

**Dissertationes Forestales 352**

**Chinese urban consumers' experience and  
consumption behavior with edible non-wood forest  
products**

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**ACADEMIC DISSERTATION**

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## ABSTRACT

Consumers globally have a long history engaging with edible non-wood forest products in both rural and urban settings, and involving diverse consumption practices. While edible non-wood forest products offer critical provisioning and cultural ecosystem services, current literature primarily emphasizes the conventional economic significance in rural areas, neglecting urban consumption patterns.

This thesis aims to investigate the forms and drivers behind urban consumers' experience and consumption behavior with edible non-wood forest products in the regional Chinese market. It explores urban consumer behavior around three key aspects: consumer purchasing, foraging, and pro-environmental consumption behavior of wild/cultivated non-wood forest products. Building upon the theoretical background of ecosystem services and the Motivation–Opportunity–Ability model, supported by the Theory of Planned Behavior model, this thesis lays out a conceptual framework of the driving factors of the consumption behavior. A mixed methods approach was employed methodologically, including the logistic regression analysis, a qualitative thematic analysis, and the structural equation model.

The findings reported in three articles I-III reveal diverse patterns in urban consumer consumption behavior concerning edible non-wood forest products, emphasizing the urban-rural nexus around these products. Motivation, opportunities, and abilities emerge as key drivers of consumption behavior. Pragmatism and sustainability dominate self-consumption purchases for tea, while Chinese *mianzi* and *renqing* motives prevail in gift-giving (I). A greater diversity of motivation exists in berry-picking, particularly among younger urban families (II). Social norms and culture are influential in shaping consumer attitudes (I, II, III). High-quality product availabilities, convenience, services, and social media marketing channels offered by producers and distributors constitute vital consumption opportunities (II, III). Additional actors such as local networks will be supportive (II). Personal knowledge and consumer habits also shape consumption behavior (III). These findings provide managerial implications for farmers, marketers, and policy makers, encouraging further research in this area.

**Keywords:** Consumer, Behavior, Food, Ecosystem Services, Urban-Rural Nexus, Marketing

## TIIVISTELMÄ

Kuluttajilla maailmanlaajuisesti on pitkä historia osallistumisestaan syötävien metsäntuotteiden kulutukseen ja keräilyyn sekä maaseutu- että kaupunkiympäristöissä. Syötävät metsäntuotteet ovat tärkeitä erityisesti ravinnon ja kulttuuristen ekosysteemipalvelujen näkökulmasta, ja siirtävät kulttuurista ja henkistä merkitystä yksilöille ja yhteisöille vaikka niiden perinteisenä roolina on toimia ruoan ja muiden hyödykkeiden lähteenä. Nykyinen tutkimus keskittyy pääasiassa ei-puupohjaisten metsäntuotteiden taloudelliseen ja elinkeinolliseen merkitykseen maaseutualueilla. On siten tarvetta tutkia kaupunkikuluttajien kokemuksia ja vaatimuksia näistä tuotteista, erityisesti siirtymätalousmaiden markkinoilla.

Tämä väitöskirja pyrkii tutkimaan erilaisia muotoja ja syitä kaupunkilaiskuluttajien syötävien metsäntuotteiden taustalla kokemusten ja kulutuskäyttäytymisen näkökulmasta Kiinan alueellisilla markkinoilla. Tutkimus tarkastelee kuluttajien käyttäytymistä kolmesta keskeisestä näkökulmasta: osto-käyttäytymisessä, kuluttajien kokemukset metsäntuotteiden keräämisessä ja ympäristöystävällisyyden merkityksestä kulutuskäyttäytymisessä. Teoreettinen tausta liittyy pääasiassa ekosysteemipalveluihin ja Motivaatio–Mahdollisuus–Kyky -malliin sekä suunnitellun käyttäytymisen teoriaan. Tämä väitöskirja esittää käsitteellisen viitekehyksen kaupunkilaiskuluttajien kokemuksen ja kulutuskäyttäytymisen ajureista. Työ yhdistää kvalitatiivista haastattelumenetelmää ja kvantitatiivista kyselymenetelmää kehitetyn kehyksen selvittämiseksi ja validointiin.

Tulokset joita on raportoitu artikkeleissa I-III paljastavat monipuolisuuden kaupunkikuluttajien kulutuskäyttäytymisen syötävien metsäntuotteiden suhteen, korostaen vahvistuvaa kaupunki-maaseutu-yhteyttä näiden tuotteiden ympärillä. Tulokset (I) korostavat motivaatiota merkittävänä kuluttajakäyttäytymisen ajurina. Yhteys löytyy kiinalaiseen kulttuurin ja kaupunkikuluttajien motiivien välillä teen ostamisen yhteydessä. Kestävyys ja pragmaattisuus ovat hallitsevia motivaatioita omaan käyttöön tulevaan ostokäyttäytymiseen liittyen, kun taas lahjaostoksissa kiinalainen mianzi ja renqing olivat vallitsevia motiiveja. Marjojen keräämistä koskevilla toimilla havaittiin monipuolisempia motiiveja erityisesti lapsiperheissä ja tiettyihin demografisiin ryhmiin kuuluvien kaupunkilaiskuluttajien keskuudessa (II). Yhteiskunnalliset normit ja kulttuuri vaikuttivat kuluttajien asenteisiin ja uskomuksiin (I, II, III). Lisäksi laadukkaat tuotteet ja palvelut sekä tuottajien ja jakelijoiden tarjoamat sosiaalisen median markkinointikanavat loivat uusia kulutusmahdollisuuksia (II, III). Tutkimus osoitti myös, että kaupunkilaiskuluttajien henkilökohtainen tietämys ja tapojen rakentuminen ovat metsäntuotteissa keskeisiä tekijöitä. Nämä tulokset tarjoavat uusia näkökulmia siihen, miten kaupunkilaiskuluttajat osallistuvat ei-puupohjaisten metsäntuotteiden markkinoihin, mikä luo pohjaa lisätutkimuksia tällä alueella.

