Exploring multi-level factors predicting the role distribution of decision on transportation and destination of family vacations: An East Asian perspective.

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家族休暇に利用する交通手段と目的地の決定における役割分担の予測を可能とする多層式要因の探索的研究–東アジアにおける基礎的研究の視点から

令和４年２月

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Abstract

The topics about decision-making process are critical to family vacation studies. However, typical research suggesting joint-decision style over simplified the settings in decision-making units. Literature identified sociocultural/ideological characteristics, household characteristics and travel characteristics as antecedents for alternative styles of overall or sub-decisions of family vacation. This provides a more comprehensive framework for gaining insight into the relevant phenomena and suggests opportunities for further development.

Of the sub-decisions for family vacation, transportation and destination are mostly basic and important for a family vacation plan because these two issues pertain to risk perception and control of vacation participants. Our purpose is to present models that identifies the relative importance of those determining characteristics in predicting the probability of the father's predominance in transportation decisions and the family's role structure for decision-making about the destination for family vacations.

By investigating 1,016 cases described by senior high school students across four East Asian societies and using exhaustive chi-square automatic identification detector analysis, it was found that the primary source of the family's income was the strongest predictor of the father-determined likelihood of decisions about vacation transportation. In addition, our results revealed that society, which represents people's sociocultural and ideological backgrounds, was the strongest predictor of the likely decision maker (LDM) for decisions about family travel destinations.

Of the categories of LDM of destination, the "father" category was found to be the most acceptable target category for the model when we considered both its cumulative gain and recall rate. In addition, we identified segments that had an above-average probability of the fathers' dominance as decision maker, thus suggesting that the decision tree technique is appropriate for marketers to use in targeting the father-dominant market of travel destinations in East Asia.

Keywords: East Asia, Family vacation decision making (FVDM), Distribution of decision roles (DRD), Decision tree, Likely decision maker (LDM).

概要

　意思決定の過程に関するテーマは家族旅行の研究にとって極めて重要です。しかしながら、共同意思決定スタイルを示唆する一般的かつ典型的な研究では、意思決定の単位を単純化し過ぎている様です。文献によると、社会文化的・イデオロギー的背景、家族の構成、並びに旅行の目的等が、家族旅行の全体的またはサブ的な決定の補完的な先行要因であると断定しております。が、これは関連性のある各種現象を把握するためのより包括的なフレームワークを創出し、更なる発展を示唆していると思量します。

　就中、家族旅行のための「サブの決定」の中、「移動手段と目的地」の事前検討は、家族旅行の計画にとって、多くの場合、基本的かつ重要な要件となります。その理由として、二つ挙げられるでしょう。つまり、一つは「リスクの掌握」であり、他は、「旅行参加者の管理」に深く関与しているからです。

　ところで、本文での目的は、"家族旅行の行き先を決める際に、父親が移動手段の判断について優位に立っている可能性、若しくは、家族の役割的状況を推測する上で、これらの決定特質の相対的な重要性を分析するモデル"を提示することにあります。その結果概要は、以下の通りであります。

　東アジアの４か国で高校生に記入してもらった1016件のケースを調査し、統計学手法の「カイ２乗分布自動識別検出器」を使って徹底的に分析した結果、家族の主な収入源となる父の意思決定が、旅行の移動手段の有力な判断材料である事が解りました。また、人々に係る生活・文化、イデオロギーを背景とした「社会」が、家族旅行にとって、ふさわしい目的地を決める際の意思決定者（LDM）の最も強力な予測因子である事が明らかになりました。更に、国を越えて、最適な意思決定としての、いわゆる「ディシジョンツリー法」に拠ると、「父親が優位にある移動手段の市場」をターゲットにするのが、最も適していることを示唆しました。

　加えて、目的地に係るLDMのカテゴリーの中、累積利益と再現率の両方を考慮した場合、やはり「父親」このモデルに対して最も受け入れ可能な対象カテゴリーであることも解りましたし、父親が意思決定者として優位に立つ可能性が平均以上であるというセグメントも特定化できました。従って、ディシジョンツリー法に基づき、東アジアを旅行先として促すことは、父親の優位な市場としてもターゲット化でき、マーケターにとっても適していることが考えられます。

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1.Introduction

1.1.Background

1.1.1. Motivation

Destination selection is considered to be an indispensable factor in travel decision-making (Bronner & de Hoog, 2011a; 2011b; de Souza et al., 2020; Karl, 2018; Nyman et al., 2018; Spiers, 2017; Stienmetz et al., 2015). For destination marketers, it is particularly important to know the best way to travel for the purpose of vacation and to sell destinations to families, because family-based holidaymakers travel in groups and spend more than individuals (Kang et al., 2003). On the other hand, it is a great challenge to communicate with the specific people who are targeting the family as the target market, because the destination is not attractive to all participants' holiday needs (de Souza et al., 2020). In the topic of family purchase decision, more and more attention is paid to the importance of family decision. At present, there are not many studies on the comparison of young people's family purchase decisions with East Asian countries. However, in the past decade, Taiwan, China, Japan and South Korea among the four East Asian countries have experienced socio-economic and cultural changes. These changes also have a certain impact on the family and its functions. This study examines the differences in family roles affecting family vacation decision-making (hereafter referred to as **FVDM**) items in four East Asian countries. The purpose of this study is to understand the relative influence ability of each factor, and to predict the decision-makers of family vacation destinations, which will be helpful for providing to the suppliers of tourism destinations and transportation. When the main customers are the suppliers and salesmen of family tourism consumers, point out who is the important key object in family tourism decision-making. Therefore, the convenience sampling method was adopted in this study, and the respondents were from the four east Asia societies: young people in high schools in Taiwan, China, Japan and South Korea. The valid questionnaires were 201 in China, 262 in Japan, 268 in South Korea and 285 in Taiwan, with a total of 1,016 questionnaires recovered.

1.1.2. Research Purpose

In the research of Cheng et al. (2019) on the decision-making mode of family choosing holiday destination, it is found that the research on family role structure in the decision-making of family holiday destination puts forward contradictory findings and

discussions. The research by Jenkins (1978) is the first document to discuss the influence of family members on family vacation decisions (Cheng et al., 2019; Jenkins, 1978).

In the present research, few studies have specifically mentioned the role of father in family vacation (Schänzel, H, 2012). Therefore, the factors related to fatherhood can be discussed more, and these factors can explain family tourism from different angles such as gender differences, binary consensus and parental style (Li & Li, 2020). To solve these problems within the overall framework, this part must be studied at multiple levels. In the family decision-making process of choosing tourism products, the cultural and socio-economic background at the social level should be combined with the relevant characteristics of the traveling family at the personal level (Therkelsen, 2010).

According to previous studies, the decision of family vacation was made by both husband and wife (Rojas-de-Gracia & Alarcón-Urbistondo, 2018; Nanda et al., 2007). These studies neglect the role of children in family decision-making, thus oversimplifying other factors in family vacation decision making (Rojas-de-Gracia&Alarcón-Urbistondo, 2018; Kang & Hsu, 2003; Bronner & de Hoog, 2008). Generally speaking, compared with parents' research, children on family vacation received less attention (Carr, 2006; Nanda et al., 2007). However, a complete family vacation decision is usually planned by husband, wife and adolescent children (Chiang et al., 2021). Previous studies only provided limited relative effects of different reasons on distribution of decision roles, few of which were significant, and the results in different studies were inconsistent. This makes the author more interested in trying to explore this problem, and the results of this study can be used as a reference for researchers and practitioners in the field of family vacation.

1.1.3. Research process

Firstly, this study investigates the problems related to family vacation decision-making from a multi-level perspective. And through reviewing a series of classic documents at different levels to understand the summary of distribution of decision roles (hereafter referred to as **DRD**) in family vacation, and using decision tree analysis and Exhaustive Chi-square Automatic Interaction Detector (hereafter referred to as **E-CHAID)** analysis, it is very useful for designing empirical research and forming a method to explain the research results in detail. This method can reduce the complexity

and sensitivity of researchers to their ongoing research, and is suitable for all classification problems, and can use inductive methods to find out the rules of data sources. This study hopes to explore the relationship between multi-level factors in family vacation decision-making by empirical research, and then provide specific suggestions for the operators of related industries to improve their services, and conduct a series of research, analysis and adjustment. After investigation, finally discuss the research results and put forward relevant suggestions for future research.

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│         Literature Review        │
│  1.Family vacation decision      │
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│  2.Family vacation sub-decisions │
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│   Formulate the research questions │
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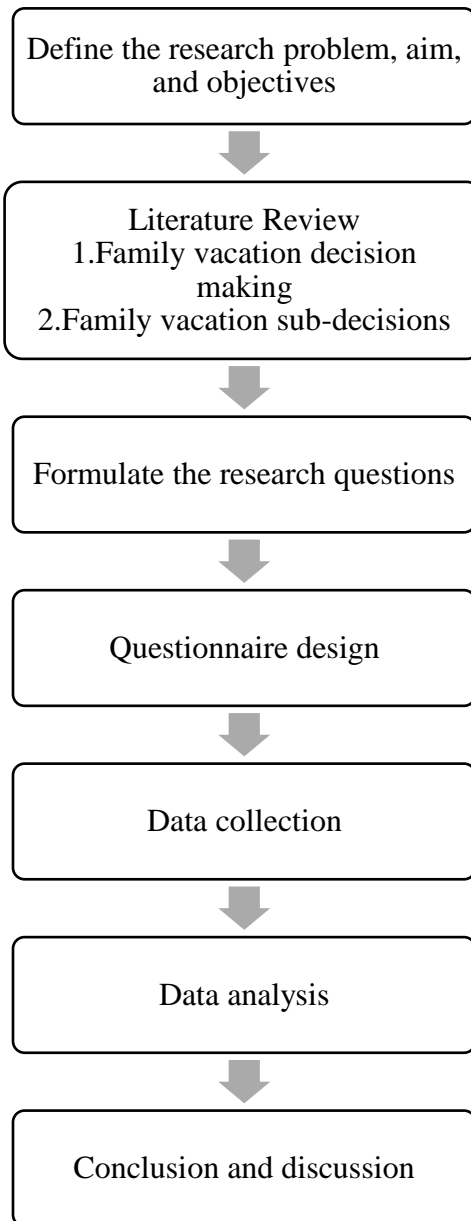
Figure 1. Flow chart of research process

2. Literature Review

2.1. Family role structure for FVDM

In the sphere of family tourism studies, family vacation decision making is a fundamental. The decision making consists of various sub-decisions such as travel destination and transportation arrangement (Jenkins, 1978; Nanda et al., 2007; Kim et al., 2010; Cheng et al., 2019). Typical research suggested that overall, family vacation decisions are made jointly by husband and wife (Rojas-de-Gracia & Alarcón-Urbistondo,2018; Nanda et al., 2007). This locus of research ignored the role of children in family decision making and thus over simplified the settings of decision-making unit of family vacation (Rojas-de-Gracia & Alarcón-Urbistondo,2018; Kang & Hsu, 2003; Bronner & de Hoog, 2008). Overall, compared to spouses, children in family vacations received less research attention (Carr, 2006; Nanda et al., 2007; van Raaij & Francken, 1984). Today's researchers are convinced that a complete decision-making unit of family vacations consists of husband, wife, and adolescent children (Chiang et al., 2021). In this sense, research on the distribution of decision role (DRD) in each sub-decision should consider three categories of decision makers: father, mother, and adolescent.

DRD is the influence of each role of family members on the decision-making process[1]. Most previous studies pointed out that the role of decision-making falls on parents. However, with the changes of the times, children or teenagers in the family gradually have certain influence in the decision-making process, and even parents will change their decisions because of the expectations of children or teenagers.

Previous research provides only limited insight into the relative effects of different antecedents on DRD. Few findings were significant and the results were not consistent across studies (Lan & Su, 2021). This interests the author to try to explore more about this issue and leave the findings and the implications to the researchers of family vacations in the future.

Kang and Hsu (2005) pointed out that previous studies, Family tourism decision-making projects will involve husbands and wives. The decision-making process, however, with the change of the phenomenon of fewer children at present, the decision-making of family travel and vacation may be changed in social and demographic

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[1] See Simon, H. A. (1960) p.3-5; Simon, H. A. (1977) p.55 for more elaborations on decision-making processes.

changes, so it is necessary to re-examine the family decision-making in order to reduce the gap in tourists' behavior literature. Past studies have emphasized the relative influence of husband and wife on purchase results (Wang, Hsieh, Yeh, & Tsai, 2004), while paying less attention to the structure of decision-making roles.

Following multi-level perspective, the issues associated with family vacation decision making are examined first in this study. Some of the essential factors involved in integrating considerations into the decision-making process are highlighted. A summary for understanding DRD in family vacations using the classic literature as the foundation is then proposed. This summary presents a comprehensive view of DRD in overall or sub-decisions of family vacation, which enables researchers to evaluate the association among the specific factors or characteristics simultaneously. This permits greater insight into the family vacation decision-making process. We identify the variables that should be examined and studied by the practitioner or the academician of DRD.

Researchers have studied the participation and influence of family members in family tourism decision-making from various aspects and angles, such as cross cultural methods (Cheng et al, 2019; Khoo-Lattimore et al, 2015; Yen et al, 2020), influencing strategies (Shoham & Dalakas, 2006; Su et al, 2019), parents' types (Darley & Lim,1986; Schänzel & Jenkins, 2017), family types (Holdert & Antonides, 1997; Yang, 2020), social power (Liang, 2013) and children's views (Blichfeldt et al., 2011; Chaudhary & Gupta, 2012). Although there are more and more literatures about the decision-making process of family holidays, However, the research on cross-cultural family tourism decision-making has not attracted enough attention from academic circles.

Our purpose is not to present propositions describing in detail the mechanics of forming a specific decision-making style, but rather to suggest a conceptual overview for DRD in the context of family vacation. This can be useful in designing empirical research and forming an approach for careful research results interpretation that conditions the researcher's sensitivity to the complexities of the phenomena he or she is studying.

2.1.1. DRD in the process of family vacation decisions

On the basis of whole-family methodology, Yeoman and Schänzel (2012) found that the role of father, mother, and children are mutually connected by family power structure and participants' purpose for family travel (see Figure 2). Similarly, various approaches studied the behavior of adolescents that focus on their relative influence (Kozak & Karadag, 2012), possession of power (Liang, 2013), or dominance in relation to other members in family travel decisions (Nanda et al., 2007; Therkelsen, 2010). All these findings suggested that a complete family vacation decision unit should be a nuclear family which consists of father, mother, and adolescent children.

Family members' sub-decisions on specific holidays, Jenkins (1979a) indicated that husbands made decisions on information collection, including whether to take children and which transportation mode to use; As well as what accommodation and destination to choose, and discuss the role of minors (children) and their wives in the whole decision-making process.

Filiatrault and Ritchie (1980) put forward an opposing view. The complexity of family decision-making is different from that of individual decision-making, which is a process of communication and conflict among family members. The relative influence of spouses depends on the existence of children and the income of husbands (Nanda et al., 2007). That is to say, different families will have different degrees of participation in individual decision-making and tourism behavior.

Overall, there are two primary deficiencies in previous research on family members' dominance of family vacation decision-making. First, typical research deemed family vacation purchase as a single-aspect decision. This approach oversimplified family vacation decision-making, which is a process involving multiple aspects of vacation products (Kozak & Karadag, 2012; Kim et al., 2010; Therkelsen, 2010). These sub-decisions are determined before the family leaves home for the destination, that is, in the pre-vacation phase, or between leaving and returning home, that is, in the during-vacation phase (Spiers, 2017). Second, researchers who have discussed family vacation decisions via multiple sub-decisions typically focused on issues determined in either the pre-vacation or the during-vacation phase (Blichfeldt, 2008; Decrop, 2005). Results derived from different phases of these decision processes are less meaningful for comparisons among studies and even lead to misleading generalizations of the dynamics of family vacation decisions.

