

INFORMATION TECHNOLOGY FACTORS INFLUENCING THE SUCCESS OF CONTRACT LOGISTICS TENDERS: CASE STUDY OF THIRD-PARTY LOGISTICS PROVIDERS IN VIETNAM

CÁC NHÂN TỐ CÔNG NGHỆ THÔNG TIN TÁC ĐỘNG TỚI SỰ THÀNH CÔNG CỦA THẦU LOGISTICS DỊCH VỤ: TÌNH HUỐNG NGHIÊN CỨU NHÀ CUNG CẤP DỊCH VỤ LOGISTICS BÊN THỨ 3 TẠI VIỆT NAM

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Abstract

Under the effects of globalization and technological development, organizations have increasingly relied on information technology (IT) in their core business processes and data accuracy. The role of IT has been becoming more and more important during the contract logistics tender process. One of the most important contributors leading to successful contract logistics deals is how to manage IT factors to obtain the most positive outcomes. This quantitative study investigates the application of IT factors to enhance the competitiveness level of a firm when applying for tenders. The study employs Technology Acceptance Model (TAM) to identify IT factors influencing the success of contract logistics tenders. 306 valid responses are collected and analyzed from executive and professional in Vietnam Third-Party Logistics Providers. Results showed there was a statistically positive relationship between IT integration and logistics tender success, a statistically positive relationship between perceived ease of use of technology and logistics tender success, a statistically positive relationship between perceived usefulness and logistics tender success, and a statistically positive relationship between attitude toward using technology and logistics tender success.

Keywords: Technology Acceptance Model (TAM), Contract logistics, information system.

Tóm tắt

Dưới tác động của toàn cầu hóa và phát triển công nghệ, các tổ chức ngày càng dựa vào công nghệ thông tin (CNTT) trong các quy trình kinh doanh cốt lõi và độ chính xác của dữ liệu. Vai trò của CNTT ngày càng trở nên quan trọng hơn trong quá trình đấu thầu dịch vụ logistics. Một trong những yếu tố quan trọng nhất dẫn đến các hợp đồng logistics thành công là cách quản lý các yếu tố CNTT để có được kết quả tích cực nhất. Nghiên cứu định lượng này điều tra việc áp dụng các yếu tố CNTT để nâng cao mức độ cạnh tranh của một công ty khi nộp đơn thầu. Nghiên cứu sử dụng Mô hình chấp nhận công nghệ (TAM) để xác định các yếu tố CNTT ảnh hưởng đến sự thành công của các thầu dịch vụ logistics. 306 phản hồi hợp lệ được thu thập và phân tích từ các giám đốc điều hành và chuyên gia từ các nhà cung cấp dịch vụ logistics bên thứ ba tại Việt Nam. Kết quả cho thấy có mối quan hệ tích cực về mặt thống kê giữa tích hợp CNTT và thành công của thầu logistics hợp đồng, mối quan hệ tích cực về mặt thống kê giữa mức độ dễ sử dụng công nghệ và thành công của thầu logistics hợp đồng, mối quan hệ tích cực về mặt thống kê giữa tính hữu ích và thành công của thầu logistics hợp đồng; và mối quan hệ tích cực về mặt thống kê giữa thái độ đối với việc sử dụng công nghệ và thành công của thầu logistics hợp đồng.

Từ khóa: Mô hình chấp nhận công nghệ (TAM), Logistics hợp đồng, hệ thống thông tin.

1. Introduction

The concept of “contract logistics tender” or “request for quotation” has been gaining importance among the third-party logistics (3PL) firms. Many long-term and long-distance transportation services are offered now under this type of reverse auction, and firms in the sector must provide competitive prices if they want to win tenders [1]. This outsourcing activity is the result of globalization in the market and production. With the growing trend, many enterprises have outsourced their logistics activities to 3PL providers to focus on their core competencies, thereby reducing costs, decreasing investment in non-core activities and improving service. Some 3PLs have recognized this need and adopted innovation practices [2]. The success of a contract logistics tender in Vietnam relates to the complexity and the myriad problems inherent in this huge undertaking of organizational transformation. Global researchers have provided information about the different factors leading to the failure of a contract logistics deal, such as cost, length of experience, managerial problems, and integration problems. In addition, each company may have a different definition of success related to contract logistics activities, such as greater profitability, higher market share, key employees, or new product knowledge. As a result, different companies may have different perceptions of the criteria for successful contract logistic deals.

