

# Citespace Knowledge Gap Analysis in Asia Duty Free Tourism Purchasing Behavior

Feng Hui, Piang-or Loahavilai, Nopasit Chakpitak, and Tirapot Chandarasupsang

**Abstract**—The tourism shoppers’ purchasing behaviors have critical effects to economies, but there are few of comprehensive review that integrates and synthesis the finding of literature on tourism purchasing behavior systematic from past, present and future perspective. As the international tourists consuming volume have decreased in average, the purchasing behavior has changed into online, planned characters especially under the conflict from COVID 19, this paper tries to find the way to solve this problem for the tourism retailing industries development and the market demand. The methods of this paper is to use the theory of tourist classification and duty-free products classification for research shoppers’ sample identification and duty free products wish lists audition, customers purchasing methods is to analyze the gap, Citespace is used here to fill the gap with domain knowledge and visualize the finding of 150 papers on tourism purchasing behavior published from 2010 to 2020. The finding of this research is: i) Lotte, King Power, Dubai international duty free can be Asia representative research shops, Chinese international tourists can be the research target group; ii) Fragrances & cosmetic, wines & spirits, fashion & accessories and personal luxury goods can be selected as the 4 duty free products categories; iii) Chinese tourism shoppers have the purchasing gap between oversea and domestic products, both those kinds of products can be acquired online and offline; iv) Multiple emergent themes in the existing corpus, the theory of planned behavior and online communication are the key domain knowledge to fill this gap. So, a questionnaire is urgent to design based on this research result to find out the decision tree nodes and then compose the decision-making model for duty free industry and tourism shoppers effectively.

**Index Terms**—Tourism shoppers, tourism purchasing behavior, citespace, duty free, cross border e-commerce.

## I. INTRODUCTION

Tourism has become an important social and economic force in the world [1]. Duty free is the main travel retail industry under the tourism. But there are many problems in duty free industry. Firstly, there are an increasing expectation in the duty free and travel retails worldwide from 69.5 billion USD in 2016 to 125.1 billion USD in 2025 [2]. But the problem is that the per passengers spending in the airport shop decrease year by year in average from more than 19 USD in 2014 to 16.4 USD in 2017, this problem shows that tourism shoppers are more considering in buying. The Fig. 1 can be shown as following:

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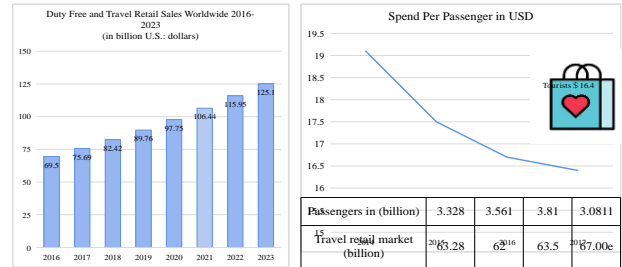


Fig. 1. Duty free and travel retail sales situation.

Secondly, from the m1nd-set research in 2018, ensuring full digital engagement prior to travel is essential to capture 65% [3] of potential purchases (see Fig. 2). Moreover, the new duty-free World Council global shopping monitor in the third quarter of 2019 updates that the planned airport shoppers increase to 80% among all tourism buyers [4]. So, duty free physical shopping experience get challenged by online information and tourists planned behaviors now, the decision making can be influenced by other factors outside the duty-free shops.

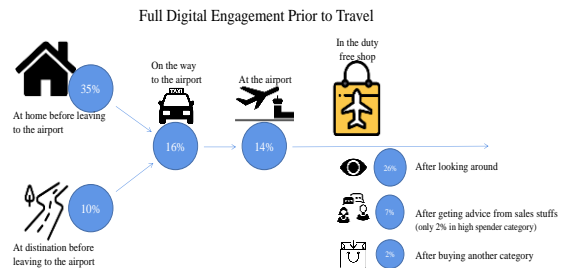


Fig. 2. Full digital engagement prior to travel.

