

## Halal Logistics Success Factors by Conventional Transportation Providers: A Review

Nor Wazirah Radzman Shah, Azlina Muhammad, Sabariah Mohamad, Harlina Suzana Jaafar

Malaysia Institute of Transport, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia

*Received: May 24, 2016*

*Accepted: July 3, 2016*

---

### ABSTRACT

This paper presents the factor that motivates conventional transportation providers mainly for food and beverage goods/products to implement Halal logistics in the Halal industry. Logistics service providers (LSP) are one of the mainstream elements in Supply Chain Management and due to this, most of the industry players tend to apply the approach of outsourcing the firm services in order to stay competitive with other logistics players in the industry. The emergence of the Halal industry in Malaysia, especially from the food and services sectors lead to the usage of logistics service providers (LSP) which is the outsourcing of one or more services to the third party. The expanding of business and increment in this intense competition has aroused many organizations to develop logistics as a part of their corporate strategy for cost and service advantages [19]. Currently, manufacturers and retailers are seeking opportunities to outsource their logistics activities to LSP in order to introduce goods/products and service innovations into the business. Their action seems to give a positive impact to the trend of business organizations using LSP in order to compliment and cater the increasing demand for logistics services [17]. Because of this, many logistics service providers are moving towards catering the demands of the Halal industry based on the Halal trend that is being reviewed mostly as one of the profitable platforms for the business lately. A conceptual framework is developed and 4 factors are identified based on the literature review. The factors are profit orientation, business trend, government support and customer service. Although the demand of the Halal industry in Malaysia is expanding, yet the supply of Halal logistics still remained low. Industry players such as these conventional transportation providers should take part in adopting and utilizing the attractive opportunity provided by Halal industry as Malaysia has all the necessary facilities and expertise in this field.

**KEYWORDS:** Halal Industry, Halal Logistics, Logistics Service Providers (LSP), Conventional Transportation Providers.

---

### INTRODUCTION

Today, the Halal industry market is estimated of an RM9 trillion per year money-making and has caught the attention worldwide. Halal market cuts across many industries such as the food and beverages, non-food industry, logistics and services industry, manufacturing, pharmaceuticals, tourism, cosmetics and even personal care industry. One of the most important components in Supply Chain Management is the concept of logistics. Logistics can be defined as a part of supply chain process that needs the activities of planning, organizing, implementation and controlling the performance of a business operation in an effective and efficient manner. It includes the storage of goods/products, service operation, transportation and related information from the point of consumption to the fulfillment of demand meet the predefined requirements from the customers.

In recent years, due to the process of globalization and adjustment in business culture, the significance of logistics management have been diversified [36]. Logistics is one of the supporting items in optimizing existed production and distribution activity to perform effectively and efficiently in market competition. Transportation involved one-third of the amount for costs in logistics, and also represent a big portion of logistics performance of a company. This is due to the requirement of transportation needed throughout the whole process from manufacturing to end-users and vice versa.

The emergence of the Halal industry in Malaysia especially from the sectors of food and services leads to the usage of logistics service providers (LSP) or sometimes known as third party logistics (3PL). The expanding of business and increment in competitive-strain has aroused many organizations to develop logistics as a part of their corporate strategy for cost and service advantages [19]. Currently, many manufacturers and retailers are seeking opportunities to outsource their logistics activities to LSPs in order to introduce products and service innovations into the markets. Their actions seem to give impact to the trend of business organizations using LSPs to satisfy the increasing demand for logistics services [17].

Generally, as defined by [7], LSPs is a provider of logistics services that performs all or part of a client company's logistics function. This includes of at least the managing and operating of the transportation and

warehousing functions. In a typical LSP arrangement, LSP sits in the middle between the manufacturers/suppliers and the end-users. At this position, the LSP will need to balance the aggressive pulls generated by the upstream and downstream entities thus faces challenges which are unique to its operations. LSP is the outsourcing of logistics operations to a third party and LSP may provide logistics services to one or more clients at any given time. Clients may choose to outsource a portion or all of their logistics services to one or more LSP. LSP is also known as a third-party logistics provider abbreviated as 3PL or sometimes TPL. These LSPs specialize in unified operation, warehousing and transportation services that can be measured and customized to customers' needs based on market conditions and the demands in delivery service requirements for their products and materials.