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Lingyun Tong  
April 2024  
Helsinki, Finland

## LIST OF ORIGINAL ARTICLES

This thesis is comprised of three articles, denoted by Roman numerals, in addition to the summary. All three articles have been published. Reproduction of all articles is carried out with the kind permission of the publishers.

- I. Tong L, Toppinen A, Wang L (2021) Cultural motives affecting tea purchase behavior under two usage situations in China: a study of renqing, mianzi, collectivism, and man-nature unity culture. *J Ethn Foods* 8: 1-10. <https://doi.org/10.1186/s42779-021-00092-6>.
- II. Tong L, Toppinen A, Wang L, Hu M (2024) Exploring the Urban Consumers' Experience and the Influencing Factors in Berry-Picking Activities in China. *For Trees Livelihood*: 1–14. <https://doi.org/10.1080/14728028.2024.2340450>.
- III. Tong L, Toppinen A, Wang L, Berghäll S (2023) How motivation, opportunity, and ability impact sustainable consumption behaviour of fresh berry products. *J Clean Prod* 401, article id 136698. <https://doi.org/10.1016/j.jclepro.2023.136698>.

## DIVISION OF LABOR IN COAUTHORED ARTICLES

	I	II	III
Concept and design	LT, AT, LW	LT, AT	LT, AT
Data collection	LT, LW	LT, MH	LT, LW
Data analysis	LT, AT, LW	LT	LT, SB
Manuscript writing	LT	LT	LT
Editing and reviewing	LT, AT, LW	LT, AT, LW, MH	LT, AT, SB, LW
Overall responsibility	LT	LT	LT

LT=Lingyun Tong, AT=Anne Toppinen, LW=Lei Wang, SB =Sami Berghäll, MH= Meijun Hu

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**LIST OF ACRONYMS**

NWFPs	Non-Wood Forest Products
ES	Ecosystem Services
PES	Provisioning Ecosystem Services
CES	Cultural Ecosystem Services
SES	Supporting Ecosystem Services
MOA	Motivation-Ability-Opportunity
TPB	Theory of Planned Behavior



## **ERRATA**

In the authorship contribution statement in the article III, Lingyun Tong was responsible for writing- drafting, reviewing, and editing.



# 1. INTRODUCTION

## 1.1 Contextual background

According to the definition given by the United Nations Food and Agriculture Organization (FAO), edible non-wood forest products (NWFPs) refer to edible physical and tangible biological items originating from forests other than wood. This definition, emphasizing on the wild products which largely reproduce on their own, does not exclude cultivated or domesticated ones which may appear under agroforestry practices (Shackleton et al. 2011). These edible NWFPs encompassing both wild and cultivated forms can be consumed as food or medicinal materials, involving but not limited to nuts, edible fungi, tea, and berries (Kiprop et al. 2017; Shackleton & De Vos 2022). Compared to processed and industrial food alternatives, these natural foods have garnered increasing interest globally (Shackleton & De Vos 2022). They not only offer functional benefits, such as vitamin C and the antioxidants in berries (Bozkurt et al. 2013), but also possess unique economic and social value. That is, these edible NWFPs supplement the income of rural residents (Peltola et al. 2014), offer economic benefits to local communities (Kusters & Belcher 2004), and their value are often intertwined with local culture. For example, the Chinese bayberry (*Myrica rubra Sieb et Zucc*) is steeped in cultural narratives that have shaped the consumption of bayberries in Chinese daily life since the Han dynasty, with its presence recorded in a wealth of classical poems (Wang & Williams 2015). In addition, edible NWFPs, as renewable resources, have also garnered attention from governmental bodies and scholars because of their considerable potential for environmentally sustainable forest product development (Byron & Arnold 1999; Zhu et al. 2019). The utilization of these products presents an opportunity to harmonize the inherent contradictions between ecological preservation imperatives and the imperative for household livelihood development (Živojinović et al. 2017).

Ecosystem services (ES), a term coined by Costanza et al. (1998), are the benefits people can receive from the natural ecosystem, a complex of the animal, plant, micro-organism and non-living environment, according to MEA (2005). The concept highlights the vital role of the natural ecosystem for human well-being and increases people's awareness of the value of ecosystems (Costanza 2008; Pascual et al. 2017). As a critical component of the ecosystem, NWFPs can benefit human beings via ecosystem services they provided. Ecosystem services are argued to be highly valuable to families, communities, and regional and national economics (Costanza et al. 1998; Boyd & Banzhaf 2007). The ecosystem services conceptual framework suggests that consumers, as human beings, are integral entities of the ecosystem and there is a dynamic interaction between the human being and edible NWFPs in the natural ecosystem (MEA 2005).

While Shackleton and De Vos (2022) define the people utilizing NWFP as users, dependents, and traders of NWFPs, this thesis focuses exclusively on urban individuals who collect and consume wild/cultivated edible NWFPs. These individuals are referred to as consumers here. On a global scale, edible NWFPs are recognized for their economic and cultural importance, serving as a manifestation of the provisioning and cultural ecosystem services they offer (CIFOR 2011; Shackleton 2022). From consumers' perspective, a large proportion of the consumers worldwide, rural and urban, have been engaged with edible NWFPs for a long time (CIFOR 2011). Literatures suggest that individual consumer behavior regarding edible NWFPs include both transactional (e.g., purchasing) and non-transactional (e.g., wild forage) aspects (van Doorn et al. 2010; Cambra-Fierro et al. 2014; Jaakkola &

Alexander 2014). Tables 1 and 2 have summarized the selected studies concerning consumers' consumption behavior and their experience with edible NWFPs in developed and emerging countries and markets.