Thirdly, from the physical duty-free perspective, as the COVID 19 outbreak worldwide in 2020, 85% of the tourists would have impacted from the PI Insight research report on March 2020. Besides, the COVID 19 impact on likelihood to browse certain duty-free categories are also changed with less chance from airport shoppers [5]. The Fig. 3 and Fig. 4 can be shown as below:

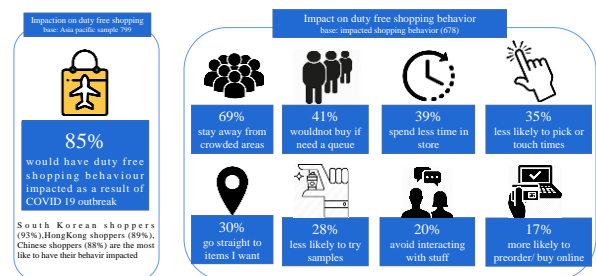


Fig. 3. COVID 19 Impact on duty free shopping behavior 2020.

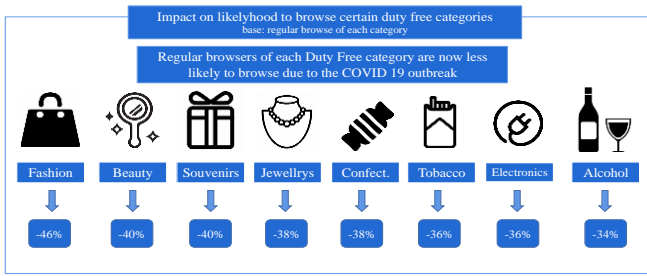


Fig. 4. COVID 19 Impact on likelihood to browse certain duty-free categories 2020.

Under the new COVID 19 epidemic situations, the tourism airport shoppers buying behavior have changed obviously which has a critical effect to the destination tourism economies, it is urgent to understand it to enhance the retailing industries development. Therefore, a new international market plan is needed to help duty free industry and meet international airport shoppers' demand. What tourism shoppers will buy and how to buy products in the future, the airport shoppers purchase behavior will have a huge economy value for the international travel retail industry significantly.

So, this research aims to: i) identify Asia representative international airports, duty free stores and tourism shoppers; ii) find out key duty free representative products classification; iii) organize the international tourists purchasing methods; iv) analyze knowledge gap in duty free of international customer purchasing behavior after the COVID 19 outbreak.

## II. LITERATURE REVIEW

### A. Tourists Classification

The tourist's classification is based on duration length, region of origin, travel purpose and the different organizational activities. The trip variables include the travel purpose, travel frequency, role of purchasing decision and others. The personal variables related to demographics include nationality, education level, age, and others [6].

This theory can be used to identify the target tourist group and select the research sample from Asia representative international airports duty-free shops.

### B. Duty Free Products Classification

From the Generation research 2017, the global duty fee and travel retails sales are classified by products market shares into 7 categories, which include fragrances & cosmetic, wines & spirits, fashion & accessories, tobacco goods, watch, jewelry & fine writing, confectionery & fine food, electronics, gifts and other [7]. The customer consuming is through the products and service buying. Besides, as duty free shops are high relationship in tax and policy supports, luxury goods which have high tax and value are also an interesting research area [8].

This theory is to find out key duty-free products category according to the historical sales. So, the international tourism shoppers' wish list on products are selected based on duty free products classification.

### C. Customers Purchasing Methods in International Duty-Free Products

Purchasing oversea products contains online and offline methods. In September and October 2013, Chinese President Xi Jinping proposed cooperation initiatives to construct the "New Silk Road Economic Belt" and the "21st Century Maritime Silk Road" [1], there are 3 ways for customers to buy oversea products online, which are cross border e-commerce, personal mail and traditional import [9]. Cross border is the main B2C retail way to do international business. Offline to buy oversea products include the self-buying and traditional import trade in the physical shops. As the COVID 19 influence, the customer may choose the alternative products within country in case the virus infection, they can also choose the online and offline purchasing methods to buy.

This theory is effective to organize the international tourism shoppers' purchasing methods. The gap is shown between the duty-free offline shopping and online shopping among domestic and international market under COVID 19.