Meanwhile, according to [18], the third-party logistics that is also abbreviated as 3PL or sometimes TPL service is something more than just subcontracting or outsourcing. Typically, subcontracting or outsourcing covers one product (or a family of products) or one function that is produced by an outside vendor. In contrast, the functions performed by 3PL providers cut across multiple logistics functions such as procurement, warehousing and distribution. It could be argued that 3PL service is the complete process where a number of functions is outsourced, hand operated by the external body to gain synergies from scale and scope [12]. Currently, the widespread use of LSP has been increasing because of the globalization of supply chain and firm outsourcing the demands for LSPs [8]. Consequently, the roles of LSPs are extending rapidly as the number of firm outsources their logistics function to LSPs has increased [16]. Some recent logistics literature has focused on understanding the roles and competitive advantages of LSPs, and suggested that it is necessary for LSPs to increase and transform the right resources into significant logistics performance [10, 16, 34].

According to [25], standard outsourcing activities such as transportation, freight forwarding and warehousing are the most sought after logistics activities have started in Malaysia since 2010. Most of the value-added services such as packing and labeling, reverse logistics, quality assurance and control, and information management are the top 10 logistics functions outsourced in Malaysia. The concept of supply chain management emerged in this direction and seeks to optimally manage the physical and information flows exchanged among all players in a supply chain, with the objective of achieving simultaneous cost reduction throughout the supply chain and a perceived increase in value of goods and/or services [4].

## HALAL LOGISTICS INDUSTRY-THE OVERVIEW

The current trend of Malaysia's economy sector has shifted to a phenomenal growth in the global industry when the element of Halal comes into existence. The participation from the government, industry players and consumers have contributed massive impact to the process of supply chain and demand from various sectors for goods/products, food and non-food, services, tourism, pharmaceuticals, textiles/garments and also healthcare and beauty products. Surprisingly, the demands do not only requested from Muslims countries but also received a tremendous attention from the non-Muslims countries worldwide. With the population of more than 1.8 billion world's Muslims and still growing, it is a mandatory for them to consume and seeks for any Shariah-compliance pertaining the religious obligation as one's life in this world and hereafter. Whilst for the non-Muslims, Halal has created the major concern and awareness for them in consuming quality, secure, safety and hygienic goods/products.

In Malaysia, Halal logistics seem to be expanding in the logistics industry in the early year of 2000. Kontena Nasional Berhad is the first logistics service provider company that was certified Halal by JAKIM and one of the largest one-stop logistics companies that provide thorough logistics solutions based on the requirements of customers [26]. Kontena Nasional Berhad started as a conventional logistics provider have now offered a full range of Halal logistics services namely Halal transportation, Halal warehousing and 'samak' service for containers. Halal Logistics approach in the Halal industry has assembled advancements in Halal trading thus creating a new business segment in supply chain process. The flow of goods/products and services from the beginning (farm) to consumers must comply with Shariah principle and free from the hazards of food safety contamination and cross-contamination by segregating Halal with non-Halal goods/products. As a guideline for both individual and industry players before entering Halal logistics business, Malaysian Standard of MS2400 series on Halalan-Toyyiban Assurance Pipeline specifically outlined the Management System Requirements for transportation, warehousing and retailing [14].

Due to the increasing demand from Muslim consumers for Halal goods/products as part of the religious obligation, a new form of service has been established called Halal transportation services. According to [22], Halal transportation is dedicated to catering the demand from the Halal manufactures in aligning to preserve the integrity and transparency of the Halal goods/products. However, the adoption of this kind of service in Malaysia is rather low. In ensuring the integrity of Halal products throughout the process of Halal logistics, the logistics service management used as a tool to evaluate the successfulness of the operations. Any firms that outsourced its logistics functions to the third party or LSP need to assure that those who involved in the process follows the regulations precisely according to Shariah principle. In [33] mentioned that one of the elements of supervising Halal in logistics activities is the Halal performance in transportation activities by any type of transportation mode that complies with Shariah.