Studies in the context of the Global North acknowledge a variety of values associated with NWFPs beyond their direct economic significance. For instance, studies emphasize the relevance of NWFPs beyond their economic value in Europe, connecting them to cultural heritage and territorial identity. In Canada, berry-picking is considered an important cultural activity contributing to spiritual, personal, and community well-being (Boulanger-Lapointe et al. 2019). In other cases, edible NWFPs are increasingly viewed as niche-marketed products or well-being products embedded with recreation and educational services (de Arano et al. 2018, 2021). Yet, the research in emerging countries and markets still emphasizes more the subsistence and livelihood use of NWFPs as food, despite a few studies suggesting the cultural and social merits behind (e.g., Rosardi 2021). The contention is that current global estimates may have overlooked societal changes in these regions and countries (Shackleton & De Vos 2022). Indeed, due to rapid urbanization rates, a marked decrease in poverty (by approximately 75% over the past two decades), and alterations in education levels across a significant portion of Asia and sub-Saharan Africa, the pattern of edible NWFP consumption and the traditional rural settings for NWFP studies are subject to changes as well (Schlesinger et al. 2015). Utilizing the updated CIFOR data from 2016, it is estimated that 47-95% of households in towns and cities across the emerging markets are engaged in the use or collection of at least one NWFP (Shackleton & De Vos 2022). The median figure for NWFP urban users is estimated to be around 2.06 billion, which is 0.85 billion less than the rural user population (Shackleton & De Vos 2022). A broader perspective in NWFP studies that considers the evolving urban dynamics in emerging markets is necessary, paving the way for more inclusive and effective policies and better marketing strategies.

Understanding the complexities of edible NWFP-related ecosystem services and their relationship with urban consumers can help to make decision-making around these natural products more informed. It is hoped that policymakers and other stakeholders will be motivated to involve local communities and individual consumers in decision-making processes concerning the management and development of edible NWFPs (Pan et al. 2022). The integration of edible NWFPs into national forestry strategies, biodiversity action plans and other policy frameworks can further promote the sustainable use and management of forest resources (Liu et al. 2008; He et al. 2014).

**Table 1.** Summary of consumer experience and consumption behavior concerning NWFPs in developed markets.

<b>Title</b>	<b>NWFP</b>	<b>ES</b>	<b>Consumer Context</b>	<b>Regional Context</b>	<b>Researcher</b>
Perspectives on non-wood forest product development in Europe	Various NWFPs	PES, CES	General public	Europe	Wiersum et al. (2018)
The practice of entrepreneurship in the non-wood forest products sector: Support for innovation on private forest land	Elderberries, tea, mushroom	PES, CES	National and local consumer	Europe	Ludvig (2016)
Developing forest-based bioeconomy in the Region of North Karelia, Finland	North Karelian chaga, reishi mushroom	PES, CES	National and international consumers	Finland	den Herder (2022)
Recreational Wild Berry Picking in Finland-Reflection of a Rural Lifestyle	Wild berry	PES, CES	Not specified	Finland	Pouta et al. (2006)
Urban Consumers' Attitudes Towards Non-wood Forest Products and Services in Switzerland and an Assessment of Their Market Potential	Honey, berries, mushroom, chestnut	PES, CES	Urban consumers	Swiss	Seeland et al. (2007)
A comparative study of the legal and grey wild product supply chains	Wild blueberry	PES, CES	Rural communities	Latvia	Grivins (2016)
Berry Plants and Berry Picking in Inuit Nunangat: Traditions in a Changing Socio-Ecological Landscape	Berry	PES, CES	Inuit	Canada	Boulanger-Lapointe et al. (2019)
Ecological knowledge, subsistence, and livelihood practices: the case of the pine mushroom harvest in northwestern British Columbia	Mushroom	PES	First Nations	Canada	Menzies (2006)

**Table 2.** Summary of consumer experience and consumption behavior concerning NWFPs in emerging markets.

Title	NWFP	ES	Consumer Context	Regional Context	Researcher
Non-timber forest products and village livelihoods in Rajasthan, India: adaptation in a changing environment	Chironji, edible gum, seasonal fruits, honey	PES	Ruralists in village of Khanda Sharol, Rajasthan	India	Natcher et al.(2018)
Integrating livelihoods and conservation in protected areas: understanding the role and stakeholder views on prospects for non-timber forest products, a Bangladesh case study	Bush meat, fruits, honey, wild cardamom	PES	Rural families in Northeast Bangladesh	Bangladesh	Mukul et al.(2010)
Distribution, abundance, and traditional management of Agave potatorumin the Tehuacán Valley, Mexico: bases for sustainable use of non-timber forest products	Tobala (ingredient for Mezcal)	PES, SES	Ruralists in village and territory of San Luis Atolotitlán (SLA)	Mexico	Delgado-Lemus et al. (2014)
Ethnicity and the utilization of non-wood forest products: findings from three Philippine villages	Various edible plants and honey	PES	Villagers (Indigenous people and the migrants)	Philippines	Lacuna-Richman (2003)
Importance of Non-Timber Forest Products (NTFPs) in rural livelihood: A study in Patharia Hills Reserve Forest, northeast India	Several edible NWFPs	PES	The fringe village people	India	Nazimur et al. (2021)
Multiple values from the forest: contribution of non-wood forest products to livelihoods of local communities in northeastern Thailand	Various edible NWFPs	PES	Rural residents in northeastern Thailand	Thailand	Ormsby et al.(2021)
Sustainable Tourism Model in Pagilaran Tea Plantation Agrotourism, in Indonesia	Tea	PES, CES	Domestic and foreign tourists	Indonesia	Rosardi (2021)
Tea heritage tourism: evidence from Sri Lanka	Tea	PES, CES	Domestic and foreign tourists	Sri Lanka	Jolliffe & Aslam (2009)

## 1.2 Research aim

The interactions between consumers and edible NWFPs reflect a deeper connection among consumers, non-wood forest products, local environment, and culture. However, the connection between urban consumers and edible NWFPs in the context of a single market, China, where NWFPs used to be considered important for subsistence has been little explored in urban settings (Schlesinger et al. 2015; Shackleton & De Vos 2022). Considering this, this thesis aims to explore the different manifestations and drivers of urban consumers' experience and consumption behavior with edible NWFPs in the Chinese market (Fig. 1.).