### D. Citespace Reference Co-citation and Co-keyword Analysis

Citespace software is developed based on the Java language and is an information visualization software based on citation analysis theory. The prominent feature of Citespace is to convert a large amount of literature data in a knowledge field into a multiple, time-sharing, dynamic citation analysis visualization language through a clever space to layout, focus on the evolution of the field on a knowledge graph of a citation network and automatically identify the research frontiers represented by the citation node literature and co-citation clustering as the knowledge base on the graph [10].

So, the Citespace graph can show the interpretability through the scientific network, the domain knowledge is identified. The relevant literature review of this research will be analyzed on the Citespace visual thinking. The application of all research theories will be explained in the next session in detail.

## III. METHODOLOGY

This part narrates how to use each selected theories and method to form the implementation. To solve the problem in duty free shops, this duty-free problem identification process is shown in Table I:

TABLE I: OVERVIEW OF EXPERIMENTAL DESIGN AND METHODOLOGY

Overview of Experimental Design and Methodology			
Steps	Theories	Tools	Output (expected)
1. Identify the research problems and Asia representative international airports		Document learning manual record	The critical problem is identified in Asia representative duty free shops.
2. Find out Asia representative international tourism shoppers	Tourists classification		The target tourism shoppers of research sample are identified.
3. Acquire representative duty-free products among tourism shoppers	Duty free products classification		Duty-free popular products and tourism shoppers' wish list are found.
4. Organize the international tourism shoppers' purchasing methods	Customers purchasing methods		The purchasing gap is shown between the duty-free offline shopping and online shopping among domestic and international market.
5. Analyze knowledge gap in duty free tourism shoppers purchasing behavior after the COVID 19 outbreak	Citespace reference co-citation and co-keyword analysis	Manual selection	Domain knowledge is analysed to fill this research gap

*Step 1: Identify the Research Problems and Asia Representative International Airports*

The first step is to read the secondary data from tourism and duty-free industry reports to find the key problems from last 10 years, internet knowledge collection is also used here. The notebook and pen are used in this step to make the first version craft and then the computer is used to make the digital database in timeline based on the main concept in every report, paper and official website knowledge.

*Step 2: Find Out Asia Representative International Tourism Shoppers*

The theory of tourist’s classification is to find out representative international tourism shoppers based on the travel purpose of trip variables and the nationality of personal variables from the industrial literature review, so the research target sample are selected.

*Step 3: Acquire Representative Duty-Free Products Among Tourism Shoppers*

According to the historical duty-free international tourism shoppers purchasing sales record, duty free products classification is used in this step, so the duty-free popular products and tourism shoppers’ wish list are found.

*Step 4: Organize the International Tourism Shoppers’ Purchasing Methods*

Tourism shoppers’ purchasing methods in international duty-free products are used to understand the purchasing overseas products and domestic alternative products through online and offline channels. The output of this step shows the purchasing gap between the duty-free offline shopping and online shopping among domestic and international market as the COVID 19 decrease the abroad travelling.

*Step 5: Analyze knowledge gap in duty free tourism shoppers purchasing behavior after the COVID 19 outbreak*

Citespace 5.6.R4 (64-bit) version is used in this research to find out the domain knowledge and analyze knowledge gap. All literature is from Web of Science database are collected under the key words “tourism purchase behavior”, and then those literature is refined by SCI-EXPANDED and SSCI index to concentrate on the core journals and references only to ensure the paper quality. Time span is from 2010 to 2020 with 240 papers, time length is 1 slice per year, both reference co-citation and co-keyword analysis selection criteria is top 15 per slice, this research collect 150 papers in total, the operation time is July,2020.

The analysis of these records was undertaken in two steps. First, this research used Citespace to perform a reference co-citation analysis in the downloaded corpus. Citespace allows visualization of similarities in publications through an examination of bibliometric networks. Furthermore, this research use Citespace to do test mining in co-keywords analysis. Second, this research use LLR algorithm to extract key thematic clustering label in the literature on tourism purchase behavior. The output of this step is to find the domain knowledge to fill this research gap. Further details about these analyses and results are presented in next parts.