According to [33], the numbers of Halal manufacturers, Halal menu, Halal goods/products are expanding continuously. The main success of the Halal industry depends massively on the capability of logistics service management in order to ensure the integrity of Halal products well-kept along the process until it reaches the end-users. Without Halal service such as transportation, there is no guarantee whether those Halal

goods/products are still considered Halal at the point of consumption by the consumers [22]. In this conceptual paper, the researchers only focus on the motivations to implement Halal Logistics by conventional transportation providers based on literature review. Most of the published journals and papers focusing on the general functions of a logistics service provider and when it comes to practicing Halal in the industry, only those with Halal certification are being studied. There is no doubt that Halal industry has a positive potential market to devote in especially those from conventional transportation providers that are keen to take this opportunity in the profitable Halal business.

## **SUCCESS FACTORS BY CONVENTIONAL TRANSPORTATION PROVIDERS**

### **Profit Orientation**

The idea of setting up any business is for the purpose of a profit-oriented regardless background of the businesses. Since the Halal industry is major trending nowadays, doing Halal-related business seems to give a positive and strong potential market to industry players. According to [13], in response to the money-making and expanding demand for Halal products, it is likely that the increasing number of Halal operators is also in need to be recognized and Halal certified. A business in the Halal supply chain means that each and every component involved throughout the process are bound to comply with Shariah principle. Considering Malaysia has all the facilities and amenities in facilitating the progress in the Halal industry, the establishments of Halal parks located on a common property are set to promote Halal manufacturing and Halal services business with no compromise about Halal integrity [24]. This kind of incentives will tackle industry players to enter Halal business for greater revenue income.

With the estimated market size of more than US\$600 billion (RM2.1 trillion), the potential of business on Halal is likely beyond the doubt with the market of 1.6 billion Muslims worldwide [6]. Moreover, in the context of the Halal supply chain, it is impossible to achieve effective and efficient economic development without providing logistics services as the value-added to accommodate the customer's demand [9, 15, 20, 21, 31, 35]. In order to be a success and stay competitive in the Halal business [32], conventional transportation providers need to consolidate with any changes in Halal requirements especially by providing value-added services that will help organizations to gain higher revenue as the result [5].

### **Business Trend**

Adopting the concept of Halal in the global business context, it is not only limited to the Halal food business. The Halal industry, according to the Ministry of International Trade and Industry Malaysia (MITI) [28], covers three markets namely food, non-food (pharmaceuticals, toiletries, medical products and cosmetics) and services (logistics, transportation, retailing, warehousing and tourism). In [1] mentioned that the large-scale of Halal related business today has proved that Halal is a worldwide business. With Malaysia seeking to become a global Halal hub, from the perspective of providing transportation services, it gives the advantage and tremendous opportunities for conventional transportation providers to cater Halal logistics services in fulfilling customer's demand to consume Halal products and services [23].

Another point worth mentioning why Halal is a global business trend is due to the enormous Muslim population. In a statement made by [11], the Muslim population in the year 2012 was amounted to 1.8 billion is forecasted to be increased to 2.2 billion in 2030. This explains that there is a strong and positive business opportunity for those who wanted to enter the Halal market. In [3] agreed that because of the Muslim population expansion, thus the influence of Muslim society that is obliged to be consumed only Halal products and services will create higher demand in future. Whilst Halal is perceived as compulsory requirements for the Muslim by most of the layman, non-Muslim seeks for hygienic, safe and quality products that claim to be contributing the increment of Halal products and services. According to a report from Malaysia Investment Development Authority (MIDA) [27], the European Halal market demand from non-Muslim countries like United Kingdom, France and Germany valued at US\$76 billion [2].

### **Government Support**

Malaysia is currently in a strategic position to be a leading player in the global Halal business. In the Second Industrial Master Plan (1996-2005) and The National Agriculture Policy (1998-2010), the Malaysian government has built Halal parks in conjunction with supporting the ground idea for Malaysia becoming a global Halal hub. Among those states that have the Halal parks are Selangor, Kedah, Melaka, Negeri Sembilan, Perak and Pahang [6]. Malaysia government has also given incentives to the companies that venture into the Halal industry. Subsequently, MITI as the promoting agencies in the international trade arena, in the Third Industrial Master Plan (IMP3) offers some attractive benefits for industry players to do Halal business [28]. One of the measures is tax incentives which includes tax exemption, tax drawbacks and double deduction for logistics and shipping sub-sectors and Halal LSP. Besides, special grants are given to LSP to become Halal-compliant and any LPS will enjoy a double tax deduction on expenditure for obtaining Halal certification and accreditation [28].