The purchasing consumer behavior, which is transaction-oriented, will be discussed in Article I. Edible NWFPs are often accorded cultural and social meanings. Since there is the customary practice to present tea as gifts in China, both self-use purchase behavior and gift-giving oriented purchase behavior are explored in Article I. In addition to buying behavior, there seems to be a growing tendency towards rural tourism and natural product picking in China. Such picking experience, commercial or non-commercial, indicates a deeper connection between edible NWFPs and urban consumers beyond transactions, and will be discussed in Article II. Finally, within the Sustainable Development Goals (SDGs) framework and the nature of NWFPs, this thesis is also interested in analyzing the pro-environmental consumption behavior of urban consumers. As people are looking for natural and healthier food, and consumers are taking an ever more important role in the transit to sustainable development, this thesis explores different dimensions of the sustainable consumption behavior and its driving forces in Article III.

Research sub-questions to be addressed are listed below:

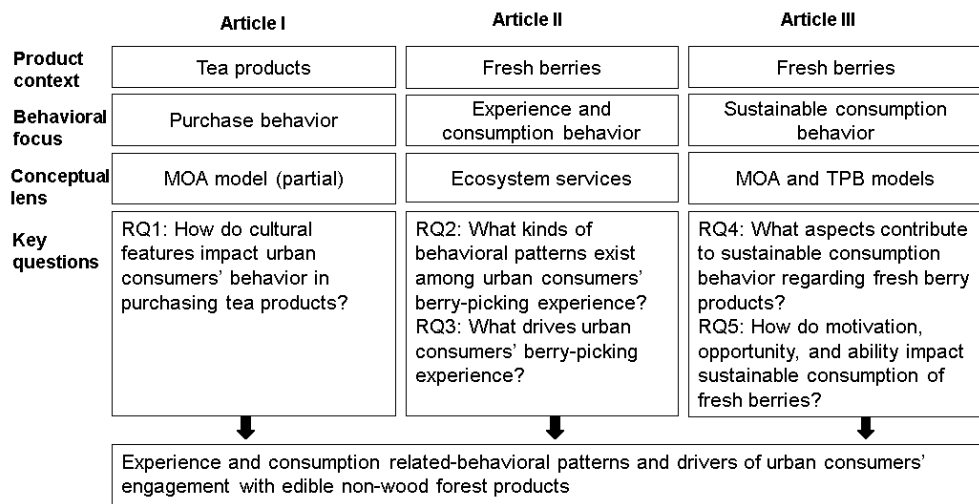
RQ1: How do cultural features impact urban consumers' behavior in purchasing tea products?

RQ2: What kinds of behavioral patterns exist among urban consumers' berry-picking experience?

RQ3: What drives urban consumers' berry-picking experience?

RQ4: What aspects contribute to sustainable consumption behavior regarding fresh berry products?

RQ5: How do motivation, opportunity, and ability impact sustainable consumption of fresh berries?



**Fig. 1.** The positioning of the dissertation.



## 2. CONCEPTUAL BACKGROUND

### 2.1 Concept of ecosystem services

Ecosystem services (ES) refer to the benefits people receiving from the natural ecosystem (MEA 2005). Suggested by Chaudhary (2015) and Gómez-Baggethun et al. (2011), ecosystem services research has gone through stages involving utilitarian framing (1960s-1990s), monetization (1960s-1990s), appropriation and exchange (1970s-2000s), expanding interest and uptake by global actors (2000s-2010s). The recent monumental efforts of Millennium Ecosystem Assessment (MEA) (2005) and The Economics of Ecosystems and Biodiversity (TEEB 2010) have led to an exponential growth in ES studies (Jiang et al. 2021). Since 2011, ES-related studies have increased exponentially (Droste et al. 2018). During the period of 2011 to 2016, the main ES topics were centered around ES assessment, ES governance and ES in different ecosystems (ibid). The expanding interest and uptake by global actors demonstrate a growing recognition of the importance of incorporating ecosystem services into decision-making across various sectors (Fisher et al. 2008; Balmford et al. 2010; Burkhard et al. 2012), including China. There are an estimated 995 papers on ES-related topics in China in the Web of Science core collection (Jiang et al. 2021) from 1997 to 2016, in addition to the large number of studies reported in Chinese and inaccessible to the global research community (Liu & Costanza 2010).

The following section summarizes the contribution of edible NWFP-related ecosystem services to consumers (Table 3.). First, the provisioning ecosystem services (PES) refers to products people obtained from ecosystems for basic needs including food, minerals, water, fuel, and shelter (MEA 2005). Edible NWFPs can provide edible food, medicines, fiber, and other materials and nutrition, which in fact generate economic returns to local communities and that are critical for human well-being (Chamberlain 2017). Despite the limited valuation research and data on NWFP provisioning services, personal uses of edible NWFPs seems widespread (Robbins 2008). Further quantifying and utilizing their provisioning service may require both market estimation (such as market price, quantity harvested) and non-market estimation (in the case of nonmarket personal consumption) and thus needs deliberation from consumers (Chamberlain et al. 2017).

Second, cultural ecosystem services (CES) refer to benefits which are nonmaterial but can be experienced and are essential to the human spiritual pursuit (MEA 2005). Culture is defined as traditions and learned customs in behavior and thinking expressed as daily practices, in particular those maintaining social cohesion in specified biophysical environments (Lake et al. 2018). MEA (2005) categorizes six indicators of cultural ecosystem services, including cultural identity, heritage value, inspiration, spiritual functions, recreational tourism, and aesthetic appreciation. It is argued that cultural ecosystem services of edible NWFPs arise from the economic and social practices surrounding their harvesting and utilization (Burger et al. 2008; Fisher et al. 2008; Lake et al. 2018). Specific utilization may involve ceremony, distribution, traditional teachings and harvesting (Lake et al. 2018). Certain edible NWFPs can offer significant cultural and spiritual value to local communities. The cultural ecosystem services can aid in preserving values and associated traditional knowledge systems, while it is observed that cultural services are dynamic and that interactions between climatic variability impacts, governance, and cultural uses of NWFPs should be further analyzed (Lake et al., 2018).