IV. RESULTS ANALYSIS AND DISCUSSION

This section reports results and discuss with theoretical support based on research objectives as follow: i) identify Asia representative international airports, duty free stores and tourism shoppers; ii) find out key duty free representative products classification; iii) organize the international tourists purchasing methods; iv) analyze knowledge gap in duty free of international customer purchasing behavior after the COVID 19 outbreak

*Objective 1: Identify Asia Representative International Airports, Duty Free Stores and Tourism Shoppers*

From the ICAO Air Transport Monthly Monitor in February 2020, Dubai international airport is the only one located in west Asia of middle east [11], Dubai airport is the first choice in Asia to be a flight transaction center to Europe and British, which is ranked at the third place of 3,875,995 million passengers’ number among the world international airports. From the geographic distance to top 3 tourism destination in Europe and America, it is the representative airport in west Asia. As Thailand is on the first place on the ranking of the fastest growing airports in passenger traffic over the last decade 2008–2018 in 23.20% from the Annual World Airport Traffic Report [12], Bangkok airport is more representative to be a transaction center to transit to Southern Hemisphere destination in the southwest of Asia region. From the 2017 South Korean traveler destinations, the America and Europe record the highest increase with double digit growth to both USA and Canada, and Mexico welcoming is first direct service from South Korea. Russia, Italy, Spain, and Poland were the top growth destinations across Europe, although (along with Russia) Germany and France made up the top 3 [4]. So, Korea is representative in Northeast Asia to be a transaction center to transit to America and Europe region. The Asia representative airports can be shown in Fig. 5 as following:

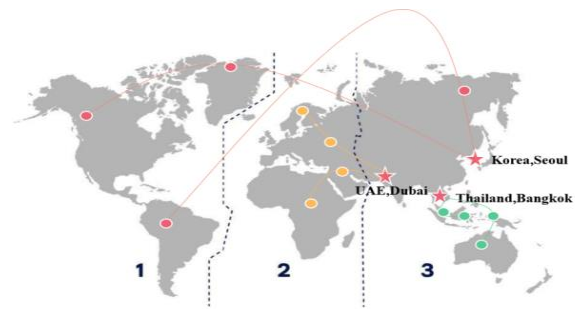


Fig. 5. Asia representative airports.



Fig. 6. The Moodie Davitt Report's Top 10 Travel Retailer Ranking 2018 (by turnover, million).

From the Moodie Davitt report published on September 2019, the duty-free shops in those airports are within top 10 in the world duty free industry (see Fig. 6) [3]. The top 10 airports in 2018 for international traffic (including lead travel retailers), both Dubai international, Incheon international and Bangkok Suwannabhumi are listed inside (see Fig. 7) [13].

TOP 10 airports for international traffic (including lead travel retailers) 2018			
Rank 2018	Airports	Lead Travel Retailer(s)	International passengers(million)
★ 1	DXB/Dubai international	Dubai duty free	88.9
2	London heathrow	World duty free(Dufry)	75.3
3	Hongkong international	Duty zero (Lagardere JV), The shilla duty free, Gebr heinemann	74.4
4	Amsterdam Schiphol	Schiphol airport retail, Kappe international, Lagardere travel retail, Gassan	71
★ 5	Incheon interantional	Lotte duty free, the shilla duty free, Shinsegae duty free	67.7
6	Paris Charles de Gaulle	SDA (ADP/ Lagardere travel retail JV )	66.4
7	Sigapore, Changi	The shilla duty free, Lagardere travel retail, DFS Group	64.9
8	Frankfurt	FAR(Fraport, Gebr heinemann JV)	61.8
★ 9	Bangkok Suvarnabhumi	King power international	50.9
10	Istanbul, Ataturk	ATU Duty free/ Unifree duty free	49

Fig. 7. Top 10 airports for international traffic (including lead travel retailers) 2018.

So, the Lotte, King power and Dubai international duty-free shops can be the research duty free shop from the Asia representative transit airports.