Other than marketing and promoting approaches, Malaysian government support comes in the form of policy-making, procedures and guidelines too [2]. One of the ultimate roles of The Department of Standards Malaysia (Standards Malaysia) as the National Standards Body and the National Accreditation Body is providing trustworthy standardization and accreditation services for global competitiveness [29]. As regards to

the study of Halal Standards, as of 31st January 2016, there are 18 cumulative Malaysian Standards (MS) developed. The following are examples of Malaysian Standards for Halal Logistics:

- 1) MS1500:2004 Malaysia Standards for General Guidelines on the Production Preparation, Handling and Storage of Halal Food.
- 2) MS2400-1:2010 Halalan-Toyyiban Assurance Pipeline-Part 1: Management System Requirements for Transportation of Goods and/or Cargo Chain Services.
- 3) MS2400-2:2010 Halalan-Toyyiban Assurance Pipeline-Part 2: Management System Requirements for Warehousing and Related Activities.

### **Customer Service**

The best and easiest way to grow any business is to not lose existing customers. Customer services have always been the major part of the business cycle despite the fact that customer loyalty and trust are the quickest way to profit growth. The slightest dispute with customers can bring down the business as the customer is perceived commonly is always right under any circumstances. According to a study by [30], since Halal products is not only consumed by Muslims, the concept of Halal that highlight on the factor of hygiene, safety and the wholesomeness has persuaded the non-Muslim to choose Halal too because of the concept that strictly comply with the Shariah principle. Consuming Halal products has proven to be an outstanding for a healthy dietary platform as promoted in the Islamic way of life [30].

In the context of conventional transportation providers, it is a benefit to the firm that can offer a broad variety of logistics services to cater the differences of preferences from each customer. Those who can provide customer service with better performance can be considered as a potential source of competitive advantages towards achieving success in the Halal logistics field. Whilst being sensible to the demands of Muslims customers that bound to comply with Shariah principle, conventional transportation providers should also be responsive to the need of non-Muslim customers without any favoritism to any of these customers. Adding to this, in maintaining integrity throughout Halal logistics activities, Halal certified conventional transportation providers will help to ease customer's ambiguity and build trust regarding the Halal products and services whether they are being utilized appropriately in the present market [22].

### **CONCLUSION**

Today, the Halal market is estimated of an RM9 trillion per year money-making and has caught the attention worldwide. The halal industry cut across many ranges of businesses such as the food and beverages, non-food products, logistics and services, manufacturing, pharmaceuticals, tourism, cosmetics and even personal care industry. With the population of more than 1.8 billion world's Muslims and still growing, the obligation for them to consume and seeks Shariah-compliance in all matter based on Islamic principles, create a huge opportunity for industry players in doing Halal businesses. Whilst for the non-Muslims, Halal has initiated a major concern and awareness for them in consuming a quality, secure and safety and hygienic goods/products.

From the context of logistics service providers, there are so many advantages that beneficial for them as entering the Halal market is concerned. This study has been reviewed and promoted a basic conceptual framework of the factors that motivates conventional transportation providers to implement Halal logistics into the business. Among the factors are profit-orientation, business trend, government support and customer service. More experimental research can be carried out in the future to attempt the significance and justification between the factors that have been mentioned in this conceptual paper for a better understanding. Adopting Halal logistics into the business is certainly not an easy decision to these conventional service providers as managing change and practicing innovation can sometimes completely restructure the existing system and management of the company. Nevertheless, conventional transportation providers can be creative in finding ways to tap into all these challenges as Halal logistics surely guaranteed massive advantages for those who can be competitive in the Halal industry.

### **ACKNOWLEDGEMENT**

This project was funded and supported by the Ministry of Higher Education (MOHE) Malaysia for Halal Supply Chain (HSC) Research Project grant scheme [600-RMI/REG 5/3 (18/2015)] under Malaysia Institute of Transport (MITRANS), Universiti Teknologi MARA (UiTM), Shah Alam, Selangor, Malaysia.