INFLUENTIAL FACTORS	DECISION UNIT	ROLES	ACTIONS

Characteristics of Vacation Products
- Type of vacation
- Price of vacation
- Distance to destination
- Length of vacation
- Activities involved
- (Benefits sought)

Toward Husband and wife
- Culture and subcultural factors
- Degree of involvement
- Role specialization
- Personal characteristics

Toward children
- Sociodemographic factors
- Type of family(family life cycle)
- Family socialization

ALL

BOTH

Husband

Wife

Children

Gatekeeper

Information Gatherer

Influencer

Decision Maker

Purchaser

User

Recognize vacation Needs and wants

Search Travel Information

Evaluate Travel Alternatives

Decide final choices
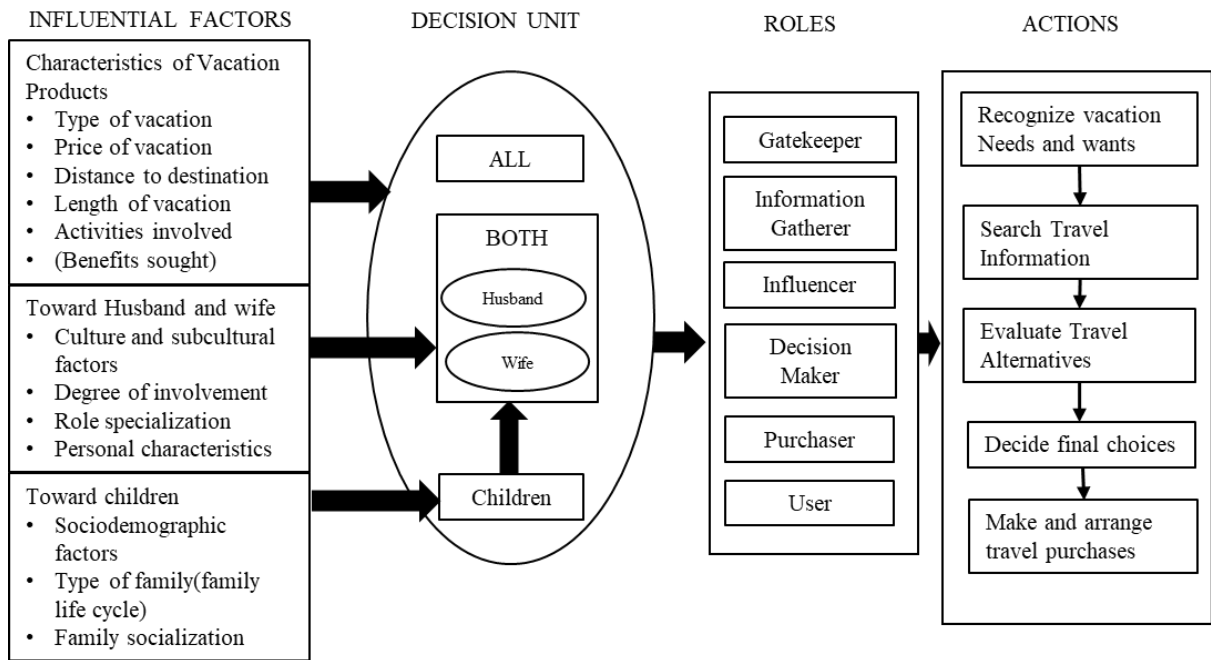
Make and arrange travel purchases

Figure 2. A family decision-making model of vacation purchases (Nanda et al., 2007, p.110)

2.1.2. Decision style of FVDM

Lan and Su (2020) present analogical configuration that converges measurement and judgment rules for the dominance style in married couples into four categories of role taxonomy: husband-dominant, wife-dominant, autonomic (single influence), and joint (Rojas-de-Gracia & Alarcón-Urbistondo, 2018), so that the features that distinguish the three categories of family influence patterns (i.e., husband-dominant, wife-dominant, or joint) are clarified in terms of their corresponding approaches, measurement, and rules for judgment (See Figure 3).

Meanwhile, another research perspective has focused on family vacations with children and has extended the participants of joint decision making to include the children (Kim et al., 2010). Cheng and colleagues (2019) further divided this husband-wife-child style of decision making into "autonomic decisions" and "collective decisions," according to the level of responsibility shared by the husband, wife, and child(ren). Following the approach we proposed in Figure 3, an analogical configuration Figure 4 emerged. That configuration bridges the measurement and judgment rules for family dominance styles and family influence patterns into four role categories (father-dominant, mother-dominant, autonomic, and collective) and three role categories (husband-dominant, wife-dominant, and joint). (See Figure 4).

Measurement (Likert scale)	Rule (Feasibility triangle)		Dominance style (Rojas-de-Gracia & Alarcón-Urbistondo, 2018)		Influence pattern (cf. Nanda et al., 2007)	Approach I (Bronner & de Hoog, 2008; Hsu & Kang, 2003; Kang et al., 2003; Jenkins, 1978; Rojas-de-Gracia & Alarcón-Urbistondo, 2019)		Approach II (Ritchie & Filiatrault, 1980; Wang et al., 2007; Wang et al., 2004)	
	Relative influence	Responsibility sharing %				Rule	Measurement (Nominal scale)	Rule (judged by the statistical significance of the score differences between spouses)	Measurement (100-point constant sum scale/Likert scale reflecting agent's influence level)
1 = Husband; 2 = Joint; 3 = Wife.	< 1.5	--	Husband-dominant		Husband-dominant	H	H = Husband has more influence than wife; W = Wife has more influence than husband; J = Equal husband/wife.	Husband > Wife	Husband's influence; Wife's influence.
	> 2.5	--	Wife-dominant		Wife-dominant	W		Wife > Husband	
	> 1.5 and < 2.5	< 50	Autonomous (single influence)		Joint (Husband-Wife)	J		Husband = Wife	
	--	> 50	Joint (Husband-Wife)						

Figure 3. Conceptualization and measurement of the husband-wife styles for determining the FVDM

Measurement (Likert scale)	Rule (Feasibility triangle)		Dominance style *(Cheng et al., 2019)*	Influence pattern *(Kim et al., 2010)*	Rule (judged by the statistical significance of the score differences among categories)	Measurement (Likert scale reflecting how the respondents disagree-to-agree existence of each decision-making style)
	Relative influence	Responsibility sharing %				
1 = Mother alone; 2 = Other; 3 = Father alone.	> 2.5	--	Father-dominant	Husband-dominant	Husband > Joint, Wife	Husband-dominant decision making; Wife-dominant decision making; Joint (Husband-Wife-Child) decision making.
	< 1.5	--	Mother-dominant	Wife-dominant	Wife > Joint, Husband	
	> 1.5 and < 2.5	< 50	Autonomous (single influence)	Joint (Husband-Wife-Child)	Joint > Husband, Wife	
	--	> 50	Collective (Father-Mother-Child)			

Figure 4. Conceptualization and measurement of the husband-wife-child styles for determining the FVDM

2.1.3. Globalization and DRD in of family vacation decisions

The fundamental assertion of the more comprehensive framework presented here is that a family vacation decision is a dynamic process carried out by individuals, in interaction with other people in a household, in the context of a culture or country. Several key factors found in this article may facilitate understanding and developing this perspective (See Table 1).

Family vacation decision are three primary categories of influential factors on DRD in terms of their level. They are (1) sociocultural/ideological characteristics, (2) household characteristics, (3) travel characteristics. They are"Domestic /Foreign vacation"(Nanda et al., 2007),"Duration of the trip, in day"(Kang et al., 2003; Nanda et al., 2007,"Travel group size" (Kang et al., 2003; Nanda et al., 2007),"Number of child in family"(Bronner & de Hoog, 2008; Filiatrault & Ritchie, 1980; Nanda et al., 2007; Spiers, 2017),"Main financial source of the family"(Filiatrault & Ritchie, 1980; Nanda et al., 2007),"Current stage in family life cycle"(Backer, 2012),"Highest educational level of household head"(Kim et al., 2010; Nanda et al., 2007; Schänzel & Yeoman, 2014; Yeoman et al., 2012) ,"Occupation of household head."(Kim et al., 2010; Schänzel & Yeoman, 2014).

Table 1. Summary of determinants of DRD

Characteristic	Sociocultural characteristic	Household characteristic					Travel characteristic		
	Country/culture Cultural dimension Technology Development	Number of child in family	Main financial source of the family	Current stage in family life cycle	Highest educational level of household head	Occupation of household head	Duration of the trip, in day	Travel group size	Status of travel
Wang et al.(2004)		√	√	√	√	√	√	√	√
Jenkins(1978)							√		√
Bronner & de Hoog(2008)		√					√	√	√
Filiatrault &Ritchie(1980)		√	√						
Nanda et al.(2007)	√	√	√		√		√	√	√
Backer(2012)				√					
Cheng et al.(2019)	√	√	√	√			√	√	√
Kim et al.(2010)					√	√			
Schanzel & Yeoman(2014)					√	√			
Yeoman et al.(2012)					√				
Kang et al.(2003)								√	√
Li, et al.(2020)				√			√		√
Yi & Wu(2020)				√					√
Belch & Belch(1985)							√		√
Spiers(2017)		√							
Yen et al.(2020)	√								

In globalizing business environments, all issues of human life should be addressed in an integrated view of systems (Kabasakal et al., 2012). How social and cultural context shapes the process of family vacation decisions may account for inconsistent findings in the endeavour to clarify the distribution of spousal decision roles (Hofstede 2001; Nanda et al., 2007). To obtain results with cross-societal validity, a research design which investigates societies from well-defined cultural regions of the world is needed to construct a globalized sampling frame (Gupta

et al., 2002). Moreover, in the practices of marketing family travel products, there has not been a globalized segmentation of societies and phases of the decision process based on parents' role distribution in family decision-making. Mapping profiles of segments globally to identify target markets is not only an imperative for international tourism business but also offers a remarkable payoff for planning the marketing of tourism products.

2.1.4. Linear categories of influential factors on DRD

Yeoman & Schänzel (2012) proposed a general model of family vacation decision-making (see Figure 5) which has been widely used for empirical research and model extension. The influential factors of decision unit are categorized into "characteristics of vacation products", "toward husband and wife", and "toward children". This classification failed to incorporate societal or cultural features which are emphasized by research in globalizing trend. In addition, this list did not distinguish these factors in term of the level they are at, which failed to guide researcher to take into account the effect of the influential factors in order.
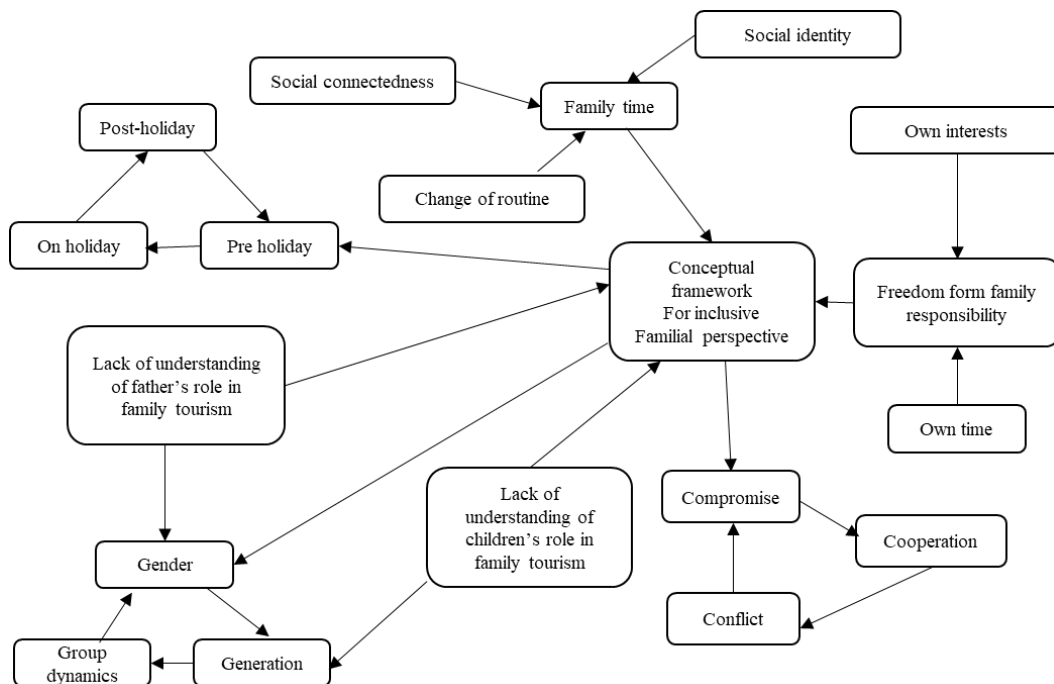

Figure 5. Conceptual map of inclusion of fathers, children and the whole family group (Yeoman & Schänzel, 2012, p.180)

2.1.5. Reorganizing influential factors on DRD in multi-level perspective

The fundamental assertion of the more comprehensive framework presented here is that a family vacation decision is a dynamic process carried out by individuals, in interaction with other people in a household, in the context of a culture or country. While it is beyond the scope of this paper to review in detail all of the works listed below, several key factors found in this article may facilitate understanding and developing this perspective. There are three primary categories of influential factors on DRD in terms of their level. They are (1) sociocultural/ideological characteristics – country/culture, cultural dimension, technology, development; (2) household characteristics - number of children in family, main financial source of the family, current stage in family life cycle, highest educational level of household head, occupation of household head; and (3) travel characteristics - status of travel, duration of the trip, travel group size. For countries which share similar historical, geopolitical, and geographical features, their sociocultural and ideological differences could lead to variations in DRD about family vacation (Hofstede et al., 2010; Su & Wang, 2010). Cultural and socioeconomic characteristics should be taken into consideration with travel- and household-related characteristics when we are exploring the DRD for family vacations (Cheng et al., 2019; Yang et al., 2020).

2.2. FVDM's sub-decisions

Insights into the consumption behaviors of family tourists, such as their destination decision making, underlie the development of family-focused strategies for destination marketing (e.g., Baptista & Matos, 2018). From among the possible perspectives for studies on destination decisions about family vacations, the decision-making roles and interpersonal influence of the family members have won academic attention (e.g., Tagg & Seaton, 1995).

On the other hand, previous research identified 15 sub-decisions which are included in overall family vacation decision-making. They are (1) time frame; (2) number of places to visit; (3) length of stay; (4) with own family or with others; (5) travel budget; (6) quiet surroundings versus lively ones; (7) destination; (8) sun-beach-water or not; (9) means of transportation; (10) having an active vacation or not; (11) accommodations; (12) doing cultural activities or not; (13) organization; (14) child-friendly or not; and (15) meeting others or not (Jenkins, 1978; Bronner & de Hoog, 2008). Previous suggested that the decision-making style of family vacation varied by sub-decisions (Bronner & de Hoog, 2008; Cheng et al., 2019; Chiang et al., 2021) because participants have competing needs and preference for each sub-decision (de Souza et al., 2020). In general, participants' involvement with the sub-decision shaped the DRD on each sub-decision and findings on the DRD are not comparable across sub-decisions.