In addition, the supporting ecosystem services (SES) refers to benefits which are

necessary to maintain the function of all other ecosystem services; for instance, pollination, nutrient cycling, and seed dispersal (MEA 2005). SES provided by edible NWFPs may include biodiversity conservation, because while these products often depend on intact and healthy ecosystems, they in turn help maintain important biodiversity and ecological functions (Read & Perez-Moreno 2003; Hackett 2015). Some edible NWFPs such as berries are important sources of pollen to attract pollinators, and as such, play a role in supporting pollinator populations and, ultimately, pollination services (Cavigliasso et al. 2021). In addition, products such as fungi can contribute to regulating soil nutrient cycling, decomposition by breaking down dead organic matter and recycling nutrients back into the soil, maintaining healthy soil quality and supporting the growth of other plant species (Read & Perez-Moreno 2003; Hackett 2015).

Ecosystem services play a pivotal role in shaping decision-making processes concerning the governance and development of edible non-wood forest products. They provide a foundational framework for understanding the benefits and trade-offs associated with land use and development decisions (Daily et al. 2011). Given the value to families, communities, as well as regional and national economies (Costanza et al. 1998; Boyd & Banzhaf 2007), decision-making related to edible NWFP management should be well-informed and sustainable. The needs of various stakeholders should be considered (MEA 2005), including individual consumers. In fact, policymakers and stakeholders are increasingly encouraged to engage consumers and local communities in decision-making processes pertaining to the management and utilization of these resources (He et al. 2014; Pan et al. 2022). This interconnected approach effectively bridges the governance and development guidelines for edible NWFPs with the ecosystem services framework, fostering a more comprehensive and holistic perspective on resource management. As a result, edible NWFPs and their consumers are more likely to be integrated into national and local forestry strategies, rural development policy frameworks, and biodiversity action plans, aligning with the principles of sustainable use and management of forest resources (Liu et al. 2008; He et al. 2014).

**Table 3.** Summary of ES provided by edible NWFPs.

ES	Service indicators	Sources
PES	Food and medicines	Saha and Sundriyal (2012); Alamgir et al. (2016); Chamberlain et al. (2017); Caleño-Ruíz et al. (2018); Frey et al. (2019)
	Subsistence income provision	
	House-building materials	
	Cooking fuel	
CES	Aesthetic services, such as craft	Burger et al. (2008); Fisher et al. (2008); Pröpper and Haupts (2014); Chamberlain et al. (2017); Lake et al. (2018)
	Spiritual and religious services	
	Education	
	Recreation and ecotourism	
SES	Nutrient cycling	Read & Perez-Moreno (2003); Hackett (2015)
	Biodiversity conservation	

## 2.2 Concept of the MOA model and the TPB model

The analytical framework is mainly based on the Motivation-Ability-Opportunity model (MOA), supported by the theory of planned behavior (TPB) model (Fig. 2.). The MOA model (Ölander & Thøgersen 1995) offers valuable insights into the explanations of consumer behavior. Motivation encompasses both affective and cognitive goal-oriented performance that guides the direction and intensity of a specific behavior. It involves aspects, such as personal attitudes, value, intentions, and social norms in the original MOA model (Ölander & Thøgersen 1995). Opportunity pertains to the circumstances that enable people to engage in desired behavior, while ability relates to resources which people possess that facilitate the realization of desired outcomes (Ölander & Thøgersen 1995). Additionally, the TPB (Ajzen 1985), widely used for comprehending and predicting consumer behavior (Kautish & Sharma 2019), sheds light on more detailed explanations. The TPB model posits that consumer behavior is influenced by behavioral intentions, which are shaped by personal attitudes toward a behavior, social norms, and perceived behavioral control. Personal attitudes and values can be influenced by social norms and culture, and internalized as personal norms and beliefs (Ajzen 1985). Both models posit that consumer behavior is influenced by volitional factors like personal attitudes and subjective norms, as well as non-volitional factors such as regulation or perceived control over the behavior (Ajzen 1985; Kautish & Sharma 2019).

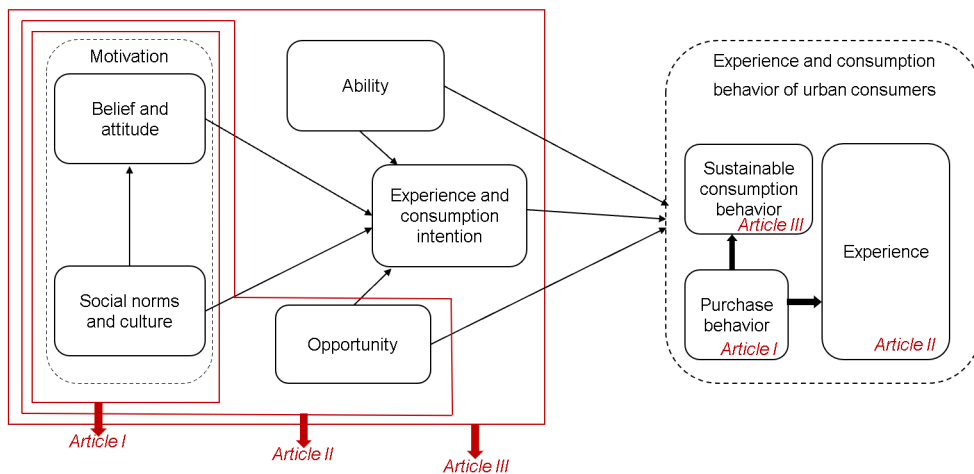
On the basis of Ölander & Thøgersen (1995), this thesis defines motivation as personal value and attitudes towards certain behavior, social norms, and culture. Personal value and attitudes are individuals' emotional and cognitive evaluations of behaviors or objects in specific situations. It can be developed affectively, cognitively, and conatively (Hansen et al., 2018). For example, a pro-environment attitude is considered one fundamental concept in environmental psychology (Kautish & Sharma 2019). Social norms represent commonly recognized agreements, including social approval and pressure regarding appropriate or inappropriate behavior (Ajzen 1985). Suggested by social comparison theory, consumers tend to compare their values and beliefs against the perceptions of peer norms (e.g., O'Fallon & Butterfield 2011). Individuals shaped by social norms are more likely to heed the counsel of influential figures like friends, family, peers, and society (Ghazali et al. 2019).