### **REFERENCES**

1. Talib, M.S.A. and A.B.A. Hamid, 2014. Application of Critical Success Factors in Supply Chain Management. *International Journal of Supply Chain Management*, 3(1): 21-33.
2. Talib, M.S.A., A.B.A. Hamid, M.H. Zulfakar and A.S. Jeeva, 2014. Halal Logistics PEST Analysis: The Malaysia Perspectives. *Asian Social Science*, 10 (14): 119-131.
3. Adams, I.A., 2011. Globalization: Explaining the Dynamics and Challenges of the Halal Food Surge. *Intellectual Discourse*, 19(1): 123-145.
4. Aguezoul, A., 2014. Third-Party Logistics Selection Problem: A Literature Review on Criteria and Methods. *Omega*, 49: 69-78.

5. Tarmizi, H.A., N.H. Kamarulzaman, I.A. Latiff and A.A. Rahman, 2014. Factors Behind Third-Party Logistics Providers Readiness Towards Halal Logistics. *International Journal of Supply Chain Management*, 3(2): 53-62.
6. Dali, N.R.S.B.M., M.N.B. Nooh, N.B. Nawai and H.B. Mohammad, 2009. Is Halal Products are More Expensive as Perceived by the Consumers? Muslimpreneurs Challenges and Opportunities in Establishing a Blue Ocean Playing Field. *Journal of Management and Muamalah*, 2: 39-62.
7. Delfmann, W., S. Albers and M. Gehring, 2002. The Impact of Electronic Commerce on Logistics Service Providers. *International Journal of Physical Distribution and Logistics Management*, 32 (3): 203-222.
8. Ellinger, A.E., D.J. Ketchen, G.T.M. Hult, A.B. Elmadağ and R.G. Richey, 2008. Market Orientation, Employee Development Practices, and Performance in Logistics Service Provider Firms. *Industrial Marketing Management*, 37 (4): 353-366.
9. Esper, T.L., B.S. Fugate and B. Davis-Sramek, 2007. Logistics Learning Capability: Sustaining the Competitive Advantage Gained Through Logistics Leverage. *Journal of Business Logistics*, 28 (2): 57-82.
10. Fabbe-Costes, N. and M. Jahre, 2009. Flexible and Integrated Supply Chains Towards an Innovative Research Platform. In the Proceedings of the 2009 21st Annual NOFOMA Conference, pp: 1-19.
11. Grim, B.J. and M.S. Karim, 2011. The future of the global Muslim population: projections for 2010-2030. Pew Research Center.
12. Hilletofth, P. and O.P. Hilmola, 2010. Role of Logistics Outsourcing on Supply Chain Strategy and Management: Survey Findings from Northern Europe. *Strategic Outsourcing: An International Journal*, 3 (1): 46-61.
13. Iberahim, H., R. Kamaruddin and A. Shabudin, 2012. Halal Development System: The Institutional Framework, Issues and Challenges for Halal Logistics. In the Proceedings of the 2012 IEEE Symposium on Business, Engineering and Industrial Applications, pp: 760-765.
14. Jaafara, H.S., E.N. Omar, M.R. Osmani and N. Faisal, 2013. The Concept of Halal Logistics-An Insight. In the Proceedings of the 2013 International Conference on Logistics and Transport, pp: 1-6.
15. Jia, P., H.A. Mahdiraji, K. Govindan and I. Meidutė, 2013. Leadership Selection in an Unlimited Three-Echelon Supply Chain. *Journal of Business Economics and Management*, 14 (3): 616-637.
16. Lai, K.H., 2004. Service Capability and Performance of Logistics Service Providers. *Transportation Research Part E: Logistics and Transportation Review*, 40(5): 385-399.
17. Lieb, R. and J. Miller, 2002. The Use of Third-Party Logistics Services by Large US Manufacturers, the 2000 Survey. *International Journal of Logistics*, 5 (1): 1-12.
18. Marasco, A., 2008. Third-Party Logistics: A Literature Review. *International Journal of Production Economics*, 113 (1): 127-147.
19. McGinnis, M.A. and J.W. Kohn, 2002. Logistics Strategy-Revisited. *Journal of Business Logistics*, 23 (2): 1-17.
20. Meidutė, I. and J. Raudeliūnienė, 2011. Evaluation of Logistics Centres Establishment: External and Internal Factors. *Business: Theory and Practice/Verslas: Teorija ir Praktika*, 12 (2): 175-182.
21. Meidutė, I., M. Litvinenko, M. and A. Aranskis, 2012. Logistics Cooperation: Integrated Logistics Services. *Business: Theory and Practice/Verslas: Teorija ir Praktika*, 13 (4): 343-351.
22. Ngah, A.H., Y. Zainuddin and R. Thurasamy, 2014. Barriers and Enablers in Adopting Halal Transportation Services: A Study of Malaysian Halal Manufacturers. *International Journal of Business and Management*, 11 (2): 49-70.
23. Pahim, K.M.B., S. Jemali and S.J.A.N.S. Mohamad, 2012. An Empirical Research on Relationship Between Demand, People and Awareness Towards Training Needs: A Case Study in Malaysia Halal Logistics Industry. In the Proceedings of the 2012 IEEE Business Engineering and Industrial Applications Colloquium, pp: 246-251.
24. Halal Industry Development Corporation, 2013. Home. Retrieved from [http://www.ghsc.com.my/publisher/alias/halal\\_park?dt.driverAction=RENDER&pc.portletMode=view&pc.windowState=normal&pc.portletId=HalalParkNewsPortlet.HalalParkNewsPortlet](http://www.ghsc.com.my/publisher/alias/halal_park?dt.driverAction=RENDER&pc.portletMode=view&pc.windowState=normal&pc.portletId=HalalParkNewsPortlet.HalalParkNewsPortlet).
25. Frost and Sullivan, 2011. Frost & Sullivan predicts Malaysia's logistics revenue to increase 11.5 per cent year-on-year to RM 121 billion in 2011. Retrieved from <http://www.frost.com/prod/servlet/press-release.pag?docid=222515845>.
26. Kontena Nasional, 2015. Welcome to Kontena Nasional. Retrieved from [http://www.kn.com.my/index.php?option=com\\_content&view=article&id=61:welcometo-kontena-nasional&catid=1:latest-news&Itemid=64](http://www.kn.com.my/index.php?option=com_content&view=article&id=61:welcometo-kontena-nasional&catid=1:latest-news&Itemid=64).
27. Malaysian Investment Development Authority, 2014. Together with ASEAN: Annual report 2014. Retrieved from [http://www.mida.gov.my/home/administrator/system\\_files/modules/photo/uploads/20160114023100\\_MIDA%20Annual%20Report%202014-EN.pdf](http://www.mida.gov.my/home/administrator/system_files/modules/photo/uploads/20160114023100_MIDA%20Annual%20Report%202014-EN.pdf).
28. Ministry of International Trade and Industry, 2016. Performance and challenges of industrial development. Retrieved from <http://www.miti.gov.my/miti/resources/auto%20download%20images/557f968be4aaf.pdf>.
29. Department of Standards Malaysia, 2014. About us. Retrieved from <http://www.jsm.gov.my/about-us#.V2yuwtJ95dg>.
30. Rezai, G., Z. Mohamed, M.N. Shamsudin and E.F.C. Chiew, 2010. Non-Muslims' Awareness of Halal Principles and Related Food Products in Malaysia. *International Food Research Journal*, 17 (3): 667-674.