Table 2. FVDM's sub-decisions

Sub-decision	Time frame	Number of places to visit	Length of stay	With own family or with others	Travel budget	Quiet surroundings versus lively ones	Destination	Sun-beach-water or not	Means of transportation	Having an active vacation	Accommodations	Doing cultural activities or not	Organization	Child-friendly or not	Meeting others or not
Jenkins,1978		√	√	√			√		√		√	√			
Nanda et al., 2007				√	√		√		√		√				
Ritchie & Filiatrault ,1980							√		√						
Bronner & de Hoog, 2011b							√		√						
Kang et al., 2003				√			√								
Bronner & de Hoog, 2008	√	√	√	√	√	√	√	√	√	√	√	√		√	√
Kim et al.,2010			√		√				√						
Rojas-de-Gracia & Alarcón-Urbistondo, 2018			√				√		√		√				
Rojas-de-Gracia & Alarcón-Urbistondo, 2019			√				√				√				
Cheng et al., 2019	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Spiers, 2017			√	√	√		√			√	√	√	√	√	

Transportation is considered to be an indispensable aspect of family tourism because participants' perceived risk of transport arrangements strongly affects their regard for travel information (Maser & Weiermair,1998). Wang et al. (2004) study in Taiwan found that the father and mother decided the means of transportation for family tours jointly, which agrees with the findings of a recent study in Spain (Rojasr-de-Gracia et al., 2008) and Croatia (Srnec et al., 2016). Similar additional research results have supported a general argument that family vacation decisions are made jointly by the father and mother (Jenkins,1978; Koc, 2004; Nanda, 2007).

2.2.1. Transportation

Transportation is an indispensable element of family tourism products. Cheng et al (2019) thinks that family decision-making on transportation is an important issue in family tourism research, but there are differences in the existing research on the role of fathers in family transportation decision-making. A study conducted by Wang, Hsieh, Yeh and Tsai (2004) in Taiwan found that parents jointly decided the means of transport for family travel, which was consistent with the Spanish study (Rojas-de-Gracia &Alarcón-Urbistondo,2018).

Other similar research results also support the general argument that the decision of family vacation is made by parents (Jenkins, 1978; Nanda, Hu, & Bai, 2007). However, the evidence of Kim, Choi, Agrusa, Wang and Kim (2010) in South Korea concluded that father is usually the main decision-maker of transportation-related activities, thus supporting the overall style of family tourism decision-making in South Korea (Yang, Khoo-Lattimore &Yang, 2020). They found that Korean fathers played a dominant role in the decision-making of transportation arrangements for family vacations (Bronner & de Hoog, 2008). Cheng et al (2019) confirmed that the father's dominant position in determining the mode of transportation for family vacation covers 25 societies. The contradiction of these research results can be attributed to the different mechanism of research design.

2.2.2. Destination

Destination selection is considered to be an indispensable element of travel decision (Bronner & de Hoog, 2011a; 2011b; de Souza et al, 2020; Karl, 2018; Nyman et al, 2018; Spiers, 2017; Stienmetz et al, 2015). The role structure of travel destination decision is more important than other sub-decisions, because the destination decision itself is closely related to the overall satisfaction of each participant in family vacation (Bronner & De Hoog, 2008; 2011a), and affects the activities that family members can participate in at the destination.

With regard to the existing family vacation destination decision-making, it can be said that the current research is insufficient and the research results are contradictory. The analytical concepts and research mechanisms used in previous studies are inconsistent, which makes these research results incomparable (Tagg & Seaton, 1995). In addition, previous studies did not take into account: Factors related to decision making, participants participating in decision-making, and the relative influence of these factors and personnel lead to inconsistent results without controlling factors (Nanda, 2007).

Can the research results obtained from a single cultural background be applied to other

cultural backgrounds? The answer is yet to be verified. That is to say, if the research on family vacation obtained in western countries is applied to East Asian countries, it may not get the same research results, so the purpose of this study is to conduct research and analysis through four East Asian countries. To verify whether there will be differences between different cultures in East Asia and family vacation studies in western countries or the same.

2.2.3. An overview of a framework

The foregoing discussion indicates that the notion of DRD in family vacation is a more sophisticated phenomenon than the current literature suggests. In summary, the current research findings provide some important insights into the effective use of influential factors at different levels by tourism marketers to predict DRD in specific sub-decision. However, additional research is needed to verify and extend these findings through a comprehensive framework. Our framework portrays these factors as mutually existing in real systems. This study, when assessed beyond perceptual bias, has important implications for practice and research.

Integrating the influence literature led to the identification of four groups of variables composing a broader framework for analyzing DRD in sub-decisions of family vacation. As shown in , each group represents a construct of the variables that is critical to the model explaining the associations among the determinants and consequences of DRD. These factors are travel-related factors, as the direct antecedents, household-related factors reflecting the decision units' settings, sociocultural/ideological factors that shape the behavioral orientation and communication norms of a country/culture, and the manifest DRD in each sub-decision. The results from this study are generally discussed by the relevant literature.
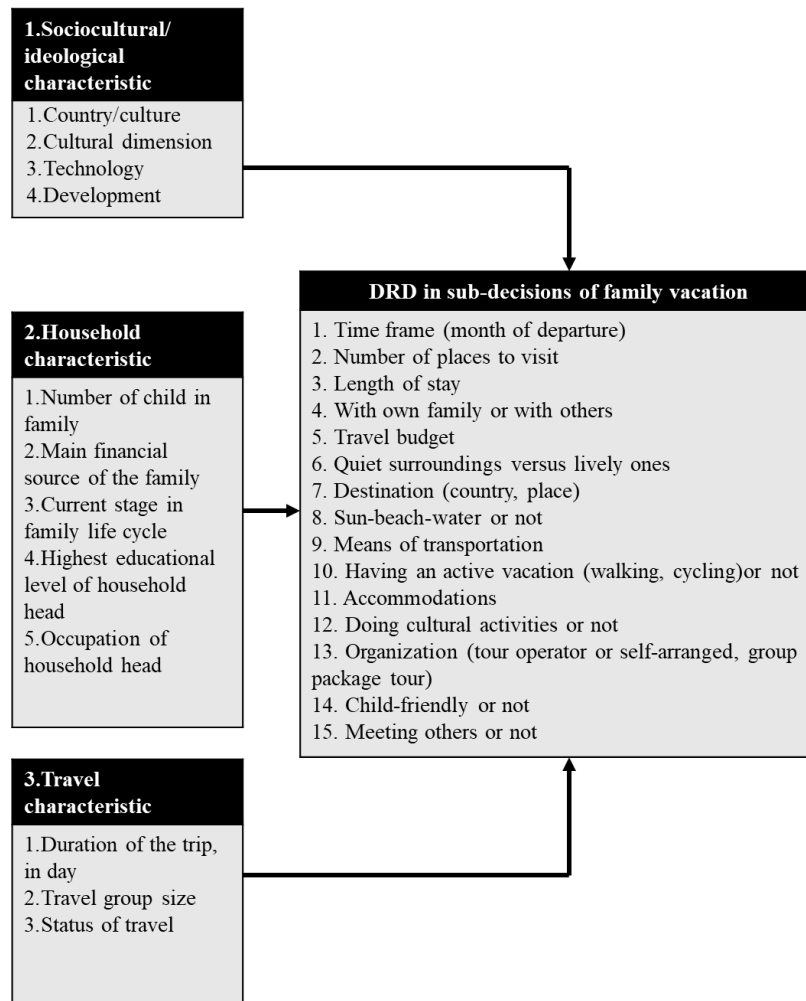
Figure 6. Integrated framework of DRD in family vacation

2.3. Crossvergence across East Asia and family vacation decisions

The concept of East Asia is also termed interchangeably as Confucian Asia in cross-societal studies, because societies of this cluster share Confucianism as a primary source of sociocultural influence on the formation of values (Gupta, et al., 2002) Harmony is the underlying value of the Confucian family, school, and workplace. To maintain harmony, family norms stress the division of roles in the husband–wife relationship, filial piety in the parent–child relationship, and unequal priority between sibling (Hofstede et al, 2010; Park & Chesla, 2007). Regardless of the value system that has evolved across East Asian societies through distinctive historical backgrounds and societal ideology, Confucianism has been widely used in analytical frameworks for research on issues of the Asian family (Park & Chesla, 2007; Su & Wang, 2010) including family vacation decision-making (Yang, et al., 2020; Wu, 2016). According to Confucian tradition, which emphasizes family-based interpersonal relationships

in terms of communication and behavioral norms, clearly defined roles emerge for individuals in the family decision-making process.

At the societal level, individuals' behavioral variations across societal contexts can be explained by society's common value system, which is influenced by two different categories of antecedents: culture and ideology. The two kinds of factors are advocated by convergence and divergence theories, respectively[2] (Ralston, 2008; Reisinger, et al, 2010).

Societal-convergence theory contests that a society's values are conditioned entirely by an ideological drive, such as the use of technology, the governance system, or the developmental orientation, and that ideological drive furnishes a shared logic with which to shape similar norms. Conversely, the societal-divergence theory argues that individual-level values with respect to culture are preserved over time, regardless of changes in economy and technology (Budhwar et al., 2016; Dunphy, 1987; Guo, 2015; Ricks et al., 1990).

Recently, the perspective of multilevel crossvergence, which entails societal-level divergence by culture and convergence by ideology, and individual-level characteristics (Ralston et al, 2009), has been introduced in an elaboration of family purchase decision-making under down-to-earth circumstances (Su & Wang, 2010; Su, 2011). The multilevel crossvergence perspective was developed from the crossvergence theory (Ralston, et al,1993) and forms the foundation for reference frameworks in cross-societal-context research. In response to that trend, it is worthwhile to extend the crossvergence perspective into family purchase decisions in order to take into account a multilevel theoretical foundation of societal backgrounds, such as sociocultural and ideological influences, and individuals' features, on the formation of family vacation decision-making.

We focused our study on four Eastern Asian societies: those of China, Japan, South Korea, and Taiwan. These four societies share similar historical, geopolitical, and geographical features but differ in their cultures and their development ideologies (Yang et al., 2020; Gupta, et al., 2002; Hofstede et al., 2010; Su & Wang, 2010; Xu & Song, 2000) In fact, their sociocultural and ideological differences could lead to significant variations in their Father-Determined Likelihood (hereafter referred to as **FDL**) of decisions about family vacation transportation. Furthermore, we argue against an assumption that all East Asian consumers operate from shared similarities. Cultural and socioeconomic characteristics should be taken into consideration with travel- and household-related characteristics when one is trying to understand the roles that fathers play in deciding transport means for family vacations. Indeed,

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[2] See Ralston, D. A. (2008). p.27-p40 for more elaborations on crossvergence theory.

we believe that the region's diversity is well represented by the four societies we selected to represent East Asia. Our study was innovative and should serve as groundwork for further studies on the FDL of transportation decisions for family travels in East Asia.

In summary, we proposed the research framework Figure 7 which incorporated predictors and decision items for our study.
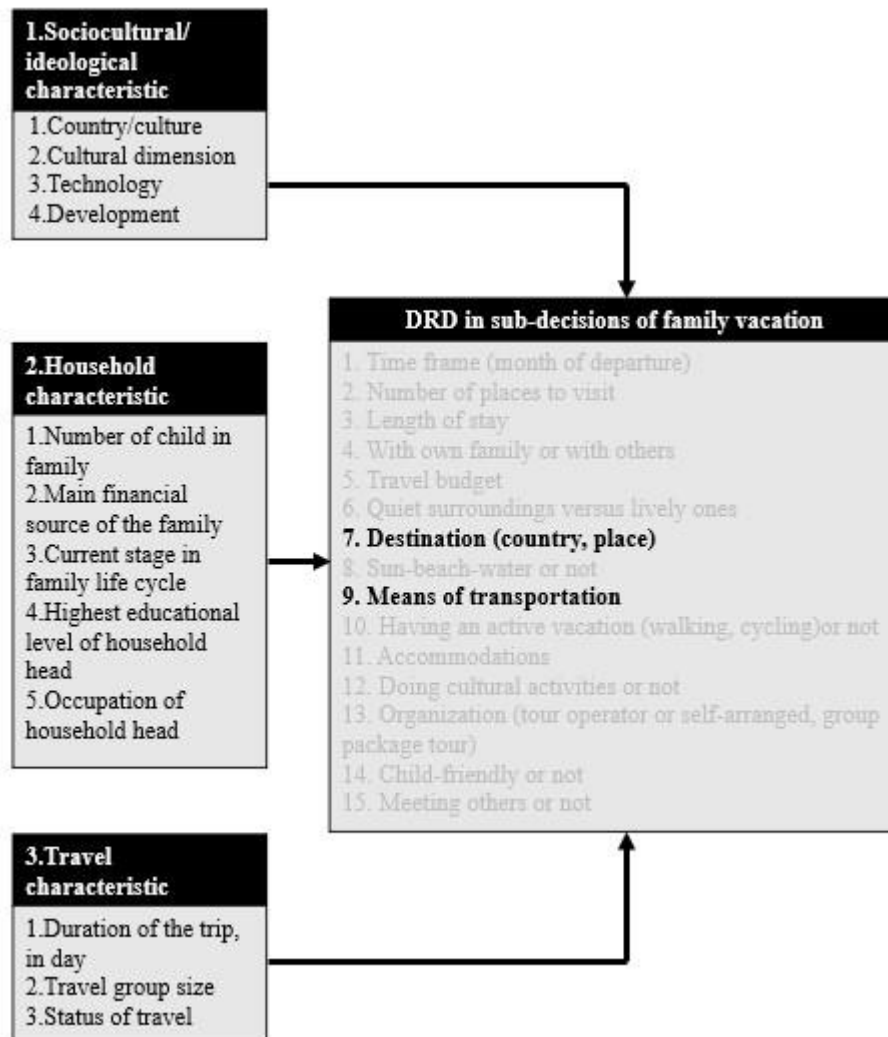
1.Sociocultural/ ideological characteristic
1.Country/culture
2.Cultural dimension
3.Technology
4.Development

DRD in sub-decisions of family vacation
1. Time frame (month of departure)
2. Number of places to visit
3. Length of stay
4. With own family or with others
5. Travel budget
6. Quiet surroundings versus lively ones
7. Destination (country, place)
8. Sun-beach-water or not
9. Means of transportation
10. Having an active vacation (walking, cycling)or not
11. Accommodations
12. Doing cultural activities or not
13. Organization (tour operator or self-arranged, group package tour)
14. Child-friendly or not
15. Meeting others or not

2.Household characteristic
1.Number of child in family
2.Main financial source of the family
3.Current stage in family life cycle
4.Highest educational level of household head
5.Occupation of household head

3.Travel characteristic
1.Duration of the trip, in day
2.Travel group size
3.Status of travel

Figure 7. Research framework

2.4. Application of the decision tree methods in tourism studies

A decision tree is a powerful approach for classification, prediction, interpretation, and data manipulation, and it has been used widely in behavioral research. For research designs, the application of a decision tree has two advantages that address the interpretability of results and the quality of data (Lin & Fan, 2019; Song & Lu, 2015). First, decision tree models simplify complex dependence relationships by dividing cases into distinctive subgroups, thus providing outputs that are clear to interpret. Second, a decision tree is a nonparametric approach without distributional assumptions. It needs no imputation to react to missing values and no transformation to respond to heavily skewed data. In addition, a decision tree is robust to outliers. The commonly used algorithms of a decision tree that are available in software are the Chi-square Automatic Interaction Detector (hereafter referred to as CHAID), the Classification and Regression Tree (CART), and the Quick, Unbiased, Efficient Statistical Tree (QUEST). In sum, these algorithms are distinctive in terms of their variable type, node splitting, tree pruning, and splitting rules (Lin & Fan, 2019; Song & Lu, 2015).