In South Korean, the top 1 inbound arrival classified by nationality and region are 42% from China [14], and China rank at the second with 18% market share in outbound departures (see Fig. 8). In Thailand, the main airport shoppers are from inbound arrivals and outbound departures. The top 1 inbound arrival classified by nationality are 27% from China [15], China also ranks at the fourth place in outbound departure with 8% share (see Fig. 9). In United Arab Emirates (UAE), The top 5 inbound arrivals classified by nationality also include 5% share from China (see Fig. 10) [16]. The Figs. can be shown as bellow:

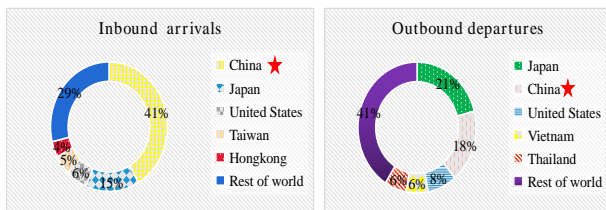


Fig. 8. South Korean inbound arrivals & outbound departure 2018.

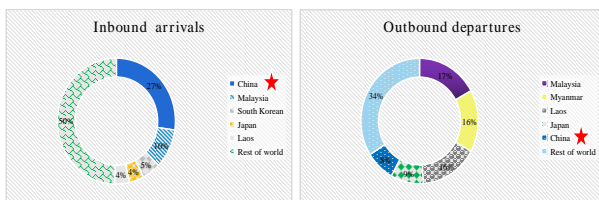


Fig. 9. Thailand inbound arrivals & outbound departure 2018.

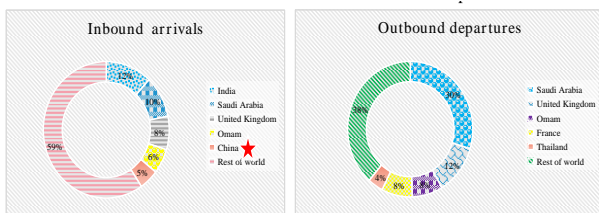


Fig. 10. Dubai inbound arrivals & outbound departure 2018.

Among those 3 airports, Chinese international tourists are the main international tourists of inbound arrivals ranked in top 5 of those representative countries. Besides, the forecasted No.1 nationalities by duty-free sales share, according to Swiss company’s report, are China with a 13.2% share [17]. According to all above, the Chinese international tourists can be the research target group to do the purchasing behavior analysis in Lotte, King power and Dubai international duty-free shops.

*Objective 2: Find Out Key Duty-Free Representative Products Classification*

Korean Air’s inflight sales were driven by cosmetics and liquor, which together will account for almost 63% of onboard revenue in 2018. Projected year-end figures from Korean Air show that cosmetics and liquor remain the most popular goods. King Power International Group at Bangkok Suvarnabhumi Airport is the top retailers in 2019 Fashion & Accessories, it was top ranked in this category in 2014, 2016, 2017 and 2018 before winning again this year [3]. It eared positive review from across suppliers large and small, and across the various luxury segments from jewelry to leather goods to fast casual fashion. The top five selling categories for the year 2019 were fragrances, liquor, cosmetics, tobacco, and electronics in Dubai international duty free.

According to the Luxury Goods Worldwide Market Study, Fall–Winter 2019, personal luxury goods grew in line with the overall market in 2019, climbing 4% to reach a record high of €281 billion, the figure bellow can show it in detail. By 2025, the luxury customer base will expand to €450 million, up from €390 million in 2019, mainly thanks to the growing middle class, especially from Asia [8]. The huge personal luxury good demand the market face with, especially for retails channel through airport, online and off-price stores. The Fig. 11 can be shown as bellow:

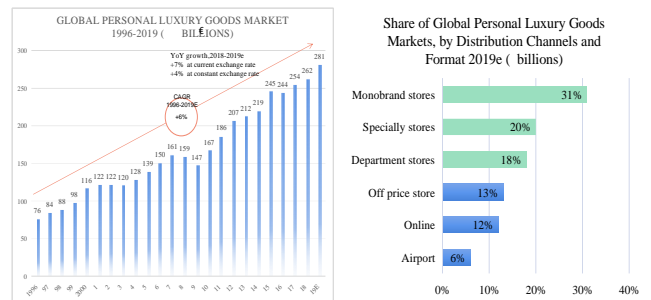


Fig. 11. Global personal luxury goods market 1996-2019 (€billions) & Share of Global Personal Luxury Goods Markets, by Distribution Channels and Format 2019e (€billions).