31. Sandberg, E. and M. Abrahamsson, 2011. Logistics Capabilities for Sustainable Competitive Advantage. *International Journal of Logistics Research and Applications*, 14 (1): 61-75.
32. Susanto, A.B., 2008. Organizational readiness for change: A case study on change readiness in a manufacturing company in Indonesia. The Jakarta Consulting Group.
33. Tan, M.I.I., R.N. Razali and M.I. Desa, 2012. Factors Influencing ICT Adoption in Halal Transportations: A Case Study of Malaysian Halal Logistics Service Providers. *International Journal of Computer Science Issues*, 9 (1): 62-71.
34. Wong, C.Y. and N. Karia, 2010. Explaining the Competitive Advantage of Logistics Service Providers: A Resource-Based View Approach. *International Journal of Production Economics*, 128 (1): 51-67.
35. Yang, C.C., P.B. Marlow and C.S. Lu, 2009. Assessing Resources, Logistics Service Capabilities, Innovation Capabilities and the Performance of Container Shipping Services in Taiwan. *International Journal of Production Economics*, 122 (1): 4-20.
36. Tseng, Y.Y., W.L. Yue and M.A. Taylor, 2005. The Role of Transportation in Logistics Chain. In the Proceedings of the 2005 Eastern Asia Society for Transportation Studies, pp: 1657-1672.