3.Research methods
3.1. Measure

We measured our dependent variable, the Father-Determined Likelihood (hereafter referred to as **FDL**) of transportation means, by rating it on a binary scale: 1 = yes (i.e., by the father alone), 2 = no (i.e., not (just) the father). Table 3 summarizes the condition variables suggested by our literature review, with three types of conditions used for the E-CHAID analysis, and their description and corresponding categories. They are (a) sociocultural/ideological characteristics—society (with **SOC** categorizing each case into China, Japan, South Korea, and Taiwan); (b) travel characteristics—status of travel (with **STA** categorizing each case into domestic vacation or foreign vacation), duration of the trip, by number of days (with **DUR** categorizing each case into 1~2 days, 3 days, or 4 or more days), and travel group size (with **GS** categorizing cases into 2~3 group members, 4 group members, or 5 or more group members); and (c) household characteristics—the number of children in the family (with **CN** categorizing each case into 1, 2, or 3 or more children) and the family's primary source of income (with **INC** categorizing each case into both parents, the father, the mother, or others). In addition, we investigated the respondents' demographics (i.e., gender, age, current stage of the family's life cycle, the highest educational level of the head of the household, and the occupation of the head of the household). We produced our original questionnaire in English and then used standard back-translation procedures to convert the questionnaire into each surveyed society's official language.

Table 3. Factors conditioning father-others predominance in deciding transportation for family travel

Label and source	Description	Category
Sociocultural/ideological characteristics		
SOC (Cheng et al., 2019)	society	(1) China, (2) Japan, (3) South Korea, (4) Taiwan
Travel characteristics		
STA (Nanda et al., 2007)	status of travel	(1) domestic vacation, (2) foreign vacation
DUR (Nanda et al., 2007)	duration of the trip, in days	(1) 1~2, (2) 3, (3) 4 or more
GS (Kang et al., 2003; Nanda et al., 2007)	travel group size	(1) 2~3, (2) 4, (3) 5 or more
Household characteristics		
CN (Bronner & de Hoog, 2008; Filiatrault & Ritchie, 1980; Nanda et al., 2007; Spiers, 2017)	number of children in family	(1) 1, (2) 2, (3) 3 or more
INC (Filiatrault & Ritchie, 1980; Nanda et al., 2007)	main source of income for family	(1) both parents, (2) father, (3) mother, (4) others

The scope of the study is high school teenagers aged 16-19 in Taiwan, China, Japan and Korea. It is equivalent to the students from Grade 1 to Grade 3 in senior high school and has participated in family vacation tourists in the past year. The respondent's family can be a single parent or two parents, and there is no limit on the number of brothers and sisters in the family. Respondents were asked to recall the family vacation decisions and their participation in the past year.

Respondents need to answer their age, gender, number of child in family, main financial source of the family, occupation of household head, highest educational level of household head.
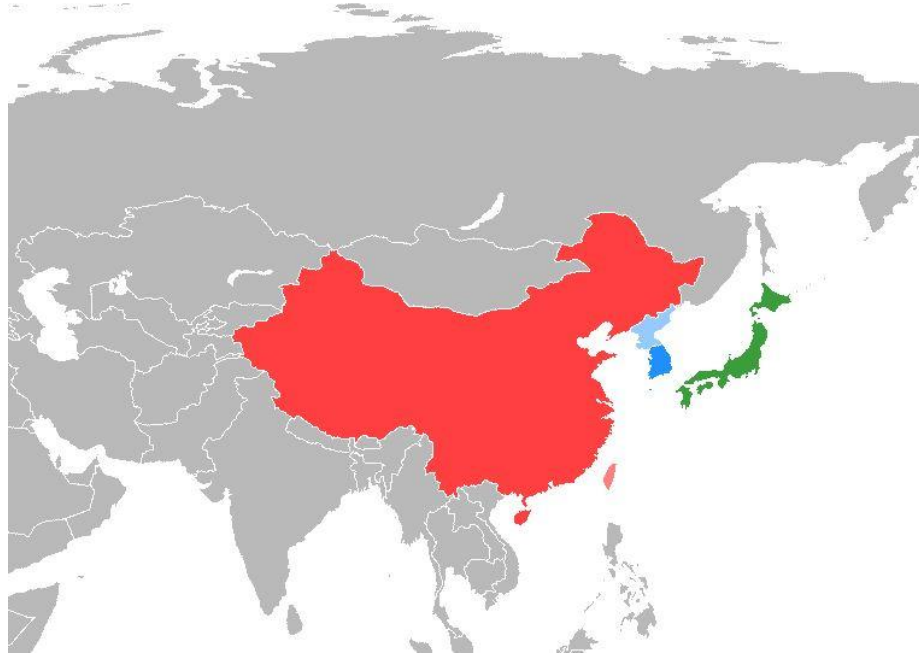
Figure 8. Field of research

3.1.1. Decision tree

It belongs to one of the classification methods in data mining technology of decision tree, which automatically classifies data according to the segmentation conditions of algorithm and expresses it in the form of tree diagram. It is suitable for all classification problems, and finds out the rules of data sources by inductive method. In use, this model can be used to analyze existing data, and it can also be used to predict future data. It can construct a clear and easy-tounder stand decision-making model, and has the ability to simplify complex decision making and judgment procedures, and provide easy-to-explain answers to questions (Safavian & Landgrebe, 1991).

A decision tree is a powerful approach for classification, prediction, interpretation and data manipulation and it has been used widely in behavioral research. For research designs, the application of a decision tree has two advantages that address the interpretability of results and the quality of data (Lin & Fan, 2019; Song Lu, 2015). First, decision tree models simplify complex dependence relationships by dividing cases into distinctive subgroups, thus providing outputs that are clear to interpret. Second, a decision tree is a nonparametric approach without distributional assumptions. It needs no imputation to react to missing values and no transformation to respond to heavily skewed data. In addition, a decision tree is robust to outliers. The commonly used algorithms of a decision tree that are available in software are the Chi-square Automatic Interaction Detector (CHAID), the Classification and Regression Tree (CART) and the Quick, Unbiased, Efficient Statistical Tree (QUEST). In sum, these algorithms

are distinctive in terms of their variable type, node splitting, tree pruning and splitting rules (Lin & Fan, 2019; Song & Lu, 2015).

Decision trees have the following advantages: (1) Can produce easy-to-understand rules; (2) Excellent performance in the rule-oriented field; (3) Classification is fast and simple; (4) Class and continuous variables can be processed simultaneously; (5) Find out the important variables.

3.1.2. E-CHAID

In general, empirical comparisons have suggested that CHAID-based models have been evaluated to be stably preferable to CART and QUEST (Lin & Fan, 2019; Chou, 2012; Jan, 2018; Sut & Simsek, 2011). Moreover, the CHAID algorithm has been widely used to explore favourable segments of tourism market (Hsu & Kang, 2007), profiles of tourist choice behaviors (Bargeman, Joh, Timmermans, van, 1999), tourist satisfaction (Rojas-de-Gracia & Alarcón-Urbistondo, 2019). The basic CHAID algorithm has also been modified as the Exhaustive CHAID (E-CHAID), which performs a more thorough merging and testing of predictor variables. The remedies make E-CHAID an advantageous technique for tourism research. Even the use of CHAID-based algorithms contributes to tourist behavior research, but no empirical study has heretofore attempted to use decision tree analyses to explore the FDL of family vacation issues. Moreover, typical decision-tree research on tourist or travel behaviors rarely incorporates cultural factors into the model. Rules resulting from a single society tend to lack generalizable implications (Ramaswami & Bhaskaran, 2010).

CHAID analysis technique (Kass, 1980) is an analysis method in which all predicted variables are monotonous (Magidson, 1994), which can be used to find the target market. Because of the importance and popularity of marketing and the increase of marketing database, more advanced analysis methods are needed to find the target market(Baron & Phillips,1994；Wyner, 1995). To solve this necessity, CHAID analysis was developed by Kass (1980).

Furthermore Magidson (1994) is a popular research tool for different disciplines, including consumer marketing (Baron & Phillips,1994; Riquier & Luxton & Sharp, 1997), direct marketing (Elsner, Krafft & Huchzermeier, 2003; Schellinck & Groves, 2002), destination marketing (Casas, 2003), education (Grobler,et al,2002) and game (Welte et al., 2004). In the CHAID algorithm proposed by Kass(1980), it is mainly used to calculate the dependence variables among factors.

CHAID analysis is a sensitive and intuitive subdivision method. According to the

relationship between the basic variables and the dependent variables, the respondents are divided into several groups, and then each group is divided into different groups. The dependent variables are usually some key indicators, such as use level, purchase intention, etc. The tree diagram will be displayed after each analysis operation. At the top of the tree is a collection of all the respondents, and at the bottom of the tree is two or more branch subsets. The special feature of CHAID analysis is that the classification is based on the classification of a dependent variable, and the categories of various subtle degree of difference dependent variables are changeable, and the categories with close and low correlation are merged, and the remaining categories will be analyzed repeatedly until the difference is no longer significant.

CHAID analysis allows the development of prediction models, the screening of irrelevant prediction variables and the generation of easy-to-read charts, which can mutually identify the unique parts of people with similar characteristics (Levin & Zahavi 2001; Magidson, 1994). CHAID analysis is very common in data analysis (Mistikoglu et al., 2015). However, CHAID algorithm cannot handle continuous data. Therefore, data must be converted into classification variables. Original numerical variables can be replaced by large, medium and small categories.

In the field of sightseeing, it is rare to use CHAID analysis for subdivision research, and the related tourism literature is inferior to other common analysis tools (Bargeman, Joh, Timmermans & van der Waerden, 1999; Chen 2003a, 2003b; van Middelkoop, Borgers & Timmermans, 2003; Welte et al., 2004). Bargeman et al. (1999) examined the relationship between vacation choice behavior and socio-economic variables, and classified the respondents into homogeneous clusters using CHAID analysis in the following ways. The research results of Middelkoop et al. (2003) confirmed that CHAID analysis has a detailed transportation mode selection method, which can be used to understand tourists' choice behavior more accurately. Chen (2003a) used CHAID technology to subdivide college students' spring vacation decision, which resulted in four parts (two of which were marked as operable and the other two were inoperable). The comparison between these two parts is a series of supplementary analysis, including Chi-square, logit analysis and variance analysis.

The results show that CHAID will be a useful tool for analysis in the field of tourism research. Chen (2003b) also used CHAID analysis to determine operable market segments, which was based on the possibility of tourists making positive comments about destinations, and analyzed each market segment according to population and travel characteristics. Destination satisfaction, pricing and timeliness are the three key factors that affect respondents' destination recommendation. In these two studies (Chen 2003a, 2003b), he used the percentile

score as the cut-off point to determine whether the resulting market segment is operable. An index score of 100 or above is considered as an operable market; Low index score. The market segment in 100 is an inoperable market.

3.1.3. Sample and procedures

Bronner and de Hoog (2008) suggested that parents tended to report family decisions as being made more jointly than they actually are, and also that there is a need for researchers to include children's opinions. To ensure that the children to be interviewed have sufficient cognitive ability to realize and express their experience, adolescents who overall are psychologically developed are preferred over younger children as respondents (Su et al., 2019; Yen et al., 2020). We followed Beatty and Talpade's (1994) design, which defines an adolescent as any person aged 16 to 19 (Carr, 2006; Su, 2011; Su & Wang, 2010; Su et al., 2019; Yen et al., 2020). A self-administered questionnaire was distributed to adolescents in three senior high schools (equivalent to 10th to 12th grade of the US system) in each of China, Japan, South Korea, and Taiwan. The administrative areas incorporated were Guangzhou and Zhuhai in China; Osaka City and Wakayama City in Japan; Taoyuan City and Taipei in Taiwan; and Seoul and Busan in South Korea. As such, we collected 1,016 usable responses from our four East Asia societies: China (n = 201), Japan (n = 262), South Korea (n = 268), and Taiwan (n = 285). Seventy percent of the participating adolescents were female, and most (87.4%) were currently living with both parents. In addition, our sampling criteria confined the age range of the participants (mean = 16.43 years, standard deviation = 0.91) and thus attempted to avoid any significant variations in the family experience that would be explained by the adolescent respondents' age-related transitions in decision-making competence (Nanda, et al., 2007). The participants were asked to recall a family decision that had included them and that had been about a vacation during the previous year. They were then asked to report on the role distribution, within their cohabiting family, for making the decision about the vacation destination.

Table 4 lists the background profiles of the cases surveyed, based on characteristics that have potential to predict the Likely decision maker (hereafter referred to as **LDM**) for vacation destinations. Overall, the majority of the cases came from a double-income family (68.6%) in which there were two children (47.5%), with a head of household who was working in business or industry (45.2%) and who was in middle age or older, with the youngest child's age being no older than 17 years (59.2%). The majority of the travel cases were domestic (82.7%) and

ranged from one to three days in length (66.9%). In addition, the vacations' destinations were determined primarily by the father alone (34.0%), followed by the mother alone (29.8%), then by the child(ren) (23.4%), and finally by other (12.8%).

3.1.4. Data analysis

To induce rules that explained the FDL based on the condition variables, the IBM SPSS Decision Trees 20 program was used to analyze the data. The SOC was forced as the first predictor, to split the overall sample, because this research was cross-society oriented. The stopping criteria for FDL were set at 60 cases before and 30 cases after the division of the (sub)sample (Rojas-de-Gracia & Alarcón-Urbistondo, 2019), at a significance level of 0.05 for predictor eligibility. The splitting process continued until either the split did not help to improve the predictive accuracy or a node contained fewer cases than the specified size.

Table 4. Background profiles of cases

	Society (Cheng et al., 2019; Nanda et al., 2007)				
	China (*n* = 201)	Japan (*n* = 262)	South Korea (*n* = 268)	Taiwan (*n* = 285)	Overall (n= 1,016)
Gender					
Male	31.3	26.5	27.8	34.2	29.8
Female	68.7	73.5	72.8	65.8	70.2
Age					
Mean	16.29	15.98	16.62	17.00	16.00
SD	1.13	.73	.69	.90	.91
No. of children in family *(Bronner & de Hoog, 2008; Filiatrault & Ritchie, 1980; Nanda et al., 2007; Spiers, 2017)*					
1	68.2	13.0	17.9	14.4	25.6
2	22.9	54.6	62.7	44.2	47.5
3 or more	9.0	32.4	19.4	41.4	26.9
Mean	1.45	2.25	2.03	2.00	2.00
SD	.81	.74	.65	.86	.83
Living with					
Both parents	86.6	87.0	94.7	81.3	87.4
Father	2.5	1.6	2.3	7.7	3.7
Mother	6.5	10.6	1.9	9.5	7.2
Neither	4.5	.8	1.1	1.4	1.8
Main financial source for the family *(Filiatrault & Ritchie, 1980; Nanda et al., 2007)*					
Both parents	82.1	73.3	62.7	60.4	68.6
Father	13.4	19.8	33.6	26.7	24.1
Mother	2.0	6.1	3.0	10.9	5.8
Others	2.5	0.8	0.7	2.1	1.5
Current stage of family life cycle *(Backer, 2012)*					
Young parents	0.5	2.3	0.4	2.1	1.4
Mature parents	65.7	86.3	42.9	44.9	59.2
Mature couple	30.3	8.0	47.0	46.0	33.4
Senior couple	3.5	3.4	9.7	7.0	6.1
Mean	2.37	2.13	2.66	3.00	2.00
SD	.56	.49	.65	.65	.63
Highest educational level of household head *(Kim et al., 2010; Nanda et al., 2007; Schänzel & Yeoman, 2014; Yeoman et al., 2012)*					
High school or below	31.3	27.1	21.6	76.5	40.4
College/university	53.2	69.8	59.7	22.1	50.5
Graduate school	15.4	3.1	18.7	1.4	9.2
Mean	1.84	1.74	1.97	1.00	2.00
SD	.67	.51	.64	.47	.63
Occupation of household head *(Kim et al., 2010; Schänzel & Yeoman, 2014)*					
Homemaker	4.5	3.4	1.9	9.8	5.0
Business and industry	46.8	67.9	28.0	39.3	45.2
Government/agency	13.9	16.8	17.9	3.2	12.7
Faculty/teacher	10.9	5.7	1.5	1.4	4.4
Professional	9.5	4.2	13.1	18.2	11.5
Worker	4.5	1.9	29.9	24.6	16.1
Other	10.0	0.0	7.8	3.5	5.0

Status of travel *(Nanda et al., 2007)*					
Domestic vacation	66.2	93.1	76.9	90.2	82.7
International vacation	33.8	6.9	23.1	9.8	17.3
Travel group size *(Kang et al., 2003; Nanda et al., 2007)*					
2-3	52.7	22.5	21.6	15.1	26.2
4	28.4	46.6	54.1	44.2	44.3
5 and more	18.9	30.9	24.3	40.7	29.5
Duration of the trip, in days *(Nanda et al., 2007)*					
1-2	13.9	43.9	31.3	46.0	35.2
3	16.9	40.8	36.9	28.8	31.7
4 and more	69.2	15.3	31.7	25.3	33.1
Likely decision maker (LDM)					
Father alone	22.9	33.2	46.6	30.5	34.0
Mother alone	28.4	30.2	32.1	28.4	29.8
Child(ren) alone	41.3	24.0	11.9	21.1	23.4
Other	7.5	12.6	9.3	20.0	12.8

Note:

1. Missing observations were excluded in the calculations; papers suggesting the variables included in the study are listed in parentheses.
2. The percentage numbers are presented in the table; the total may not equal 100 due to rounding.
3. Definitions of the family life cycle stages are as follows: young parents = the head of the household (the person who declares the most taxes in the family) is 18-34 years old and the youngest child is 0-17 year(s) old; mature parents = the head of the household is 35 years old or older and the youngest child is 0-17 year(s) old; mature couple = the head of the household is 35 years old or older; senior couple = the head of the household is 55 years old or older.