So, this research selects the fragrances & cosmetic, wines & spirits, fashion & accessories, and personal luxury goods from duty free shops as the 4 research products categories.

*Objective 3: Organize Tourism Shoppers’ Purchasing Methods in International Duty-Free Products*

According to the tourism purchasing methods, as the COVID 19 outbreak, the tourists reduced in traveling and have the purchase choice in products from oversea or domestic. Both those kinds of products can be acquired online and offline. Each detail can be show in the following Fig. 12 as below:

Comparison Before & After COVID 19 in Duty Free Channels for airport tourism shoppers				
Products coming from	Methods	Types	Before	After
Oversea products	Offline	Self purchase	√	√
		Traditional improt trade		√
	Online	Cross border e commerce		√
		Personal mail		√
Domestic alternative products	Online	Ecommerce platform		√
		Social media		√
	Offline	Physical shops		√

knowledge gap

Fig. 12. Comparison Before & After COVID 19 in Duty Free Channels for tourism airport shoppers.

So, airport shoppers buy duty-free products in the duty-free shops which is only 1 of 8 purchasing methods for them to consider in the previewers, 85% of the behaviors has been impacted by COVID 19 [5], but the tourism shoppers have more channels and more products ranges to buy instead of duty free products as COVID 19 outbreak in the world. Besides, there will be back to normal or come into a new normal for the duty-free shoppers to purchase the products after the CIVID 19 with the vaccine. The Proposal of the duty-free decision-making behavior in 2 scenarios is shown as following Fig. 13:

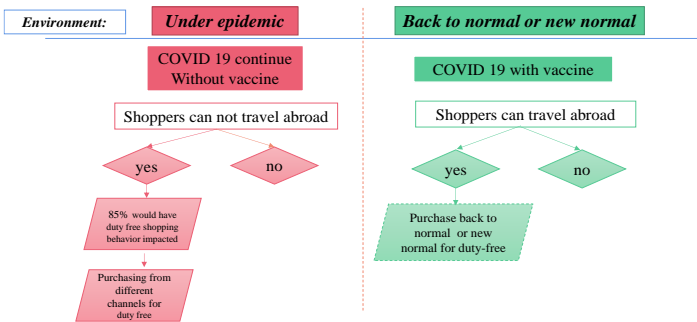


Fig. 13. Proposal of the duty-free decision-making behavior in 2 scenarios.

So, the gap is presented between the physical shopping and online shopping for oversea products. The alternative domestic products are also another gap for tourists to decide in products purchasing. Meanwhile, the purchasing behavior before and after COVID 19 is also a research gap to analyze the normal or new normal purchasing behaviors.

*Objective 4: Analyze Knowledge Gap in Duty Free in Tourism Purchasing Behavior After The COVID 19 Outbreak*

From the Citespace reference co-citation analysis results, the results are nodes 175, links 561. There are 10 clustering based on tourism purchase behavior literature review identified by Citespace, which are attachment theory, the theory of planned behavior, consumer purchase decision-making process, online communication, green food, customer engagement, urban tourism, cooperation, food festivals, hotels segment, respectively. According to the high reference co-citation frequency and centrality ranking from 2010-2020, this result can be the research theoretical background to understand the tourism purchase behavior using areas and research frontiers. The Fig. 14 can be shown as bellow:

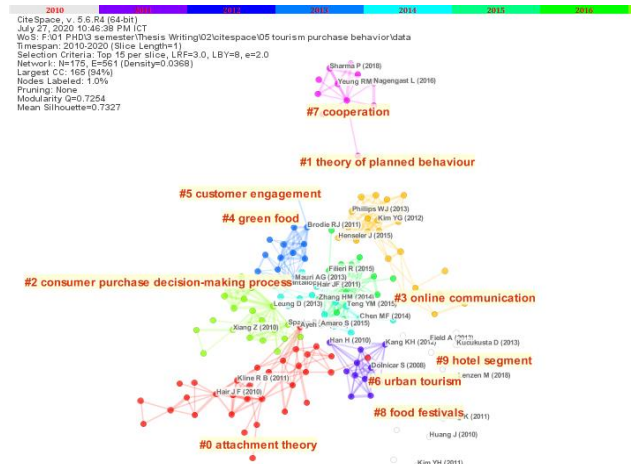


Fig. 14. Reference co-citation clustering analysis.