IT has been identified as the most influencing factors in contract logistics tenders. By IT solutions, the logistics RFQ process becomes more streamlined, efficient, and competitive. This is especially crucial in an industry where speed, transparency, and accuracy are key to winning contracts. For instance, IT systems can analyze historical data to help logistics providers offer competitive quotes based on performance metrics and cost structures. Some IT tools leverage machine learning algorithms to forecast demand, costs, and service levels, allowing for more accurate quotations. Despite the importance of IT factors in the success of contract logistics deals, there are few studies addressing how these IT factors influence the process of contract logistics tender. The major problem that needed investigation and evaluation was how IT factors influence the success of contract logistics tenders in Vietnam.

Additionally, the involved parties, the outsourcing firms, and the 3PL providers, hold different positions in the contract logistics tender process concerning costs and benefits. Therefore, the managers of the

outsourcing firms and the 3PL providers investigate the factors influencing the success of contract logistics tenders from different perspectives. For these reasons, it is necessary and meaningful to examine how the managers from outsourcing firms and the third-party logistics providers perceived IT as an influencing factor in the success of contract logistics tender in Vietnam.

The researchers found no significant previous studies exploring the perspectives of managers concerning the relationship between integration, ease of use, and attitudes toward IT and the perceived success of the logistics tender process in Vietnam. Therefore, it was critical and meaningful to carry out the current study into the influence of IT on the success of logistics tender process.

The current study was designed to address the literature gap concerning the impacts of IT on contract logistics tender success in the Vietnamese context, with a particular focus on the relationships among key factors such as IT integration, ease of use, and attitudes toward technology adoption. Specifically, the study aims to explore how these factors influence the perceived success of contract logistics tenders from the perspectives of both executives of outsourcing firms and third-party logistics (3PL) providers in Vietnam. Despite the growing global emphasis on IT in logistics, there remains limited research that delves into how these technologies impact the tendering process in emerging markets like Vietnam, where logistical challenges and opportunities differ from more developed markets.

The study seeks to understand the extent to which seamless technological adoption facilitates more efficient and competitive bidding processes. Additionally, the research aims to analyze how the perceived ease of use of IT systems impacts the willingness of logistics service providers to adopt these tools in their tender processes, which is crucial in determining the broader success of IT implementation. This investigation will also explore how positive or negative attitudes toward IT affect decision-making, collaboration, and contract outcomes between outsourcing firms and 3PL providers.

Through these analyses, the study will not only fill the knowledge gap in the literature but will also provide actionable recommendations for logistics firms looking to effectively utilize IT in their tendering processes. In this context, the research will focus on the Vietnamese market, highlighting its

unique logistical landscape while providing strategies that could be adapted for similar emerging economies. Ultimately, this study aims to enhance the understanding of how IT can be leveraged to optimize contract logistics tender success in Vietnam, benefiting both the academic community and industry practitioners.

This study attempts to answer the following questions:

RQ1: What is the relationship between the integration of IT during a logistics tender process and the perceived success of a logistics tender process in Vietnam?

RQ2: What is the relationship between integration and ease of use of IT and the perceived success of a logistics tender process in Vietnam?

RQ3: What is the relationship between integration, ease of use and the perceived success of the logistics tender process in Vietnam?

RQ4: What is the relationship between attitudes toward IT, the integration of IT, and the perceived success of the logistics tender process in Vietnam?

2. Literature Review

2.1. Logistics Tender

In the last decades, the selection of suppliers has developed into a contest in which the logistics service companies compete to provide their best offers. In traditional auction processes, also known as forward auctions, the seller offers a product or service that is requested by more than one buyer. These buyers participate in the bidding process, and the highest bid wins the auction. In reverse auctions, which receive the common name of tenders or request for quotation (RFQ), the buyer gets to choose the best quotation offered by the sellers [1].

The sellers quote their lowest price or tariff and provide added-value services to win the bid. Typically, a proposal includes (i) the lowest possible price, (ii) the highest quality service, and (iii) additional services like customs clearance, intermodal service, consolidation service, etc. Proposals usually refer to a specific package of services that the customer requests to move their products or raw materials from the supplier to the manufacturing plant, from the plant to the warehouse, or from the warehouse to the retail centers [1].