4.Findings

4.1. FDL in transportation decision

The decision tree structure that we constructed using the E-CHAID algorithm is shown in Figure 9. The top square of the tree diagram shows the distribution of the cases over the dependent variable, the categories of "yes" and "no." Below each of the squares are the predictor variables with the statistics for the split; the p-value, the Chi-square statistic and the degrees of freedom. The number and percentage of cases per category are given for each (group of) predictor category(ies). The model exhibited six layers of characteristics and ultimately led to eight end nodes that represented the final subgroups of the tree.

The tree began with the top decision node (Node 0), with all 1,016 cases of the data set and the entire data set was then divided into two distinctive groups based on society: Node 1 (China) was dominated by "no" (59.2 %) and Node 2 (Japan, South Korea, Taiwan) was dominated by "yes' (62.5 %). Node 1 was further divided into two groups based on status of travel: Node 3 (domestic vacation) was dominated by "no" (51.9 %) and Node 4 (foreign vacation) was dominated by "no" (73.5 %). Node 3 was split into two groups, determined by the duration of the trip: Node 7 (3 days or fewer) was dominated by "yes" (69.6 %) and Node 8 (4 or more days) was dominated by "no" (63.2 %). In the same vein, the node at the right (Node 2) was broken into two groups by the family's main source of income: Node 5 (father, both parents, others) was dominated by "yes" (65.8 %) and Node 6 (mother) was dominated by "no" (83.6 %). Then, Node 5 was divided into two groups based on status of travel: Node 9 (domestic vacation) was dominated by "yes" (69.3 %) and Node 10 (foreign vacation) was dominated by "no" (56.3 %). In addition, Node 9 was divided into two groups based on travel group size: Node 11 (2~3 group members) was dominated by "yes" (51.8 %) and Node 12 (more than 3 members) was dominated by "yes" (72.8 %). At the bottom of the tree, Node 11 was split into two groups on the basis of the number of children in the family: Node 13 (1 child) was dominated by "yes" (71.7 %) and Node 14 (more than one child) was dominated by "no" (66.7 %).

The dendrogram shows that the rankings of predictors according to their ability to explain the variances of the FDL were INC ($\chi2$ = 53.43, Bonferroni adjusted p < .001), SOC ($\chi 2$ = 31.08, Bonferroni adjusted p < .001), STA ($\chi 2$ = 25.86, Bonferroni adjusted p < .001), GS ($\chi 2$ = 18.87, Bonferroni adjusted p < .001), CN ($\chi 2$ = 16.19, Bonferroni adjusted p < .001) and DUR ($\chi 2$ = 12.95, Bonferroni adjusted p < .001).
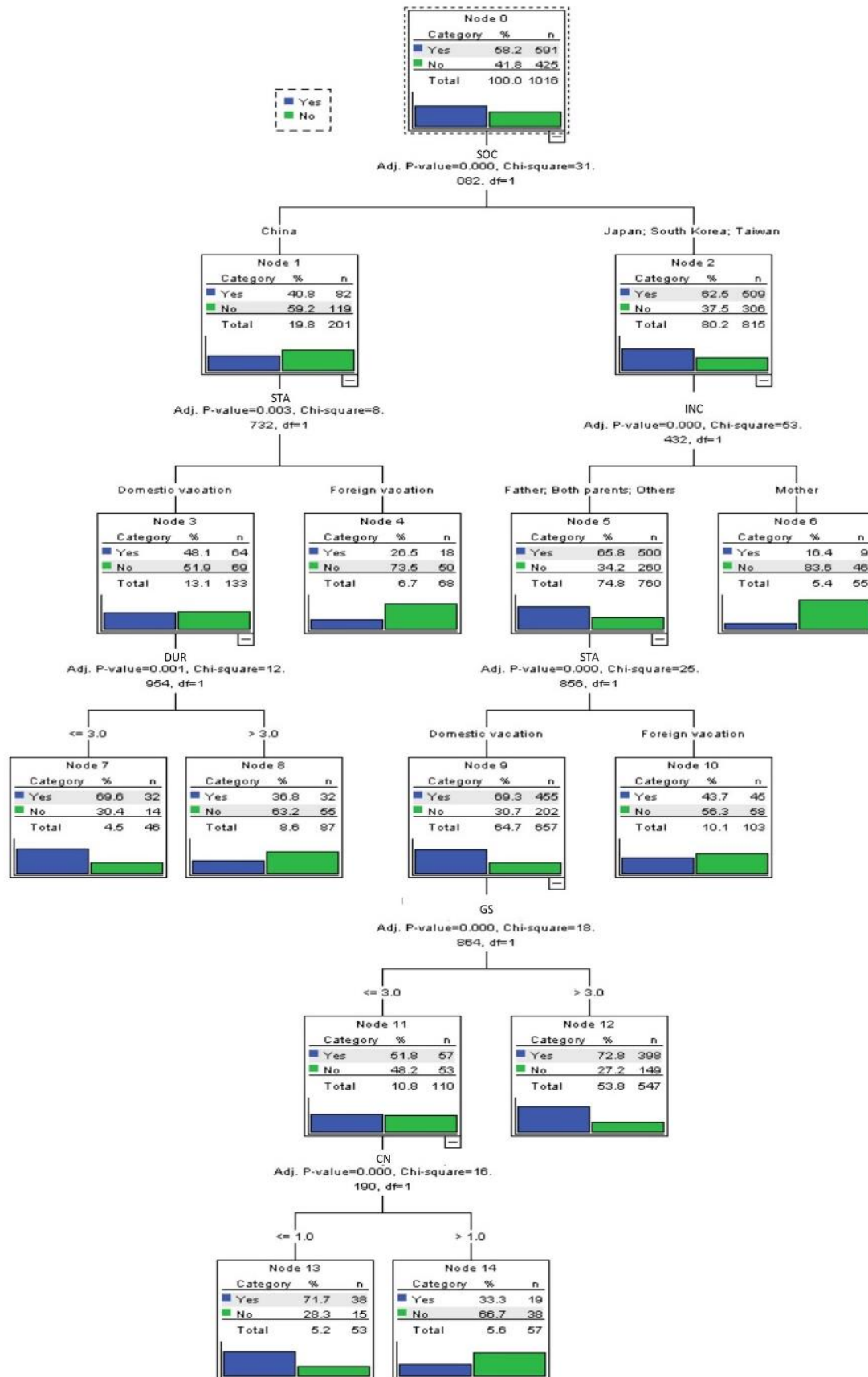
Figure 9. Transportation E-CHAID analysis result model

The classification rules generated by the decision tree are summarized in following the path from each end node to the root node. The relationships between the condition variables and the percentage of the FDL associated with each variable were therefore determined.

Table 5 FDL classification rules generated by the E-CHAID decision tree

FDL	Node	Rule
Yes	7	IF SOC = 'China' and STA = 'domestic vacation' and DUR = '1 ~2 or '3' THEN FDL ='yes'
	13	IF SOC = 'Japan' or 'South Korea' or 'Taiwan' and INC = 'both parents' or 'father' or 'others' and STA = 'domestic vacation' and GS = '2~3' and CN = '1' THEN FDL ='yes'
	12	IF SOC = 'Japan' or 'South Korea' or 'Taiwan' and INC = 'both parents' or 'father' or 'others' and STA = 'domestic vacation' and GS = '4' or '5 or more' THEN FDL ='yes'
No	8	IF SOC = 'China' and STA = 'domestic vacation' and DUR = '4 or more' THEN FDL ='no'
	4	IF SOC = 'China' and STA = 'foreign vacation' THEN FDL ='no'
	14	IF SOC = 'Japan' or 'South Korea' or 'Taiwan' and INC = 'both parents' or 'father' or 'others' and STA = 'domestic vacation' and GS = '2~3' and CN = '2' or '3 or more' THEN FDL ='no'
	10	IF SOC = 'Japan' or 'South Korea' or 'Taiwan' and INC = 'both parents' or 'father' or 'others' and STA = 'foreign vacation' THEN FDL ='no'
	6	IF SOC = 'Japan' or 'South Korea' or 'Taiwan' and INC = 'mother' THEN FDL ='no'

Table 6 presents the gains for the end nodes and ranks the end nodes according to their index scores, which refer to the FDL rate of each segment relative to the overall FDL rate of 58.2%. An index score exceeding 100 suggests that the corresponding end node had an above-average probability of predicting the FDL. By that criterion, three end nodes met the threshold. Node 12 had the highest index score, 125 (72.8 %/58.2 %), thus reflecting it having the highest probability of predicting FDL (72.8%). Next were Node 13, with an index score of 123 (71.7 %/58.2%) and Node 7 with an index score of 120 (69.6 %/58.2 %). In contrast, an index scores below 100 suggests that the corresponding end node had a below-average probability of predicting the FDL. Five end nodes were in that category that appeared to have a low probability of predicting the FDL. Node 6 scored the lowest, with 28 (16.4 %/58.2 %), thus reflecting it's having the lowest probability of predicting the FDL (16.4 %). Next, also with low probabilities of predicting the FDL and each shown in comparison with the overall rate of 58.2%, were Node 4 (46 = 26.5 %/58.2 %), Node 14 (57 = 33.3 %/58.2 %), Node 8 (63 = 36.8 %/58.2%) and Node 10 (75 = 43.7 %/58.2 %).

Table 6 Gains for the end nodes, and the end nodes' index scores and ranking

Node	Segment size (% of overall sample size)	Number of 'yes' respondents (% of all 'yes' respondents)	% of 'yes' respondents to the segment	Index score
12	547 (53.8)	398 (67.3)	72.8	125
13	53 (5.2)	38 (6.4)	71.7	123
7	46 (4.5)	32 (5.4)	69.6	120
10	103 (10.1)	45 (7.6)	43.7	75
8	87 (8.6)	32 (5.4)	36.8	63
14	57 (5.6)	19 (3.2)	33.3	57
4	68 (6.7)	18 (3.0)	26.5	46
6	55 (5.4)	9 (1.5)	16.4	28

The cumulative gain chart was used to evaluate the model's performance (see Figure 10). The horizontal axis plots the percentages, sorted based on the probability, from high to low and denotes the percentages of the test data set. The vertical axis records the percentages of the actual predicted values on the curved line. As Figure 10 shows, the line was an upward curve that rose steeply and then levelled off, thus suggesting that the tree model was acceptable for predicting the FDL. The cumulative index chart was also used to check whether the tree model was appropriate for predicting the FDL.

As is shown in Figure 11, the line started above 100%, remained on a high plateau as it extended to the right and then gradually descended toward 100%, thus confirming that the model was appropriate for predicting our target category of "yes."
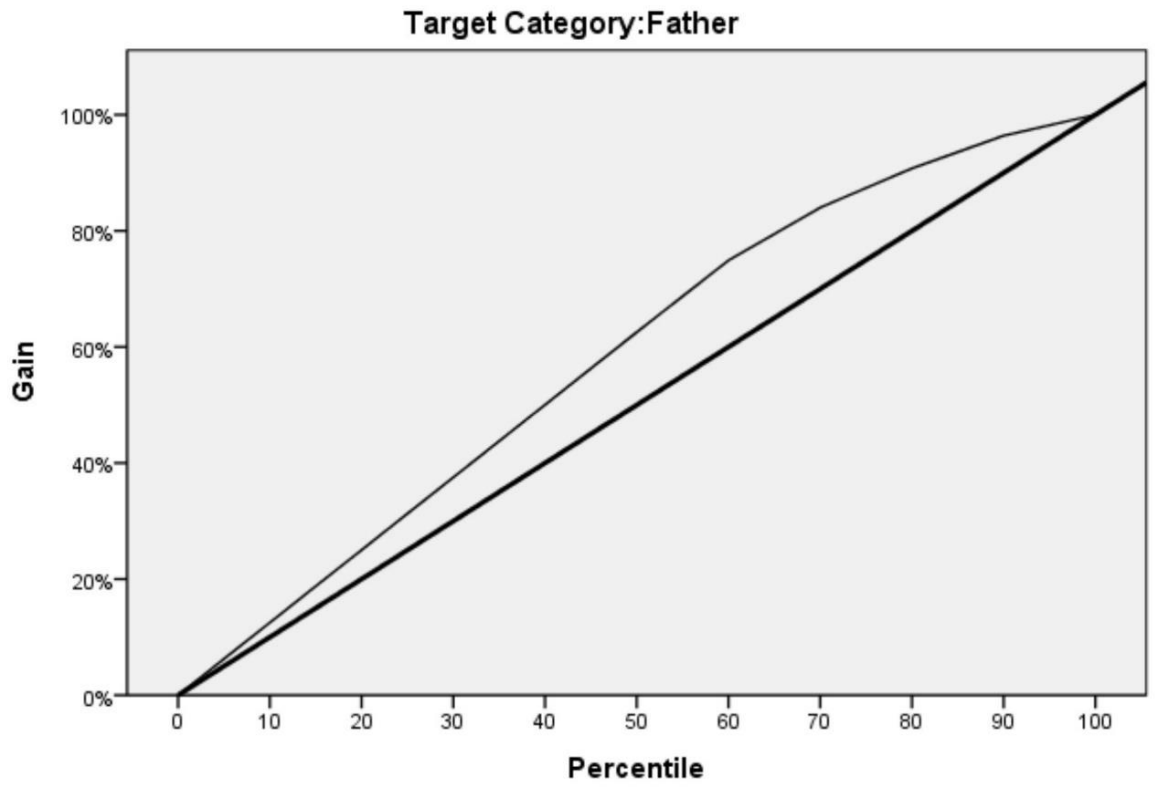
Figure 10. Gain chart for the yes category of FDL
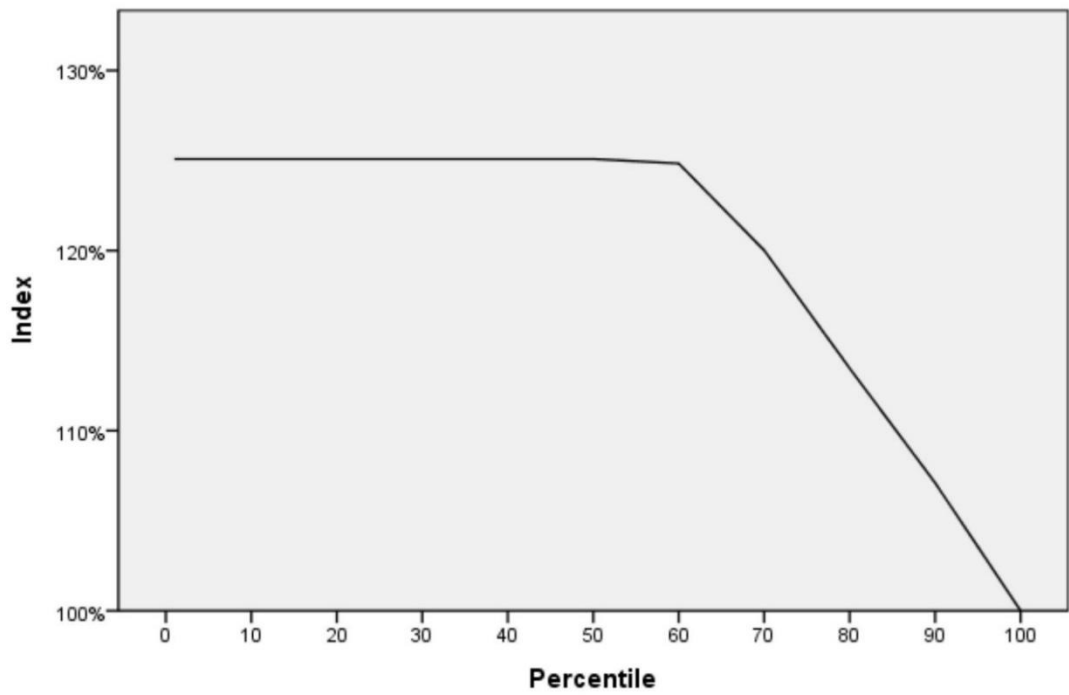
Figure 11. Index chart for the 'Yes' category of FDL