According to the trend of tourism purchase behavior in this research field from 2010 to 2015, the research frontiers concentrate on attachment theory, consumer purchase decision-making process, urban tourism, and food festival from in green band blue. From 2015 to 2018, the research frontier is changed in green food and customer engagement in yellow, after that until 2020, the research frontier is in the theory of planned behavior, online communication, cooperation, and hotel segment in orange and red (see Fig. 15).

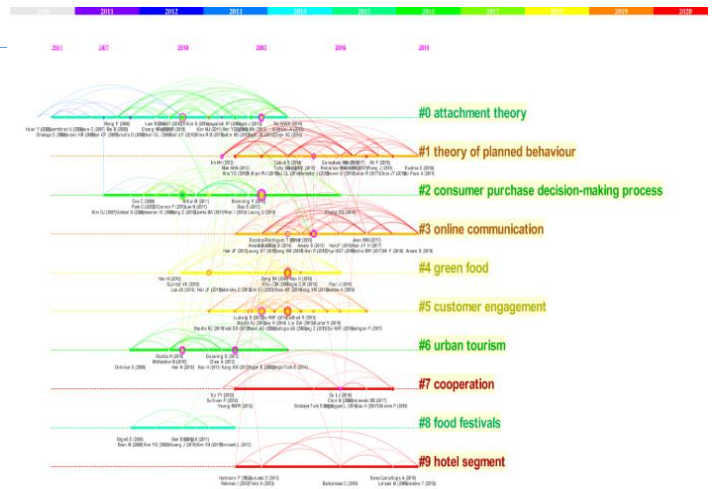


Fig. 15. Reference co-citation timeline analysis.

As the COVID 19 effect the duty-free market obviously, this research is to know the tourism shoppers' buying behavior in duty free, the frontier of the theory of planned behavior, online communication within the purchase decision research area can present what kind of risks the tourism shoppers face now and what kind of factors will affect them to make a decision, so the theory of planned behavior, online communication can be set appropriately as the frontier in this research area.

From co-keywords analysis based on the frequency and centrality in tourism purchase behavior development, the results are nodes 73 and links 315, keywords like the "perception", "tourism", "satisfaction", "quality" and others started in the early year around 2010 according to the fundamental theories support, with the burst point changed from 2012 to 2015, the hot keywords are impact, attitude,

purchase intention, social media, information, motivation and planned behavior. From the year 2016 to 2020, there are main research bursts are word of mouth and behavioral intension. In the year of 2019 until now, the hot keywords and hot research spots develop into travel, retail, cross border e-commerce and personality trait. The figure can be explained in Fig. 16 as bellow:

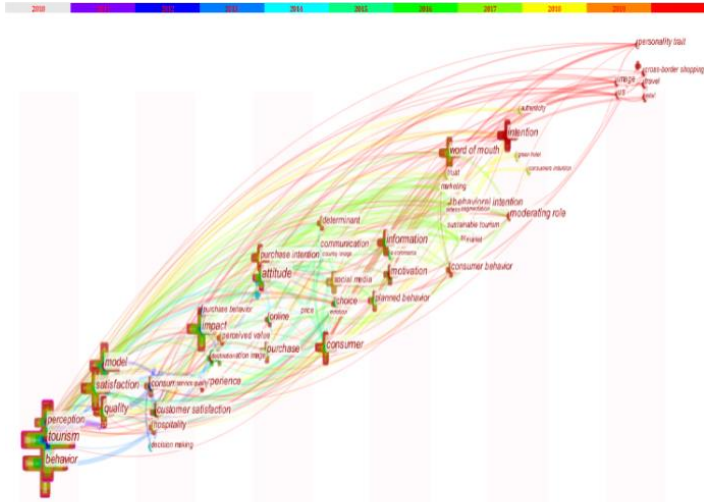


Fig. 16. Co-keywords analysis.