Globalization has significantly transformed the logistics industry, creating new opportunities and challenges. There are various aspects that contribute

to logistics performance at a country level, including the quality of trade and transport infrastructure (e.g., ports, roads, airports), the efficiency of customs (ease and speed of clearance), and the level of technology adoption. The globalization process has been recognized as an important underlying force that impacts global logistics service providers because it is an essential function in the transportation and logistics system [3].

Logistics is one of the functions that companies are currently outsourcing. The decision to keep this function in-house or to contract with one or many logistic service providers (LSP) is entirely strategic. It can have a significant impact on the bottom line. As a result, the outsourcing of logistics activities plays a vital role in making those activities more efficient and effective and has a greater impact on the performance of the logistics services. Numerous aspects of the topic of LSP issue have been covered in the foregoing studies. However, very little is known about analyzing the impact of the use of these providers on the performance of companies [4].

The 3PL selection is a multi-criteria problem and hence a complex process where multiple, both tangible and intangible, criteria need to be considered. Some criteria are developed with specific customer needs, while others are common for all circumstances [5].

In today's business world, choosing a logistics supplier is a critical factor for companies to improve operational efficiency and reduce business costs. With the development of the market economy, it is very difficult for companies to choose a suitable logistics provider according to specific rules [6].

As a result of a rising tendency towards outsourcing logistics activities, shippers have been forced to choose the most acceptable 3PL provider. The usage of 3PL providers can result in significant benefits such as lower logistical costs and fixed logistics assets, higher order fill rates, and shorter average order-cycle lengths and cash-to-cash cycles. If an appropriate 3PL provider is not selected, serious problems can occur, such as low-quality logistics services and contract nonfulfillment. As a result, the shipper's reputation, image, and trust may suffer. Therefore, in today's highly competitive business environment, more and more companies outsource their logistics services to 3 PL providers to reduce costs and improve business efficiency [7].

2.2. The Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) by [8]

is a theoretical framework designed to explain and predict user acceptance and use of technology [9]. To predict user behavior the authors decided to apply this model using three main variables: PU (Perceived Usefulness), which reflects the extent to which users believe that the technology will improve their job performance; PE (Perceived Ease of Use), which refers to the extent to which users believe that using the technology will not require much effort; and PC (Perceived Cost), which refers to the extent to which users believe that cost will affect their decision to use the technology [8]. These independent variables will be examined to assess their impact on the dependent variable. TAM has been widely applied in numerous studies on technology acceptance and use across various fields.

TAM studies conducted by Kamble et al. [11] used the Technology Acceptance Model to examine how likely supply chain managers were to accept and adopt blockchain technology. In a later study, Kamble et al. [12] sought to identify the factors influencing the adoption of blockchain technology and predict its likelihood of adoption using machine learning techniques. This analysis could offer valuable insights into the potential benefits and challenges of implementing technology in different organizations and industries.

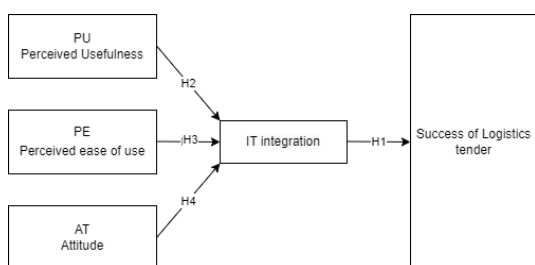


Fig. 1. Research Model

Source: Authors (2024)

In the current research, the authors advance the following hypothesis and research model:

H1: There is a statistically significant relationship between the integration of IT during a logistics tender process and the perceived success of a logistics tender process in Vietnam.

H2: There is a statistically significant relationship between usefulness and IT integration and the perceived success of the logistics tender process in Vietnam.

H3: There is a statistically significant relationship between integration, ease of use, and the perceived

success of the logistics tender process in Vietnam.

H4: There is a statistically significant relationship between attitudes toward IT, the integration of IT, and the perceived success of the logistics tender process in Vietnam.