The confusion matrix presented in Table 7 shows that the recall was 79.2% for predicting "yes" and was 58.1% for predicting "no," thus yielding a prediction accuracy of 70.4%. In sum, our E-CHAID–generated model performed satisfactorily in elaborating on the condition variables of FDL.

Table 7. Confusion matrix and classification accuracy

Actual	Predicted		
	Yes	No	% Correct
Yes	468	123	79.2
No	178	247	58.1
Overall %	63.6	36.4	70.4

Risk estimate = .296; std. error = .014

4.2. The role structure of destination decision

The decision tree structure that we constructed using the E-CHAID algorithm is shown in Figure 12 The top square of the tree diagram shows the distribution of the cases over the dependent variable, the categories of "father," "mother," "child," and "others." The model exhibited six layers of characteristics and ultimately led to seven end nodes that represented the final subgroups of the tree.

The tree began with the top decision node (Node 0), with all 1,016 cases of the data set, and the entire data set was then divided into three distinctive groups based on society: Node 1 (China) was dominated by "child" (41.3%); Node 2 (Japan; Taiwan) was dominated by "father" (31.8%); and Node 3 (South Korea) was dominated by "father" (46.6%). Node 2 was further divided into two groups on the basis of travel group size: Node 4 (2–3 group members) was dominated by "mother" (41.2%) and Node 5 (more than 3 members) was dominated by father" (35.7%). Then, Node 5 was split into two groups on the basis of the number of children in the family: Node 6 (1 child) was dominated by "mother" (39.5%) and Node 7 (more than one child) was dominated by "father" (37.6%). In addition, Node 7 was divided into two groups based on society: Node 8 (Japan) was dominated by "father" (41.1%) and Node 9 (Taiwan) was dominated by "father" (34.3%). At the bottom of the tree, Node 9 was broken into two groups by the family's main source of income: Node 10 (father) was dominated by "father" (54.4%) and Node 11 (both parents; mother; others) was dominated by "mother" (27.5%).

The dendrogram shows that the rankings of predictors according to their ability to explain

the variances of the LDM were, from highest to lowest, "SOC" ($\chi2 = 76.76$, Bonferroni adjusted $p < .001$), "GS" ($\chi2 = 20.53$, Bonferroni adjusted $p < .001$), "INC" ($\chi2 = 15.58$, Bonferroni adjusted $p < .05$), and "CN" ($\chi2 = 13.79$, Bonferroni adjusted $p < .01$).
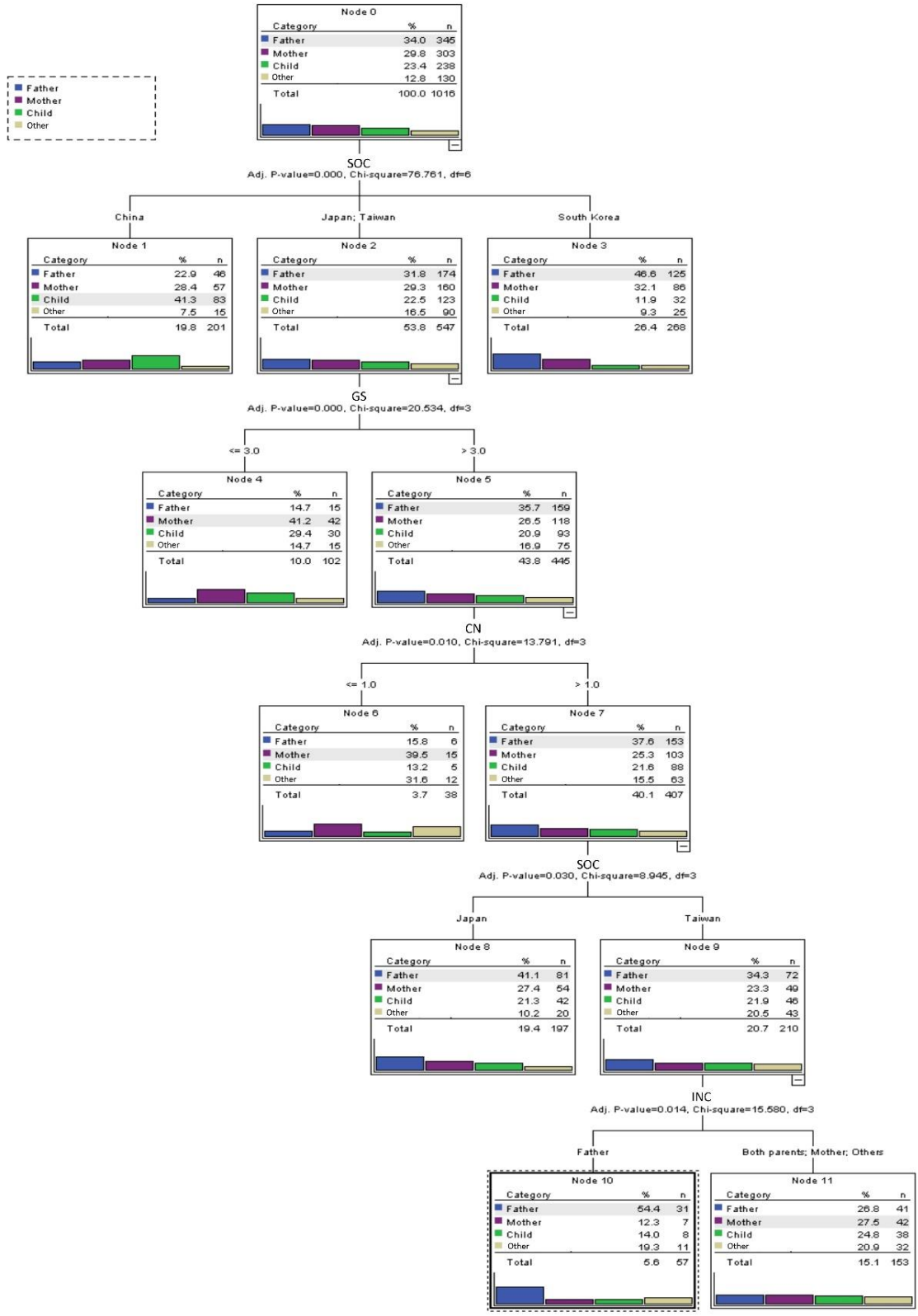
Figure 12. Destination E-CHAID analysis result model

The classification rules generated by the decision tree are summarized in Table 8, following the path from each end node to the root node. The relationships between the condition variables and the percentages of "father," "mother," and "child" of the LDM that were associated with each variable were therefore determined. These end nodes also represented the segments dominated by the father alone (i.e., Segment 1, Segment 2, and Segment 3), the segments dominated by the mother alone (i.e., Segment 4, Segment 5, and Segment 6), and those by the child(ren) (i.e., Segment 7). There was no node where the "other" category had a higher proportion of cases than the rest of categories did. We therefore ignored role of "other" in market segmentation and focused on the roles of the father, mother, and child(ren).

Table 8. LDM classification rules generated by the E-CHAID decision tree

Node (Segment)	Rule	Father	Mother	Child	Other
8 (1)	IF SOC = "*Japan*" or "*Taiwan*" and GS = "*4*" or "*5 or more*" and CN = "*2*" or "*3 or more*" and SOC = "*Japan*" THEN LDM = "**father**"	**41.1**	27.4	21.3	10.2
10 (2)	IF SOC = "*Japan*" or "*Taiwan*" and GS = "*4*" or "*5 or more*" and CN = "*2*" or "*3 or more*" and SOC = "*Taiwan*" and INC = "*father*" THEN LDM = "**father**"	**54.4**	12.3	14.0	19.3
3 (3)	IF SOC = "*South Korea*" THEN LDM = "**father**"	**46.6**	32.1	11.9	9.3
4 (4)	IF SOC = "*Japan*" or "*Taiwan*" and GS = "*2~3*" THEN LDM = "**mother**"	14.7	**41.2**	29.4	14.7
6 (5)	IF SOC = "*Japan*" or "*Taiwan*" and GS = "*4*" or "*5 or more*" and CN = "*1*" THEN LDM = "**mother**"	15.8	**39.5**	13.2	31.6
11 (6)	IF SOC = "*Japan*" or "*Taiwan*" and GS = "*4*" or "*5 or more*" and CN = "*2*" or "*3 or more*" and SOC = "*Taiwan*" and INC = "*both parents*" or "*mother*" or "*others*" THEN LDM = "**mother**"	26.8	**27.5**	24.8	20.9
1 (7)	IF SOC = "*China*" THEN LDM ="***child***"	22.9	28.4	**41.3**	7.5

Then, for each category of LDM– the "father", the "mother" and the "child(ren)" as a target category–the gains for the end nodes were calculated and ranked those according to the index scores, which referred to the rate of the target category as the LDM of each segment relative to the overall rate of the target category. An index score exceeding or falling below 100 suggests that the corresponding end node had an above-average or below-average probability of predicting the category as the LDM (see Appendix A).

Table 9 presents the summary of resulting gains for nodes for the predicted LDM. Of the father-predicted segments, Segment-2 had the highest index score of 160 (54.4%/34.0%), thus reflecting that it had the highest probability of predicting the father as the LDM (54.4%). Next were Segment-3, with an index score of 137 (46.6%/34.0%) and Segment-1 with an index score of 121 (41.1%/34.0%). Of the mother-predicted segments, and comparing each with their overall rate of 29.8%, Segment-4 scored the highest (138 = 41.2%/29.8%) and thus reflecting that it had the highest probability of predicting the mother as the LDM (41.2%), followed by Segment-5 (132 = 39.5%/29.8%) and then Segment-6 (92 = 27.5%/29.8%).

The only child-predicted segment, Segment-7, had an above-average probability (>23.4%) underlying its index score of 176 (41.3%/23.4%). Because the authors sought to identify actionable segments for planning target marketing, the ideal target category should be able to pick target cases in the least proportion of the overall sample and produce the correct rate estimate of cases of interest in each segment. To this end, the performance of each target category of the model has been evaluated by observing its cumulative gain and classification accuracy.

Table 9. Gains for the End Nodes for the Predicted LDM

Segment based on predicted LDM	Node	Size (%)	Gain (%)	Response (%)	Index score
Father alone					
Seg. 2	10	5.6	9.0	54.4	160
Seg. 3	3	26.4	36.2	46.6	137
Seg. 1	8	19.4	23.5	41.1	121
Mother alone					
Seg. 4	4	10.0	13.9	41.2	138
Seg. 5	6	3.7	5.0	39.5	132
Seg. 6	11	15.1	13.9	27.5	92
Child(ren)					
Seg. 7	1	19.8	34.9	41.3	176

4.3. Evaluation of the target categories' capacity

We used a cumulative gain chart to compare the gain capacity of the three target categories of the LDM—the father, the mother, and the child(ren)—in the decision tree model. The horizontal axis plots the percentages, sorted from high to low on the basis of probability, and denotes the percentages of the data set. The vertical axis records the percentages of the actual predicted values on the curved line. As Figure 13 shows, each cumulative line of the target categories was an upward curve that rose steeper than 45º and then levelled off, thus suggesting that the tree model was acceptable for predicting the LDM in all target categories. In addition, an upward curve of a gain chart indicates that the more efficiently the cases of interest are identified, the greater the area under the curve will be.

The first 40% of the data set (Lin & Fan, 2019) corresponds to 58.3% of the child-dominated cases, and to 54.9% of the father-dominated cases and 47.0% of the mother-dominated cases. The contrast of the area under the curve among target categories indicated that "child(ren)" appeared to have the greatest area under the curve, followed by "father" and then "mother." These results suggested that "child(ren)" as a target category had a more efficient capacity for picking target cases than the model's other target categories did. (see Figure 13)
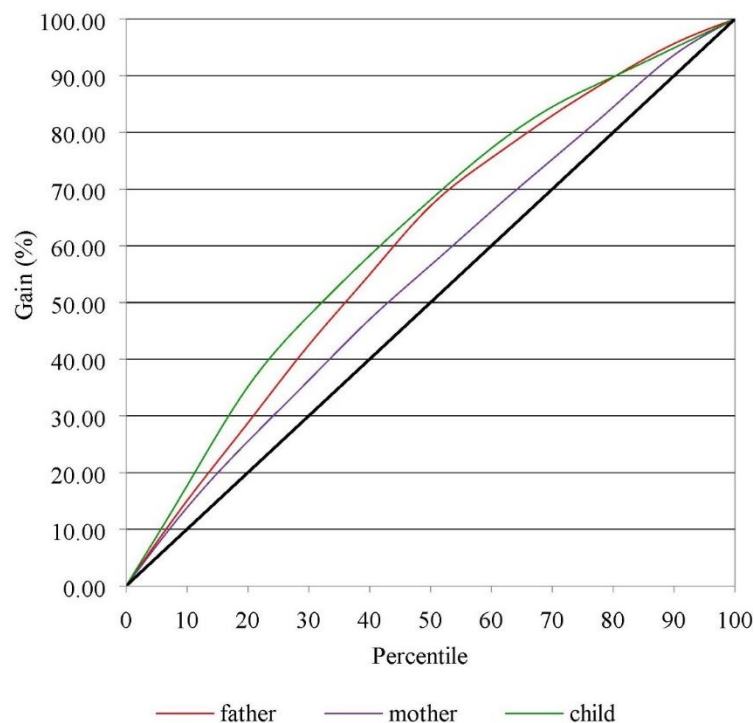
Figure 13. Gain chart for the three target categories of LDM

To compare the prediction capacity of the LDM categories with the data to determine the classification performance of each of the model's target categories, a confusion matrix has been used to evaluate the recall rate of the LDM, and the results are presented in Table 10. It shows the recall rates of 68.7% for the "father," 32.7% for the "mother," and 34.9% for the "child(ren)" categories, thus yielding a prediction accuracy of 41.2%. Although the overall accuracy was not high enough, the 'father' category had a satisfactory rate of recall.

