.

According to an OECD assessment from 2012 [4], small and medium-sized enterprises (SMEs) play a crucial role in fostering economic growth. However, SMEs encounter a significant hurdle in the form of financing, especially as an increasing number of businesses adopt proprietary SCF platforms. Numerous studies have underscored the challenges posed by credit constraints, shortages, and high borrowing costs, which impede SMEs from securing the risk-free financing essential for effective net working capital management [5].

In a quest to enhance interfirm collaboration experiences, Plé [6] has explored the intricate dynamics between customers and merchants, with a predominant focus on trade credit [7, 8]. While these papers provide comprehensive insights into the inner workings of supply chains and financial flows, they fall short of addressing the potential benefits that can emerge from symbiotic supply chain partnerships. This paper aims to explore the mutual advantages that can be derived from specific types of supply chain partnerships and proposes further research into innovative financial supply chain solutions that can be mutually beneficial, such as working capital solutions.

SCF has undergone a transformation, shifting from a service primarily offered by banks to a more dynamic, open approach propelled by proprietary bank platforms. Moreover, SCF is experiencing increased transparency and adaptability, thanks to ingenious technological solutions exemplified by innovations like Innopay. The urgent need to seamlessly integrate capital and logistics flows within the financial service provider industry is what is driving this evolution, with SCF primarily concentrating on the financial transaction process and procurement information [9].

At its core, the collaboration between financial service providers and end users is founded upon a trust-based connection with limited constraints [10].

Methodology

Collection of Raw Data

Given its versatility and wide-ranging applications in this field of study, the authors have chosen the ISI Web of Science as our primary data source. Once the data source was identified, we employed an "initial set of keywords and search" approach in our endeavour to establish the pertinent search terms. To dissect the raw data effectively, the authors have initiated the process by defining the initial set of keywords and subsequently conducting searches using the methods outlined below.

Selection of the Type of Item for the Analysis

Our study commenced with a comprehensive review of publications and research topics that are highly relevant to the current field of study. This initial step aimed to identify and establish a set of "exclusion keywords." The purpose of these exclusion keywords is to ensure the precise and accurate execution of keyword filtering, a crucial component of the TF-IDF algorithm.

Use TF-IDF Based Framework for Text Categorization

The algorithm initially extracts keywords that are emphasized within the abstract of the articles. These highlighted keywords are then utilized to conduct a comprehensive search within the complete article, subsequently determining the frequency of these keywords. To mitigate keyword duplications, including words with identical meanings and hyphenated variations, a robust keyword filtration mechanism was implemented.

TF (Term Frequency) is a technique employed to ascertain the frequency of word occurrences within a document, specifically determining the TF of the term "i" within document "j." Additionally, the IDF (Inverse Document Frequency) of the term "i" is calculated. The entire framework and testing process yielded successful results when

implementing this research algorithm approach. The successful calculation of TF and IDF facilitates the computation of the TF-IDF [9].

$$a_{ij}=tf_{ij}idf_{ij} = t_{ij}log_2(\frac{N}{df_i})$$

In this context, "tfij" represents the frequency of term "i" within document "j," while "dfi" denotes the frequency of term "i" across the entire collection. "aij" signifies the weight of term "i" within document "j," and "N" corresponds to the total number of documents within the collection. This formula constitutes the fundamental framework used in our analysis. It's worth noting that during our testing phase, where we employed documents of equal length, we achieved excellent results and validation of this framework.

Results and Discussion

Based on preliminary data estimates, a total of 618 academic research papers have been published across more than 250 journals. Specifically focusing on the subject matter under discussion, we identified that 10 journals have collectively published 143 scholarly papers (refer to table 1 below). These findings suggest that the articles in question constitute approximately 23.14% of all academically published works within the relevant field. Also, table 1 provides a breakdown of the "Top 10 journals or sources" and the respective quantities of scholarly publications to which they have contributed.