3. Data Analysis and Discussion

A quantitative research method and convenient sampling are adopted in this study that involved collecting primary data for 4 weeks from a questionnaire using a wide range of respondents, from senior management to employees, at both manufacturers and logistics service providers. Using Google Forms, the survey questions are carefully constructed. The questionnaire items are evaluated using a 5-point Likert scale with the following options: 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree), using a quantitative online questionnaire that asks respondents yes/no questions, ranking scales, rating matrices, and other quantitative question types. The survey and informed consent form were dispatched to participants through email and social networking. Actual participation in this survey including corporate administrators and professionals is 306 respondents. Sourced from the author's extensive network, responses were gathered from professionals within the logistics sector in Vietnam via email and various social media platforms, including Outlook, Gmail, Zalo. For the study, a cluster sampling technique was employed, and 60% of the industry leaders from the more than 25 logistics organizations in Vietnam were chosen using a systematic selection technique. The 60% sampling fraction selected was consistent with [13]. The data amassed from this survey will be treated with the utmost confidentiality and exclusively utilized for this paper.

To determine the impact of variables on each other, PLSEM is used. PLSEM is designed to support quantitative data analysis and provides powerful tools for descriptive statistics, regression analysis, factor analysis, analysis of variance, hypothesis testing, and many other statistical techniques.

Based on research results, all variables are significant when the outer loading coefficient is greater than 0.7; they strongly support convergent validity, as explained by Hair et al. [13].

According to Hair et al. [14], Cronbach's alpha and Composite reliability from 0.6 to 0.7 is acceptable; the optimal level is from 0.7 to 0.9. The results show that all factors have good reliability when the Cron reliability coefficient is greater than 0.7.

Table 1. Outer loading

	AT	IT	PE	PU	SLT
AT1	0.940				
AT2	0.957				
AT3	0.932				
AT4	0.984				
IT1		0.923			
IT2		0.922			
IT3		0.924			
IT4		0.863			
PE1			0.947		
PE2			0.944		
PU1				0.811	
PU2				0.849	
PU3				0.863	
PU4				0.842	
SLT1					0.896
SLT2					0.906
SLT3					0.860
SLT4					0.951

Table 2. Construct reliability and validity

	Cronbac h's alpha	Composite reliability	Composite reliability	(AVE)
AT	0.967	0.968	0.976	0.909
IT	0.929	0.930	0.950	0.825
PE	0.881	0.882	0.944	0.894
PU	0.863	0.868	0.907	0.708
SLT	0.925	0.927	0.947	0.817

Table 3. Heterotrait-monotrait ratio (HTMT) - Matrix

	AT	IT	PE	PU	SLT
AT					
IT	0.531				
PE	0.346	0.698			
PU	0.400	0.564	0.491		
SLT	0.436	0.677	0.542	0.570	

Henseler et al. [16] argue that if the HTMT index of a pair of factors is greater than 0.9, the discriminant validity of the factor is violated; if the HTMT index is smaller than 0.85, the discriminant validity of the factor is good, from 0.85 to 0.9 is acceptable. As the results, all of factors are smaller than 0.85. This indicates that all the variables are unique and not correlated to each other.

Hair et al. [13] and Hair et al. [14] suggested R² values of 0.75, 0.50, or 0.25 for endogenous latent variables can be respectively described as substantial, moderate, or weak. The table shows the adjusted R-square value for the variable IT is 0.532, suggesting a relationship between the independent and dependent variables.

Table 4. R-square

	R-square	R-square adjusted
IT	0.533	0.532
SLT	0.395	0.395

Table 5. Path Coefficients (direct effects)

	Original sample	P values
AT -> IT	0.280	0.000
IT -> SLT	0.629	0.000
PE -> IT	0.449	0.000
PU -> IT	0.212	0.000

Table 6. Specific indirect effects

	Original sample	P values
AT -> IT -> SLT	0.176	0.000
PE -> IT -> SLT	0.283	0.000
PU -> IT -> SLT	0.134	0.000

Table 7. Total effects

	Total effects
AT -> IT	0.280
AT -> SLT	0.176
IT -> SLT	0.629
PE -> IT	0.449
PE -> SLT	0.283
PU -> IT	0.212
PU -> SLT	0.134

Based on the results, the p-values for all direct effects and indirect effects are below the 0.050 threshold [15].