Despite the different streams to conceptualize culture at aggregated levels, culture refers to the shared beliefs, general value (e.g., collectivism), domain-specific value (e.g., environmentalism), as well as ingrained habits and traditional practice (e.g., the tea consumption tradition) that may impact individuals at the micro level in this thesis (Soyez 2012). Numerous studies have illuminated the impact of culture on consumer motivations (e.g., Hamelin & Thaichon 2016; Moriuchi 2018). In China, for instance, the intricate patterns of consumer tea consumption are intricately intertwined with a rich tapestry of social and religious influences spanning from ancient Daoism, Confucianism to Buddhism in the Tang dynasty (Cheng et al. 2010; Benn 2015). Another example is that the sophisticated tea rituals and the use of tea as gifts allow individuals to assert a heightened sense of manhood, garner respect from their peers, and enhance their social standing (Hinsch 2015). It is argued that an individual's self-motivation (beliefs and value) may initially stem from social norms and culture, and can be internalized as personal norms and attitudes (Zhu 2016). It may also be worth noting that the influences of culture and social norms on individual motivation and behavior can be dynamic and situational, subject to societal changes particularly as people engage with multiple cultures (Morris et al. 2015).

While the connection between personal motivation and consumer behavior has been established, this connection can be reinforced with the behavioral intention, as suggested by

Ajzen's TPB theory. Behavioral intention indicates the degree to which people are willing to perform a behavior, with stronger intentions leading to a higher likelihood of performance. This relationship between consumer intentions and purchase behavior has been observed in previous research (Ajzen 1985; Singh & Verma 2017).

Behavioral intention can be translated into behavior when individuals will solely determine the behavior's performance. However, more often, nonmotivational factors come into play. Ability can be viewed objectively as facilitating conditions and situations applicable to all individuals. For instance, knowledge about a product enhances one's ability to act upon it (Ölander & Thøgersen 1995). Another nonmotivational factor is the opportunity, perceived as a situational phenomenon (Ölander & Thøgersen 1995). Factors such as time availability, product availability, marketing, and labeling can either encourage or hinder behaviors. Lack of opportunity acts as a barrier to behavior, whereas a sufficient opportunity encourages consumer behavior. Environmental mechanisms, like information and infrastructure, positively affect recycling intentions and support green buying, as suggested by the classic TPB model (Ajzen 1985).



**Fig. 2.** The research framework of urban consumers' experience and consumption behavior in terms of the MOA and TPB models.

### 3. METHODOLOGIES AND RESULTS

#### 3.1 Overview of the research methods

This thesis combined a mix of qualitative and quantitative research methods to explore the display and influencing factors of urban consumers' experience and consumption behavior with edible NWFPs. Drawing on theoretical foundations, Article I quantitatively explored the motivational factors, arising from Chinese culture, that impacted the purchasing behavior of urban consumers in two usage contexts. Article II provided a qualitative analysis of factors which influenced urban consumer participation in berry-picking activities. Article III extended its focus to the realm of sustainable consumption behavior regarding edible NWFP, investigating how motivation, opportunity, and capability influenced consumers' engagement in sustainable berry consumption practices. Table 4 presents a summary of the methods and key results of each article.

**Table 4.** Summary of methodologies and key results.

Article	I	II	III
Method	Quantitative, factor analysis and binomial logistic regression analysis	Qualitative, thematization	Quantitative, covariance-based structural equation modelling technique
Data sources	Face-to-face structured interviews in 3 cities in Zhejiang province (N = 280)	Semi-structured interviews in Zhejiang province (N = 24)	Face-to-face structured interviews in 4 cities in Zhejiang province (N = 413)
Main results	1) Five culture-driven consumer motives were confirmed. 2) Motives of sustainability and pragmatism were positively associated with tea purchase for self-use purposes, while motive of brand and prestige chasing were positively associated with tea purchase for social use purposes.	1) Three categories of berry-collecting activities were found. 2) Five motivations were identified: recreation and social connection, desire for high quality berries, nature-based education, back-to-nature, and <i>Jie Qi</i> culture. 3) Key non-emotional driving factors were identified: social media marketing, convenience, service capability, and berry quality.	1) Four factors (motivation, opportunity, intentions, and ability) were confirmed as significant facilitators. 2) The motivation, the opportunity and the ability influenced self-claimed sustainable consumption behavior in different ways.

*Note: N refers to the number of interviews.*

### 3.2 Context of the research

Data in this thesis was collected from cities within Zhejiang province in China. The choice of Zhejiang as the research site is driven by relevant considerations, in addition to time and budget constraints. The considerations include the province's relevance to the research objectives, data availability, and data diversity.

From the selected edible non-wood forest product point of view, Zhejiang province possesses a relatively abundant supply, with a particular focus on berries and tea, as emphasized in this study. Zhejiang province is renowned for its an enduring tea-drinking culture (Benn 2015), and has earned recognition as a major green tea production region (Dewar & Li 2007). It is also a key producer of blueberries (*Vaccinium spp.*) (Zhang et al. 2015; Yu et al. 2021), strawberries (*Fragaria × ananassa*) (Zhang et al. 2014), and the red bayberry (*Myrica rubra Sieb. & Zucc.*), a native subtropical fruit tree that has long been grown and consumed as a fruit and medicine in China (He et al. 2004). Commercial berry and tea picking farms are available for urban consumers within the province, partly driven by the province's favorable climatic conditions and the successful cultivation history (Chen et al. 2003).

Second, Zhejiang province stands out with its substantial and continuously growing population base, making it a valuable indicator for future urban consumer purchasing patterns in China at large (Zhejiang Statistic Bureau 2017). In particular, the capital city of Zhejiang, Hangzhou, famous for its green tea (Dewar & Li 2007), is perceived as a rapidly developing city with an increasing number of immigrants and rising purchasing power (Wei & Li 2002). Other cities in the province, where interviews were conducted, including Jiaxing, Ningbo, Wenzhou, Taizhou, have also undergone rapid development, presenting a growing population base. In addition, the province's rapid urbanization provided a dynamic and diverse backdrop for the investigation into sustainable edible non-wood forest product consumption practices. These factors collectively underscored the rationale behind choosing the cities in Zhejiang province as the interview sites for the research.