Table 1: Top 10 Journals or sources

Journals or Sources	**No. of papers**
International Journal of Production Research	32
Frontiers in Sustainability	19
Engineering with Computers	15
International Journal of Operational Research	15
The International Journal of Logistics Management	13
International Journal of Production Economics	11
Manufacturing & Service Operations Management	10
Journal of Production Research and Management	10
MANAGEMENT SCIENCE	9
VACCINE	9

Source: Collected by Author

It is imperative to underscore that further research and optimization efforts are warranted in the application of TF-IDF for the enhancement of the SCF process. Prominent academic journals within this field, such as the "International Journal of Production Research," play a pivotal role in disseminating knowledge and fostering advancements.

In an endeavor to investigate the intricate relationship between internal and external factors and their evolving impact on keyword usage over time, the text analysis presented in Table 2 strives to unveil the underlying themes prevalent in the articles. This section assesses the significance of each phrase or word within the document collection independently and scrutinizes keyword frequency to discern shifts in subject matter across various periods of SCF publications.

Text Analysis Based on TF-IDF of Keywords

Table 2: Frequency and TF-IDF weight of top 5 keywords

Keywords	Frequency	TF-IDF weight
Finance	210	0.0459
Renewable	97	0.0087
Recharge	41	0.0036
Degenerate	35	0.0032
Cooperation	29	0.0025

Source: Collected by Author

How Finance Technology Improve SC Ecosystem

First and foremost, the optimization of inter-company financing experiences has emerged as a pivotal area of research within the realm of Supply Chain Finance (SCF) studies in recent years. SCF is instrumental in enhancing the management of invested working capital and liquidity within the operations of supply chains. The primary objective of this endeavour to improve the "management of working capital and liquidity" is to facilitate easier access to funds, particularly for smaller participants in the supply chain. Central to the concept of "working capital" lies the notion of financial stability and liquidity for every member of the supply chain. In essence, SCF fosters mutual trust and collaboration among all involved parties rather than promoting rivalry. Furthermore, it addresses the generation and flow of value within this context [11].

Secondly, economic considerations and sustainable financial development constitute two integral aspects of the broader concept of "sustainability." This framework encompasses economic dimensions that encompass both internal management systems and external management systems [12]. The former places a significant focus on strategic sourcing of transportation, continuous improvement, and transportation optimization. The latter is concerned with the process of outsourcing goods and services to reduce costs. Consequently, the relationship between consistently strong economic performance and sustainable investments yields varied effects.

Additionally, SCF represents a mixed strategy aimed at enhancing the financial value of all the companies within the system by seamlessly integrating financial processes with upstream and downstream production elements [13].

Thirdly, our research findings indicate that when a retailer’s cash reserves are low within the current SCF system procedure, a viable option, as suggested by literature connecting retailer trade credit contracts and inventory financing portfolios, is bank replenishment in the form of a bank loan [14].

Conclusion

The systematic review process places a primary focus on financial liquidity and the sustainability of Supply Chain Finance (SCF) for every member of the supply chain. Consequently, the study aims to analyse keyword frequency and assess the significance of individual terms or words within this collection of documents.

The overarching goal of this study is to elucidate how working capital, sustainability, and replenishment intricately interact, progressively establishing the significance of each component within the broader supply chain system. Suppliers utilize data to make informed decisions regarding replenishments, basing their actions on insights into buyers' inventory levels or customer orders. This approach helps coordinate production lines and minimize transportation costs. The pivotal factor lies in understanding the motivations that drive buyers and sellers to expand their utilization of SCF solutions as the optimal means to manage net working capital effectively.

The conclusions drawn from this study have the potential to offer valuable recommendations for future SCF initiatives aimed at fostering long-term, sustainable financial growth. Through text analysis, SCF can facilitate the integration of financial operations, uphold the sustainability of relationships between buyers and sellers, and shorten the cash conversion cycle without introducing unfavourable supply risks.

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Conflict of Interest
The authors state that they do not have any personal conflicts of interest.

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