4. Conclusion

Previous research did not concern the IT factors as the independent variables for evidence of its impact on the success of a logistics tender in Vietnam market. The current research focuses on the impact of the IT factors on the success of a logistics tender, in which IT factors are the main explanatory variables.

Table 8. Hypotheses conclusion

Hypothesis	Content	P-value	Result
H1	Relationship between the integration of IT during a logistics tender process and the perceived success of a logistics tender process in Vietnam	0.000	Support
H2	Relationship between usefulness and IT integration and the perceived success of the logistics tender process in Vietnam.	0.000	Support
H3	Relationship between integration, ease of use, and the perceived success of the logistics tender process in Vietnam.	0.000	Support
H4	Relationship between attitudes toward IT, the integration of IT, and the perceived success of the logistics tender process in Vietnam.	0.000	Support

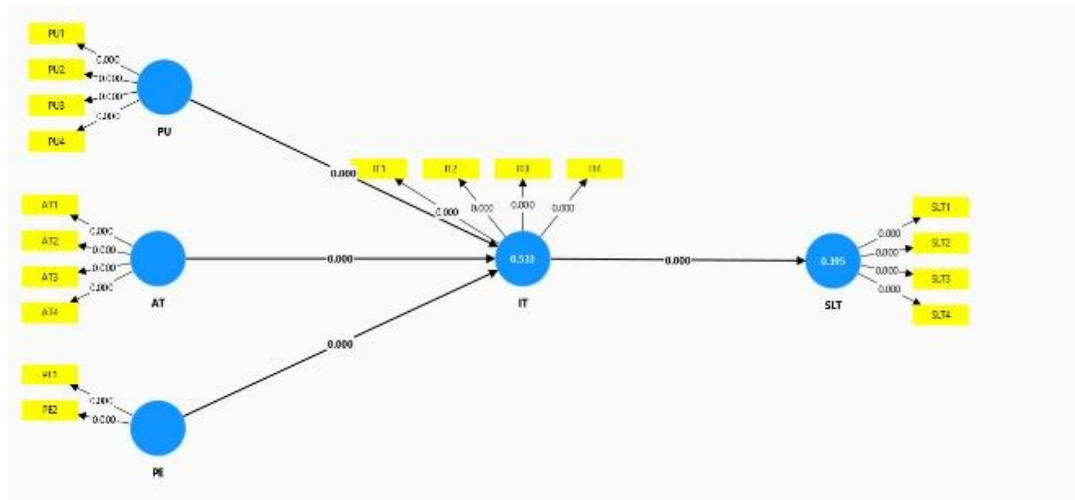


Fig 2. Research results

Logistics service providers can enhance the tender process by utilizing data analytics tools to analyze past bids, operational costs, customer needs, and performance metrics. This enables LSPs to offer more competitive and accurate bids based on informed insights. Logistics service providers also enhance Contracts Logistics tender process by using predictive analytics tools to forecast future demand, pricing trends, and service levels, offering real-time tracking solutions for shipments and logistics operations to provide customers with visibility and assurance that their logistics needs will be met as planned. This helps logistics providers create more accurate bids and anticipate potential changes in client needs.

Besides, Logistics service providers need to ensuring that tender management tools are integrated with other internal systems like warehouse management systems (WMS), transportation management systems (TMS), and customer relationship management (CRM). This provides comprehensive data for decision-making and ensures smooth coordination across different functions.

The study investigated the relationship among the

independent variables, such as integration of information technology ease of use of information technology and, attitudes toward information technology and the perceived success of a logistics tender in Vietnam, controlling for the perspective of the manager as the dependent variable. The research provides the empirical result on the effect of the IT factors on a logistics tender in Vietnam. The result of the research provides empirical evidence for the firms to apply in the practice. An appraisal of the IT system is a smart investment before the deal is closed and can have a significant impact on how the bid owner evaluates the deal, as well as in developing action plans at the end of the deal. By verifying the IT system, a 3PL provider remains proactive by understanding the complexity, cost, and time of implementing business processes after a logistics tender. Therefore, the 3PL providers can use this information to negotiate a better deal with the buyers and avoid unexpected costs from mandatory changes or additional investments in the IT system after the end of the deal.