### 3.3 Ethical deliberations

In the pursuit of this research, which integrated both quantitative and qualitative methodologies, considerations regarding anonymity, confidentiality, and data management are considered key aspects of ethical practice. We outline below these ethical practices employed throughout the research process. In Articles I and III, where quantitative research methodologies were applied, the purpose, procedures and how data would be used were clearly communicated to interviewees, and interviewees provided consent for their involvement in quantitative data collection. When sensitive or personal information (e.g., income range in Article I) were requested, all data were anonymized and aggregated to ensure that the individual identities of participants were not disclosed inadvertently. As for Article II, in which qualitative research methodology was adopted, all interviewees were told the purpose and nature of the interviews. When sensitive or personal information (e.g., marriage situation and family condition in Article II) were asked about, the details of the respondents were coarsened and stripped of any identifying information. All interview transcripts were carefully reviewed to ensure that any potentially identifying information, such as names and specific locations, was removed. In fact, in reporting the qualitative findings, interviewees' pseudonyms (codes) were used to ensure complete confidentiality. Direct quotations were

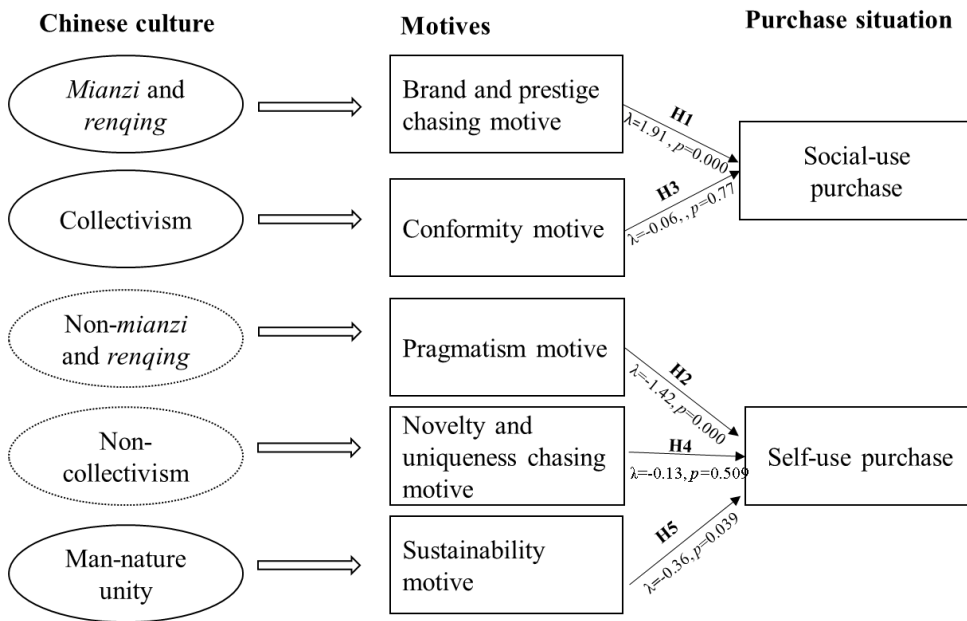
attributed to codes only. This de-identification process was rigorously implemented to protect the identity of the respondents. In addition, anonymized data were encrypted and stored in a password-protected database accessible only to authorized research members. By adhering to these ethical standards, we sought to not only contribute valuable knowledge to the field but also to uphold the trust and respect of the individuals who generously shared their perspectives.

### 3.4 Analysis and results from article I

Article I examined the motives which drive Chinese consumer behavior in purchasing tea products in self-use and gift giving situations, after considering the influence of the Chinese *mianzi*, *renqing*, collectivism, and man-nature unity culture. A theoretical deduction of Chinese culture's impacts on consumer motives was conducted. Based on the theoretical analysis, five culture-driven categories of consumer motives were proposed and later examined with factor analysis, that is 1) sustainable motive, 2) brand and prestige chasing motive, 3) social confirmatory motive, 4) novelty and uniqueness chasing, and 5) pragmatic motive. Article I hypothesized that tea purchase for social use purposes was positively affected by the brand and prestige chasing motive, and the conformity motive, while tea purchase for self-use purposes was positively affected by the pragmatism motive, the novelty and uniqueness chasing motive, and the sustainability motive (Fig. 3.). These impacts of proposed consumer motives on purchase behavior were examined with logistic regression.

To validate our hypotheses, adult Chinese urban consumers were recruited in shopping centers and tea houses in Hangzhou, Jiaxing and Ningbo cities in Zhejiang province. Interviewees were asked to recall their most recent purchase of tea products, whether the purchase was for social use or for self-use. Each of the proposed motive attributes was assessed through a series of attribute-related questions, with respondents indicating their agreement or disagreement on a 5-point Likert scale. Demographic variables were employed to understand the sample, including gender, place of birth, age, ethnic group, education background, occupation, and monthly household income. A total of 280 valid samples was retained.

All five key motives were identified by the factor analysis (Appendix A). The reliability of the factor analysis was gauged using Cronbach's  $\alpha$  (0.726), KMO (0.808), eigenvalues exceeding 1. This configuration accounted for 60.7% of the overall variance related to the dependent variable (Nagelkerke  $R^2 = 0.602$ , Cox and Snell  $R^2 = 0.450$ ). The log-binomial regression results revealed that three out of five motives were proved to influence purchase behavior at the 0.05 significance level. That is, the sustainability and pragmatism motives were proved positively associated with the tea purchase for self-use purposes, while the brand and prestige chasing motive was positively associated with the purchase for social use purposes. The novelty-and-uniqueness motive was also positively associated with the purchase for self-use purposes at close to the 0.05 significance level. With a larger sample size, this relation could be more significant. The Omnibus tests indicated that the entire logistic model was significant at the 0.0001 level.