Table 10. Confusion Matrix

Observed	Predicted				
	Father	Mother	Child	Other	% Recall
Father	**237**	62	46	0	**68.7**
Mother	147	**99**	57	0	**32.7**
Child(ren)	82	73	**83**	0	**34.9**
Other	56	59	15	**0**	**0.0**
Overall %	51.4	28.8	19.8	0.0	**41.2**

Risk estimate = .588; std. error = .015

Table 11 summarizes the picking and prediction capacities of the father, the mother, and the child(ren) as the target category of the E-CHAID– generated model. It was observed that in terms of picking target cases, the father category's performance (54.9%) was slightly inferior to that of the child(ren)'s category (58.3%). However, the father's recall rate (68.7%) was much higher than the child(ren)'s (34.9%), suggesting that overall, "father" appeared to be the most eligible target category of the LDM.

In summary, the proposed model performed satisfactorily in elaborating the condition variables– the socio-cultural/ideological, travel, and household characteristics of segmentation. The segments in which most of the destination-decisions were made by the father, that is, Segment-2 (54.4%), Segment-3 (46.6%), and Segment-1 (41.1%), are efficient and reliable for accessible father-dominated segments for family vacations (Kang et al., 2003). On the contrary, the segments in which the farther failed to play a leading role in selecting the destination, Segment-4 (14.7%), Segment-5 (15.8%), Segment-7 (22.9%), and Segment-6 (15.8%) are not advantageous to a father-focused mainstream of travel destination selection in East Asia.

Table 11. Performance Contrasts for the Predicted LDM

Performance	LDM		
	Father	Mother	Child(ren)
% Cumulative gain (given the first 40% of the data set)	54.9	47.0	**58.3**
% Recall	**68.7**	32.7	34.9

5. Discussion and conclusion

5.1. Contribution to scholarship

For decision making of transportation, presented results align with the assertion that fathers tend to be powerful decision-makers about the transportation means arrangements for family vacations and travel (Bronner & de Hoog, 2008; Cheng et al., 2019; Jenkins, 1978; Kim et al., 2010). The evidence of fathers' predominance also adds to the rationale behind why the means of transportation is the least discussed by family members of all the sub-decisions for a family vacation (Bronner & De Hoog, 2011). For East Asian cases of family travel in general, transportation arrangements were most often determined by the father alone. That result echoes the understanding that the family role distribution for deciding aspects of family travel depends on the family members' relative involvement and their relative involvement in turn is shaped by their respective perceptions of knowledge of the issues and of relevant information (Jenkins, 1978; Nanda, et al., 2007; Su 2011; Su & Wang, 2010) and by the gender-role division of responsibilities between spouses within the family (Penz & Kirchler, 2012).

In general, in families in East Asia, fathers are likely to take more responsibility for choosing the transportation means for family travel than mothers and children do, because of the fathers' personal interests and their opportunities to access information regarding transportation and their conformity to social expectations about the husband's role in the family, as well. However, the first decision tree (see Figure 9) splits showed that the Chinese group had more cases of "no", thus suggesting that China is distinctive in having a societal culture or development ideology that decreases fathers' predominance in deciding the means of transport for family travel, compared to Japan, South Korea and Taiwan, considered as a whole. This study confirms the advantage of having a synergetic perspective on values formation and evolution in cross-societal studies on the family travel decision-making (Ralston et al., 1993; Ralston et al., 1997; Ralston, 2008). The use of composites of culture and societal effectiveness as predictors take into account the similarities and differences of macro-level backgrounds across societies. Such an approach is expected to help refine the research methods and to explain family travel behavior with greater validity (Cheng et al., 2019; Yen et al., 2020).

It is noteworthy that overall, regardless of the diversity of values formation and evolution across the four East Asian societies studied, the main source of household income, rather than the society, appeared to be the most important predictor of the fathers' predominance in vacation transportation decisions. This finding confirms that the primary source of the family's income determines the distribution of the decision-making power in planning family vacations

(Filiatrault & Ritchie, 1980; Nanda, et al., 2007).

Taking the cases of Japan, South Korea and Taiwan as a group, in particular, showed that when mothers were the main source of family income, the fathers were not the predominant decision-maker, thus suggesting that the structure of economic power and reliance within the family, more than sociocultural or ideological forces, may shape the father-versus-other dominance style in decisions about transportation for family travel. Research also has shown that individuals' power over family purchase decisions decreases as their dependence on their family increases (Su, 2011; Su & Wang, 2010). This concept of dependence refers to the extent to which the individuals rely on the family to achieve their goals (Keith, Jackson, & Crosby, 1990), such as financial reliance derived from their relationship with the family (Beatty & Talpade, 1994; Foxman, Tansuhaj, & Ekstrom, 1989). That economic support usually derives from the main income source for the family. The results suggested that for East Asia, where male-oriented values underlie spousal roles in the family vacation decisions (Yang et al., 2020), the economic-reliance relationship appears to change the typical role distribution in spite of societal norms. Taken altogether, the presented transportation model is not only integrated multilevel variables in the segmentation and targeting of the family travel products market, but it elucidated the interactions among the multiple facets of family vacation market segmentation.

As for decision making of destinations, the findings emerged from using the E-CHAID approach augment the relatively limited literature on the factors that shape the distribution of roles in making decisions about destinations for family vacations. In addition, who in the family should receive the focus of destination marketers as their basis for market segmentation in East Asia was also revealed with evidence. The results derived from 1,016 cases of family vacations from four societies provide a structural model illustrating 7 rules that delineate the importance of various condition variables in predicting the LDM for decisions about family vacation destinations.

By evaluating the capacity of each category of LDM in the E-CHAID model, it was found that the father category was a more acceptable target category than the categories of the mother and the child(ren). Given "father" as the target category, we identified the 3 segments that had an above-average probability of the fathers' dominance in choosing destinations. The results of this study do not align with the assertions by other researchers that destination choices for FVDMs tend to be made jointly either by the husband-wife couple or the husband-wife-child (Bronner & de Hoog, 2008; Hsu & Kang, 2003; Kang et al., 2003; Nanda et al., 2007; Ritchie & Filiatrault, 1980; Rojas-de-Gracia & Alarcón-Urbistondo, 2018, 2019; Wang et al., 2007;

Wang et al., 2004). The results, which are inconsistent with typical arguments, add to literature of FVDMs in three ways: First, the role structure of FVDMs that we found in the four East Asian societies as a whole are more autonomic than a joint decision-making style would be, thus symbolizing the importance of the role that cultural region plays in shaping family decision-making styles for travel destinations; Second, the role structure in the four basic categories yielded more accurate information than the direct measurements in role taxonomy did, because the wording on role taxonomy used in the survey instrument likely led respondents to associate the experience with joint decision making; Third, our respondents were adolescents who were, overall, more mature than their counterparts in previous research. The adolescents in our study not only reported their experiences more reliably than younger children would tend to do, but they also appeared to have been more influential in decision making about family travel destinations.

For East Asian cases of family vacation in general, travel destinations were most often determined by the father alone, although the mother alone, and also the children, each made up a high proportion of the decision makers, as well. These three categories in total comprised 87.2% of the surveyed cases, thus suggesting that for destination choices, family members have diverse preferences and involvements that underlie the autonomic decision-making style (Jenkins, 1978; Nanda, et al., 2007; Su 2011; Su & Wang, 2010). Still, the first decision tree (see Figure 12) splits showed that the proportion of "father alone" responses as the decision maker in the Chinese group was the lowest, whereas the "father alone" proportion of the South Korean group was above the average level. It thus suggests that China and South Korea are polar opposites in the societal cultures and developmental ideologies that shape their degree of fathers' dominance in deciding the destination for a family vacation, compared with Japan and Taiwan considered as a whole.

In Chinese society, the FVDM processes were found to be child-centred because care of the children is the highest priority of the family (Wu & Wall, 2016). That family prioritization derived from China's one-child-policy era (1980-2015), which moulded the structure of modern Chinese families, and the custom continues (Li et al., 2020). The distinctive historic backgrounds of China also may explain why fathers are not as strong in determining the travel destination for family vacations.

In contrast to China, South Korea has been dominated by Neo-Confucian traditions that have given birth to male and parent-centred communications in the FVDM process (Kim et al., 2010; Yang et al., 2020). These featured practices are in accordance with our findings on the

South Korean group.

In addition to the influence of society, "the travel group size" and "the number of children in the family" appeared to be important predictors of the fathers' dominance in travel destination decisions. This finding echoes the notion that the cost of a vacation choice, which is determined by the scale of the vacation, affects the family role structure that is adopted in planning family vacations (Bronner & de Hoog, 2008; Filiatrault & Ritchie, 1980; Kang et al., 2003; Nanda et al., 2007; Spiers, 2017)

Taking the cases of Japan and Taiwan as a group, in particular, showed that when the travel group size was small, the fathers were not the dominant decision-makers. When the travel group size increased and there was only one child in the family, the fathers again were not the dominant decision-makers.

It was also observed that in the Japan-Taiwan region, the expenditure toward a family vacation could increase the possibility that fathers would be the decision makers about travel destinations, which was inconsistent with Nanda et al. (2007) proposition that the expenditures of vacations are positively related to joint decisions. That increased possibility as a result of high vacation costs may be because expensive vacations usually involve a novel destination that the family is not familiar with, and such unfamiliarity could arouse fathers' concerns for the family's safety at the destination and thus prompt them to make the decision themselves.

It is noteworthy that in the Taiwanese group with a large-group vacation and more children in the family, the main earning member of the household income appeared to predict whether the fathers were dominant in travel destination decisions. When fathers were not the main source of the family income, they were less likely to be the decision-makers. This finding from the Taiwan group supports the idea that the primary earner of a household's income determines the distribution of decision-making power in planning that family's vacations (Filiatrault & Ritchie, 1980; Nanda et al., 2007).

These findings offer East Asian evidence for application of an expanded crossvergence theory and demonstrate the theory's value in multilevel analyses of family vacation decisions. The use of composites of culture and societal development as predictors take into account the similarities and differences of societal backgrounds across countries. We obtained evidence that such an approach can be expected to help refine research designs and to explain FVDM behaviors with greater validity (Cheng et al., 2019; Yen et al., 2020).

To underscore our contributions to the scholarship of FVDM of transportation means and destination, we offer a table contrasting our findings with previous findings or arguments

(Table 12).

Table 12. Contrast between previous findings/arguments and key findings

Item	society	status of travel	duration of the trip, in days	travel group size	number of children in family	main source of income for family
Reference						
Cheng et al. (2019)	√	√	√	√	√	√
Nanda et al. (2007)	√	√	√	√	√	√
Kang et al. (2003)		√		√	√	
Bronner & de Hoog. (2008)		√	√	√	√	
Filiatrault & Ritchie. (1980)					√	√
Spiers (2017)					√	
Wang et al. (2004)		√	√	√	√	√
Jenkins (1978)		√	√			
This research finding						
Transportation	√	√		√		√
Destination	√			√	√	

5.2 Managerial implications

For marketing measures of family vacation products in East Asia, the results discussed above highlight the managerial implication that marketers, who wish to initiate a father-focused promotional strategy for entering the market of transportation for the family travel, should consider targeting Nodes 7, 12 and 13 (see Table 5), it is found that fathers were a greater decision-maker about transport means for domestic vacations than for the foreign ones; for medium-short vacations than for the long ones; and for one-child families than for families with two or more children. These findings confirm the speculation that family vacations that have high expenditures, long distances to the destination and long durations match the joint decision-making style between spouses (Nanda et al., 2007). rather than other segments, in their efforts to access and persuade fathers, because overall those three segments carried above-average likelihoods of father predominance in travel decision-making.

It also implies that marketers need to take the significant condition variables into account in designing family vacation products and customizing communications programs that support fathers' decision-making about the means of transportation for the family vacations and prevent audience misunderstandings across societies. In addition, marketers could periodically update the database and amend the model to classify and predict the favourability of new cases expeditiously and identify additional contributing factors to the FDL of the means of transportation for the family vacation travels in East Asia. Such outputs could serve as references for examining the implementation of marketing strategies and revising them properly.

On the other hand, for marketing programs promoting family vacation products in East Asia, the results of this study suggest that destination marketers would be wise to focus on the role of the father rather than that of other family members as the target decision-makers regarding vacation destinations. To initiate a father-focused marketing strategy for the East Asian market for family vacation destinations, destination-marketers should consider targeting Segment-1, Segment-2, and Segment-3 (see Table 9) which were dominated by the father alone, and not the other segments, in their efforts to access and persuade fathers. Overall, those three segments not only carried above-average likelihoods of father-determined decision making, but also were dominated by fathers. In particular, Japan group and Taiwan group were featured with larger travel parties, which suggested that they could have higher profitability than other segments (Kang et al., 2003) and should be chosen as priority markets.

To access the goal segments derived from Japan, South Korea, and Taiwan respectively, the differences and similarities of communication norms and media that fathers from those societally diverse markets followed should be identified and used as a foundation for applying information communication technology (ICT) (Sheehan et al., 2016). Social media and online platforms, which are helpful for customizing and contextualizing destination offerings for family vacations, can shape and promote favourable destination images targeting fathers in the target segments (Agapito & Lacerda, 2014; Molinillo et al., 2018). When fathers' concerns for family safety and the expected experience at the destination make them hesitate to select a destination for their family vacation, destination marketers can organize a mix of media technologies, such as virtual reality (VR) and user-generated content (UGC), to provide a right-in-the-scene feeling and word-of-mouth effect that will facilitate destination decision making.

The integration of technologies can reduce fathers' perceptions of the risks associated with their destination selection and strengthen their favourable images of the destination (Yung et al., 2020). It can also evoke a social influence on the fathers' decision-making by providing geo-informed photos and text uploaded by the social media users (Mistilis et al., 2014; Wang & Li, 2020; Zhang et al., 2020).

5.3 Limitations and research directions

We pay attention to the role structure of parents and children in choosing transportation means and destinations, and do not discuss the role that grandparents may play in deciding family travel transportation means and destinations (Shavanddasht, 2018). Without considering the cross-social environment, our research samples come from four societies composed of East Asia, which may be the reason why our findings are different from those of other cultural regions. These restrictions should provide two directions for future research on family decision making role in the context of transportation and destination selection.

First, encourage future research to conduct empirical analysis on three generations of families and explore how grandparents participate in the decision-making of family travel transportation and destinations in East Asia, where the elderly are especially respected and authoritative in family relations;

Second, it is worthwhile to extend our model to other places that display various cultural values and social characteristics, so that we can make a global effort, Explore and predict who is the factor that determines the transportation and destination of family tourism.

The results of this study strongly indicate that although historical and cultural knowledge

is very important, such knowledge itself is not enough to predict family interpersonal relationship. Further research is needed in this respect, and the understanding of family vacation decision-making should be expanded by applying the multi-level cross-perspective of region, society and personal influence. This method will guide researchers to systematically expound the influence of multi-level factors on family vacation decision-making. Therefore, continuing the survey used in this study may help to provide data on the decision-making role of other issues, such as the choice of accommodation, for further comparison.

In addition, the code of conduct based on Confucianism includes the distribution of roles in the multiple-generation family. Therefore, in the future, holiday cases will be well extended from nuclear families to multi-generation families, so that grandparents and other elderly people can be considered and the East Asian family tourism market can be fully understood. This study focuses on the decision as a description of "transportation modes", rather than every transportation mode. It is suggested that future research should explore how the father's advantage in choosing transportation mode is dominated by conditional variables.