The focus in the current study was limited to IT

factors and did not present empirical research on other factors such as financial factors and management factors that might also influence the success of logistics tenders in Vietnam. Future research may include a focus on other factors besides IT integration and their impact on the success of logistics tenders. The time restrictions placed on the current study limited the data collection to the use of the quantitative method. Future researchers may consider combination of qualitative studies to gain insight into the importance of different factors in the success of logistics tenders in Vietnam.

REFERENCES

- [1] S. Nataraj, C. Alvarez, L. Sada, A. A. Juan, J. Panadero, and C. Bayliss (2020), *Applying Statistical Learning Methods for Forecasting Prices and Enhancing the Probability of Success in Logistics Tenders*, in Transportation Research Procedia, Elsevier B.V., pp.529-536. doi: 10.1016/j.trpro.2020.03.128.
- [2] K. Kavčič, J. Suklan, and F. Milost (2016), *Outsourcing logistics activities: Evidence from Slovenia*, Promet - Traffic and Transportation, Vol.28, No.6, 2016, doi: 10.7307/ptt.v28i6.2042.
- [3] A. D. Adeitan, C. O. Aigbavboa, and O. C. Olubiyo (2023), *Impact of globalisation on logistics management in Nigeria*, International Journal of Services and Operations Management, Vol.45, No.3, doi: 10.1504/IJSOM.2023.132465.
- [4] J. Arif and F. Jawab (2018), *Outsourcing of Logistics' Activities: Impact Analysis on Logistics Service Performance*, in 2018 International Colloquium on Logistics and Supply Chain Management, LOGISTIQUA 2018. doi: 10.1109/LOGISTIQUA.2018.8428272.
- [5] C. Cheng, X. Wang, and X. Ren (2023), *Selection of outsourcing logistics providers in the context of low-carbon strategies*, Environmental Science and Pollution Research, Vol.30, No.7, doi: 10.1007/s11356-022-23468-w.
- [6] A. Aguezzoul (2014), *Third-party logistics selection problem: A literature review on criteria and methods*, doi: 10.1016/j.omega.2014.05.009.
- [7] A. Qadir, S. Abdullah, T. Lamoudan, F. Khan, and S. Khan (2023), *A new three way decision making technique for supplier selection in logistics service value Cocreation under intuitionistic double hierarchy linguistic term set*, Heliyon, Vol. 9, No. 8, doi: 10.1016/j.heliyon.2023.e18323.
- [8] F. D. Davis (1989), *Perceived usefulness, perceived ease of use, and user acceptance of information technology*, MIS Q, Vol.13, No.3, doi: 10.2307/249008.
- [9] N. Charness and W. R. Boot (2016), *Technology, gaming, and social networking*, Handbook of the Psychology of Aging, Eighth Edition, pp.389-407, doi: 10.1016/B978-0-12-411469-2.00020-0.
- [10] S. Kamble, A. Gunasekaran, and H. Arha (2018), *Understanding the Blockchain technology adoption in supply chains-Indian context*, <https://doi.org/10.1080/00207543.2018.1518610>, Vol.57, No.7, pp.2009-2033, doi: 10.1080/00207543.2018.1518610.
- [12] S. S. Kamble, A. Gunasekaran, and R. Sharma (2020), *Modeling the blockchain enabled traceability in agriculture supply chain*, Int J Inf Manage, Vol.52, doi: 10.1016/j.ijinfomgt.2019.05.023.
- [13] S. O. Hammed, A. and Popoola (2006), *Selection of sampling and sampling technique*.
- [14] J. F. Hair, M. Sarstedt, L. Hopkins, and V. G. Kuppelwieser (2014), *Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research*, European Business Review, Vol.26, No.2, pp.106-121, doi: 10.1108/EBR-10-2013-0128/FULL/XML.
- [15] J. F. Hair, L. M. Matthews, R. L. Matthews, and M. Sarstedt (2017), *PLS-SEM or CB-SEM: updated guidelines on which method to use*, International Journal of Multivariate Data Analysis, Vol.1, No.2, p.107, doi: 10.1504/IJMDSA.2017.10008574.
- [16] J. Henseler, C. M. Ringle, and M. Sarstedt (2015), *A new criterion for assessing discriminant validity in variance-based structural equation modeling*, J Acad Mark Sci, Vol.43, No.1, pp.115-135, Jan, doi: 10.1007/S11747-014-0403-8.

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