This research is on Asia duty free shops under the tourism retail sale background and related to the cross-border e-commerce as the COVID 19 outbreak, co-keywords analysis proved this research direction is the hot spot at present. So, the research scope can narrow down into tourism planned behavior and online communication under the background of cross-border e-commerce in duty free retail industry. So, the domain knowledge is collected to analyze the tourism shoppers' behavior. So, a questionnaire is urgent to design based on this research result to find out the decision tree nodes and then compose the decision-making model for duty free industry and international tourism shoppers effectively.

## V. CONCLUSION

According to Asia representative tourism purchasing behavior analysis, the research objectives are achieved. The strong point of all research results is from the past core industry reports and high-quality journals, which is based on the past researchers' achievement for the future prediction. Besides, the literature cited in this research is the result of joint experiments and recognition by most experts and scholars in this research field, which is valuable for future work predictions. The weak point of this research is that all the facts and experience was the truth in the past, but the experience and lessons learned from the past are not exactly suitable for the current situation as the reference, especially under the huge impact of COVID-19 on global tourism. The limitation of this research is that data collection can be collected more from tourists to support and prove the results during the epidemic in the future. So, the next step of the research is to design a questionnaire for a further survey based on this research result to provide a new tourism duty free marketing plan and meet the airport shoppers' demand under

the new situation.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## AUTHOR CONTRIBUTIONS

Feng Hui worked on this paper writing and modification, Piang-Or Loahavilai, Nopasit Chakpitak and Tirapot Chandarasupsang are responsible to give a strong supports and effective guidance as the supervisors during the paper publication process. Many thanks to them. All authors had approved the final version.

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**Feng Hui** was born in February 1991, in Sichuan, China. She has two bachelor's degrees in marketing and law from Zhengzhou University of Light Industry, China. She graduated in knowledge management for master's degree from Chiangmai University, Thailand. Now she is a PhD student in the major of big data analysis and financial technology in Chiangmai University. Her research areas are in knowledge management, tourism shopper's behavior, big data analysis and financial technology.

She is a research assistant now in Thailand-China cross border e-commerce project in International College of Digital Innovation, Chiangmai University, Thailand. She has been the Chinese influencer in

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Miss Feng Hui was a recipient of the following awards and scholarships: a). China National Endeavor Scholarship (Certificate No.: 20100120721) in 2014; b). Zhengzhou University of Light Industry outstanding graduates in 2015; c). Full scholarship for doctor of philosophy study in International College of Digital Innovation, Chiangmai University in 2019. She has also published “Marketing talent analysis and development model: A case study bolier fountain company in China” in International Journal of Management and Applied Science (*IJMAS*), Vol. 4, Issue 7, pp. 13-19 in 2018.



**Piang-or Loahavilai** was born in Bangkok, Thailand. Her first degree was in political science. She was a Korean government scholarship fellow and graduated with the M.B.A from Seoul National University in Seoul, Republic of Korea. She continued her Ph.D. in knowledge management at Chiang Mai University in Thailand.

She had worked at a Korean Multinational Enterprise, as semiconductor assembler, for more than 25 years. At present, she turns her career to teach students at the International College of Digital Innovation, Chiang Mai University. She also oversees the sister cities research center at the college. Her field of study are asset management, foreign direct investment, entrepreneurship, digital startup and public policy.

Dr. Piang-or Loahavilai is the president of Global Korean Scholarship (GKS) Alumni, Thailand Chapter and a GKS Publicity Envoy appointed by the Ministry of Education of the Republic of Korea. In 2019, she received a Minister Award from the Ministry of Tourism and Culture of the Republic of Korea for her 500 pieces of publication of Korean related articles and books for 10 years. Currently, she is also a consultant of the Minister's office of the Ministry of Transportation of Thailand.



**Nopasit Chakpitak** was graduated from Chiang Mai University in electrical engineering for bachelor's degree in 1986, Thailand. He received his Ph.D. in electronic and electrical engineering in 2002 from the University of Strathclyde, Scotland. He is a researcher in artificial intelligence, knowledge engineering and management. His knowledge engineering application domains include power industry, asset management and

SMEs clusters.

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