This study provides a more comprehensive framework to explore the phenomenon of family vacation decision-making, and provides opportunities for future research. This will greatly improve the understanding of family relationship and family holiday quality, so we should treat the above conclusions with caution. In the past, the definition of questions in western studies was not clear, so we must consider the units of analysis, that is, individuals, families or countries, when formulating research questions. This method will promote the consistency of theorization. It will be an important methodology to develop effective and reliable tools to measure related concepts. Cross-validation should be carried out on the national language questionnaires used in cross-cultural surveys to ensure the measurement equivalence between participating countries/cultures.

Because the family decision-making process has not been manipulated, the causal relationship can only be inferred from the survey results. Relevance may be affected by various unrelated factors, such as interviewee bias, we should regard it as a model to open the future. In addition, the averaged sample size for each country may be insufficient for greater societies such as China. It is recommended that future research will conduct surveys that consider geographical variation of critical factors in a country.

Finally, this study focused on 'means of transportation' decision that is a general description rather than on each mode of transportation (e.g., rented vehicle versus private vehicle or energy efficient mode versus eco-efficient mode) (Srnec et al., 2016; Kantawateera

et al., 2015; Reilly et al., 2010; Sung et al., 2001). Authors recommend that the future studies explore how fathers' predominance in arraying the modes of transportation is ruled by the condition variables.

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Appendix A

Table A1: Gains for the End Nodes, and the End Nodes' Index Scores and Ranking (Target Category: Father)

Segment (Node)	Segment size (% of overall sample size)	Number of "father" respondents (% of all "father" respondents)	% of "father" respondents to the segment	Index score
2 (10)	57 (5.6)	31 (9.0)	54.4	160
3 (3)	268 (26.4)	125 (36.2)	46.6	137
1 (8)	197 (19.4)	81 (23.5)	41.1	121
6 (11)	153 (15.1)	41 (11.9)	26.8	79
7 (1)	201 (19.8)	46 (13.3)	22.9	67
5 (6)	38 (3.7)	6 (1.7)	15.8	47
4 (4)	102 (10.0)	15 (4.3)	14.7	43

Table A2: Gains for the End Nodes, and the End Nodes' Index Scores and Ranking (Target Category: Mother)

Segment (Node)	Segment size (% of overall sample size)	Number of "mother" respondents (% of all "mother" respondents)	% of "mother" respondents to the segment	Index score
4 (4)	102 (10.0)	42 (13.9)	41.2	138
5 (6)	38 (3.7)	15 (5.0)	39.5	132
3 (3)	268 (26.4)	86 (28.4)	32.1	108
7 (1)	201 (19.8)	57 (18.8)	28.4	95
6 (11)	153 (15.1)	42 (13.9)	27.5	92
1 (8)	197 (19.4)	54 (17.8)	27.4	92
2 (10)	57 (5.6)	7 (2.3)	12.3	41

Table A3: Gains for the End Nodes, and the End Nodes' Index Scores and Ranking (Target Category: Child)

Segment (Node)	Segment size (% of overall sample size)	Number of "child" respondents (% of all "child" respondents)	% of "child" respondents to the segment	Index score
7 (1)	201 (19.8)	83 (34.9)	41.3	176
4 (4)	102 (10.0)	30 (12.6)	29.4	126
6 (11)	153 (15.1)	38 (16.0)	24.8	106
1 (8)	197 (19.4)	42 (17.6)	21.3	91
2 (10)	57 (5.6)	8 (3.4)	14.0	60
5 (6)	38 (3.7)	5 (2.1)	13.2	56
3 (3)	268 (26.4)	32 (13.4)	11.9	51

Appendix B

> 請回憶最近一年內，某次您印象深刻、且至少持續一夜以上的家庭度假旅遊。在該次家庭決策制定過程之各階段(發起—搜尋—最終選擇)中，您曾經與父母有過充分的互動。

★ 在**該次的家庭度假旅遊**中：

(1)屬性為：□國內度假旅遊　□國外度假旅遊

(2)停留天數：_____天

(3)全家共同旅遊的人數：_____人

★ 關於**該次家庭度假旅遊**，下列各項目**最後的決定者是誰**，

請您勾選適當的對象**(請注意是單選)**：

	父親	母親	子女	其他
1. 時間(出發月份).	□	□	□	□
2. 逗留地方之個數	□	□	□	□
3. 停留天數	□	□	□	□
4. 和自己的家人或其他人	□	□	□	□
5. 旅遊預算	□	□	□	□
6. 安靜或是熱鬧的環境	□	□	□	□
7. 目的地(國家或地方)	□	□	□	□
8. 目的地有否陽光-海灘-水	□	□	□	□
9. 交通工具	□	□	□	□
10. 是否有動態行程(如步行，騎自行車)	□	□	□	□
11. 住宿	□	□	□	□
12. 是否具有文化性質	□	□	□	□
13. 活動安排(旅行社或自行安排，組旅行團)	□	□	□	□
14. 是否適合小孩	□	□	□	□
15. 是否拜會接觸其他人	□	□	□	□

★ 關於您個人與家庭之資料：

1.性別：□男性　　　□女性

2.年齡：＿＿＿＿＿歲

3.家庭兄弟姊妹共有：＿＿＿＿＿位，您排行第＿＿＿＿＿位。

4.目前和您同住者：□父母親兩者 □父親 □母親 □兩者皆無

5.家庭之主要經濟來源為：□父母親雙方 □父親 □母親 □其他

6.家庭目前之階段為*(請注意是單選)*：

　1.□*年輕父母*—戶長(意指家庭之主要賦稅申報者)年齡為 18-34 歲，且家庭中之最年幼子女年齡為 0-17 歲

　2.□*成熟父母*—戶長年齡在 35 歲(含)以上，且家庭中之最年幼子女年齡為 0-17 歲

　3.□*成熟夫妻*—戶長年齡在 35 歲(含)以上

　4.□*年長夫妻*—戶長年齡在 55 歲(含)以上

7.戶長之最高學歷為：□高中職(含)以下 □專科/大學 □研究所

8.戶長之職業為:□家務管理　□工商產業　□政府機關　□研究/教學單位

□專門職業　□勞動工作 □其他：＿＿＿＿＿＿

—感謝您的合作，並請您再次檢查有無漏答的題目—

No.

回答者の皆様へ

　アンケートご協力ありがとうございます。このアンケートは若い皆さんが参加する家族旅行の意思決定についての国際比較調査です。回答時間は 15 分程度です。分析された結果は、学術研究及び関連産業の参考のみ使用します。なお、皆さんの回答は匿名で行い、且つ個人情報は厳格に管理され、個人が特定されることはありません。

　それでは回答よろしくお願いいたします。

過去 1 年間で最も新しい 1 泊以上の家族旅行について考えてください。
その旅行計画や家族での意思決定の過程における検索・決定について、あなたと両親らとのやり取りをうかがいます。

★**家族旅行の形態**についてうかがいます。□には、該当する方に✔を入れてください。
旅行の実施状況：□国内旅行　□海外旅行　□過去 1 年は実施していない→**終了します**
旅行の滞在日数：(　　　　　　　)日
あなたを含めた参加人数：(　　　　　　　)人.

★この家族旅行に関して、以下の点について、**最後に誰が決定**しましたか。該当する□に✔を入れて答えてください。**(一つだけ選んでください)**

F= 父親; M= 母親; C= 子供; O= その他	F	M	C	O
1.出発する時期	□	□	□	□
2.目的地の数(滞在型か、周遊型か)	□	□	□	□
3.旅行する日数	□	□	□	□
4.家族だけで行くか、家族以外も含むか	□	□	□	□
5.予算	□	□	□	□
6.静かな場所か、にぎやかなところか	□	□	□	□
7.旅行先 (国、場所)	□	□	□	□
8. ビーチ、水辺、日光浴が出来る場所を含むかどうか	□	□	□	□
9.交通手段	□	□	□	□
10. 旅行先で運動(ウォーキング、サイクリング)をするかどうか	□	□	□	□
11.宿泊施設	□	□	□	□
12.文化の性質の活動を含むかどうか	□	□	□	□
13. 旅行手配の方法 (旅行業者利用、個人手配、パッケージ旅行)	□	□	□	□
14. 子供向けかどうか	□	□	□	□
15. 旅行先で誰かを訪問するかどうか	□	□	□	□

★

あなた自身について、次の空欄を埋めるか□にチェックを入れてください。

1. **性別:** □男　　□女

2. **年齢:** _____歳

3. **あなたを含めた兄弟姉妹の人数:** _____人，あなたは上からの_____番目

4. **親と同居しているか:** □両親と □父のみ □母のみ □いずれもしていない

5. **家族の主たる収入源:** □両親とも □父のみ □母のみ □その他

6. **現在の家族の状況 _(一つだけ選んでください)_:**

   (1)□*若年家族*—世帯主 (**家族で最も税金を払っていると思われる人**) が 18-34 歳で、最も若い子供が 0-17 歳

   (2) □*壮年家族*—世帯主が 35 歳以上で最も若い子供が 0-17 歳

   (3) □*壮年夫婦*—世帯主が 35 歳以上

   (4) □*熟年夫婦*—世帯主が 55 歳以上

7. **世帯主の最終学歴:** □高校以下　□専門、短大、大学 □大学院

8. **世帯主の職業:** □主婦・主夫　□会社員・自営　□公務員　□教員 □専門職　□職人　□その他:_____

―ありがとうございました―

请回忆最近一年内，某次您印象深刻、且至少持续一夜以上的家庭度假旅游。在该次家庭决策制定过程之各阶段(发起—搜寻—最终选择)中，您曾经与父母有过充分的互动。

★ 在***该次的家庭度假旅游***中：

属性为：□国内度假旅游　□境外(含港澳台)度假旅游

停留天数：_____天

全家共同旅游的人数：_____人

★ 关于***该次家庭度假旅游***，下列各项目***最后的决定者是谁***，请您勾选适当的对象***(请注意是单选)***：

	父亲	母亲	子女	其他
1. 时间(出发月份).	□	□	□	□
2. 度假期间停留地方之个数	□	□	□	□
3. 停留天数	□	□	□	□
4. 和自己的家人或其他人	□	□	□	□
5. 旅游预算	□	□	□	□
6. 安静或是热闹的环境	□	□	□	□
7. 目的地(国家或地方)	□	□	□	□
8. 目的地有否阳光-海滩-水	□	□	□	□
9. 交通工具	□	□	□	□
10. 是否有动态行程(如步行，骑自行车)	□	□	□	□
11. 住宿	□	□	□	□
12. 是否具有文化旅游性质	□	□	□	□
13. 活动安排(旅行社或自行安排，组旅行团)	□	□	□	□
14. 是否适合小孩	□	□	□	□
15. 是否拜会接触其他人	□	□	□	□

★

关于您个人与家庭之资料：

1.性别：□男性　　　□女性

2.年龄：_____岁

3.家庭兄弟姊妹共有：_____位，您排行第_____位。

4.目前和您同住者：□父母亲两者 □父亲 □母亲 □两者皆无

5.家庭之主要经济来源为：□父母亲双方 □父亲 □母亲 □其他

6.家庭目前之阶段为*(请注意是单选)*：

　　(1) □*年轻父母*—户长(意指家庭之主要赋税申报者)年龄为 18-34 岁，且家庭中之最年幼子女年龄为 0-17 岁

　　(2) □*成熟父母*—户长年龄在 35 岁(含)以上，且家庭中之最年幼子女年龄为 0-17 岁

　　(3) □*成熟夫妻*—户长年龄在 35 岁(含)以上

　　(4) □*年长夫妻*—户长年龄在 55 岁(含)以上

7.户长之最高学历为：□高中/中专(含)以下 □大学/大专 □研究生

　8.户长之职业为：□家庭主妇/夫　□经商/实业　□政府机关　□研究/教学单位 □专业技术人员 □劳动工人 □其他：

—感谢您的合作，并请您再次检查有无漏答的题目—

No：_____

안녕하십니까? 가족 여행 의사결정에 관한 국가간 비교연구에 참여해주심에 진심으로 감사 드립니다. 본 설문은 약 15 분정도 소요될 예정이오며, 연구결과는 학술 연구와 관련 산업을 위한 중요한 참고자료가 될 것입니다. 수집된 데이터는 취합하여 통계적으로 분석하기 때문에 개인 응답 데이터는 공개되지 않음을 약속 드립니다.

> 최근에 하루 이상 가족여행을 갔던 귀하의 경험을 생각해 보십시오. 귀하는 가족 여행을 위하여 초기와 검색과 의사결정의 단계에서 부모님과 충분히 상의 했을 것으로 생각합니다.

★ 본인이 위에서 선택한 **가족여행의 특성**:

　　여행종류: □ 국내여행　　□ 해외여행

　　여행기간: _____일

　　여행에 함께한 가족 수: _____명

★ *귀하가 위에서 선택한 가족여행에서 다음과 같은 이슈를 누가 결정하였습니까?*

적절한 □에 체크하여 주십시오. (단, 하나의 보기만 선택해주십시오.)

F= 부; M= 모; C= 자녀; O= 기타	F	M	C	O
1.여행시점(출발 월)	□	□	□	□
2.방문할 장소의 수	□	□	□	□
3.여행 기간	□	□	□	□
4.여행구성원(가족 또는 다른 구성원)	□	□	□	□
5.여행 예산	□	□	□	□
6.여행 분위기(조용한 곳 또는 활기찬 곳)	□	□	□	□
7.목적지(나라, 장소)	□	□	□	□
8.여행지 유형(바다, 해변 또는 기타)	□	□	□	□
9.교통수단	□	□	□	□
10.활동적인 여행 여부(걷기, 사이클 등)	□	□	□	□
11.숙박	□	□	□	□

12.문화 체험활동 여부	□	□	□	□
13.여행의 유형(여행가이드/자유여행/패키지 여행)	□	□	□	□
14.아동 친화적인 여행 여부	□	□	□	□
15.여행지에서 다른 사람들과의 만남 여부	□	□	□	□

★ 다음은 사항에 대해 각 문항에 답해주십시오.

1.**성별:** □ 남   □ 여

2.**나이:** 만_____세

3.**형제/자매 :**_____명, 중에서 _____째

4.**같이 사는 사람:** □부모님 □아버지 □어머니 □함께 살지 않음

5.**가족을 위한 주요 소득 지원자:** □부모님 □아버지 □어머니 □기타

6.**현재 가족 생애 단계(택 1):**

*가장은 가족에서 가장 많은 세금을 신고하는 사람

    (1)□젊은 부모— 가장(18-34 세), 막내자녀(0-17 세)

    (2)□장년층 부모— 가장(35 세 이상), 막내자녀(0-17 세)

    (3)□장년층 부부—가장(35 세 이상)

    (4)□중년층 부부—가장(55 세 이상)

7.**가장의 최종학력:** □고등학교 이하 □전문대/대학 □대학원

8. **가장의 직업:** □가사 □사업 □공무원/공공기관 □교수/교사 □전문직
   □회사원 □기타:_____

—설문에 참여해주셔서 감사합니다. —

論文リスト

<u>査読付き論文</u>

Cheng, I. F., Su, C. J., Liao, H. H., Lorgnier, N., Lebrun, A. M., Yen, W. S., **<u>Lan, Y. F.</u>**, & Huang, Y. (2019). Adolescents' perceptions of mother-father dominance in family vacation decisions: A 25-society study. **Service Business, 13**(4): 755-778 **(SSCI/Scopus listed).**

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藍宜芳(2016)「旅行に際しての安全意識に関する研究－台湾の国内旅行における団体パッケージツアーの事例」『京都大学名誉教授森下正明研究記念財団・森下財団紀要第 1 号』PP.9-21、ISSN 2424-0249

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