**Fig. 3.** Analysis framework and logistic regression result (Adapted from article I).  $\lambda$  refers to coefficient in the log-binomial regression model, indicating the change in the log odds of the tea purchase behavior for a one-unit change in the consumer motives.

The results indicated the motive of chasing brands and prestige influenced the purchasing decision for ordinary goods, such as tea, for social purposes. This is particularly relevant under the Confucian's concepts of *mianzi* and *renqing*, which are important in the context of outshopping luxury consumption (Yong et al. 2010), and purchases as a way of self-expression (Cătălin & Andreea 2014). Further, sustainability consciousness indicated that the Sinitic man-nature harmony philosophy remained among urban consumers in Zhejiang province, if not all provinces in China. Edible non-wood forest products, such as tea, often reckoned as healthy and non-artificial food, may be of more potential among Chinese urban consumers. Having said that, the pragmatic motive also suggests the value in price matters to urban consumers who consume tea for daily consumption. Therefore, the product quality and price may also constitute important criteria.

### 3.5 Analysis and results from article II

Article II was largely motivated by the growing tendency to combine fruit-picking activities with sightseeing in rural areas in China (Huang et al. 2014; Cui et al. 2021), and the gap of research on the engagement of consumers in such fruit-picking activities in urban settings (Shackleton & De Vos 2022). The aim of this article was to understand and interpret urban consumers' berry-collecting experience and behavior, as well as to explore factors influencing their berry-picking experience.

The qualitative approach is beneficial for interpreting the subjective experience of

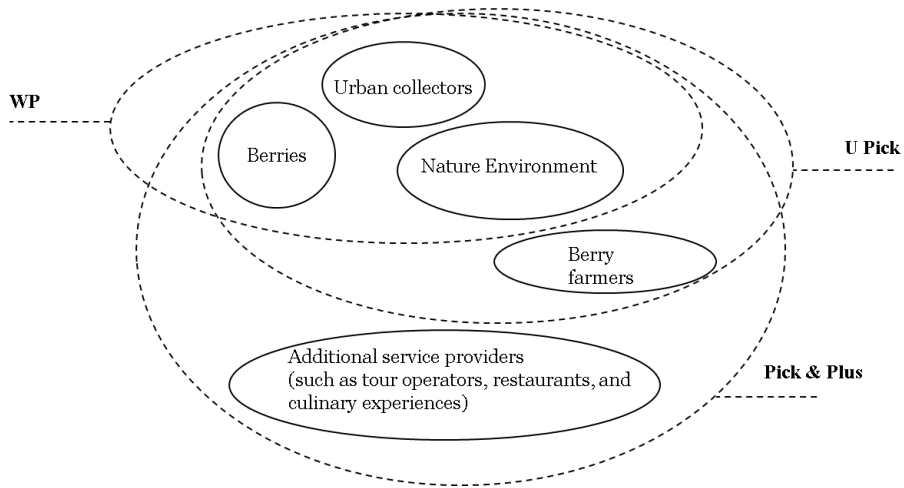


individual berry pickers (Collis 2014; Rovira et al. 2022). The thematic analysis was adopted, since it facilitated the identification and exploration of nuanced consumer demand embedded in the broader sociodemographic and cultural narratives. The interview guide (Appendix B) was generated based on literature review and our research objectives.

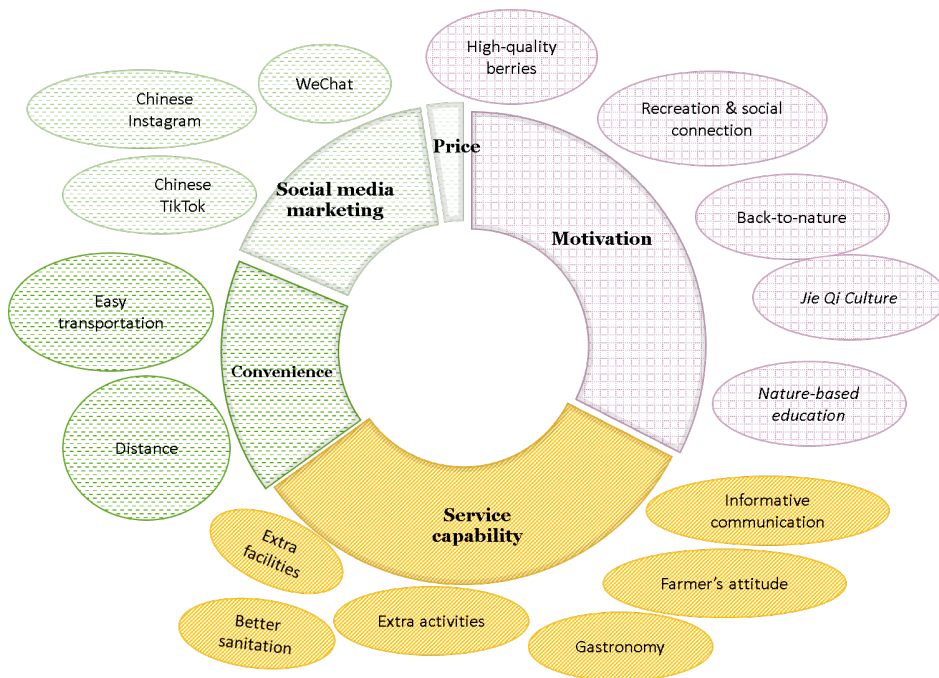
The sampling process began in mid-2021 in Hangzhou and Ningbo cities, where several berry-picking hubs were located nearby. The first 11 interviewees were recruited from both berry-collecting farms and recommendations of previous participants through snowball sampling techniques. Due to the changing COVID-19 restrictions in China in 2022 and the rising number of infected individuals, the later 13 interviewees were found and recruited via social media platforms, where they actively posted and commented their berry-picking experiences. These 13 interviews were conducted via WeChat, an alternative video-conference platform. Only those interviewees who were willing to share their stories and had sufficient time were invited to participate. Prior to the interviews, all interviewees were provided with an introduction to the purpose of the interview and topic questions. A total of 24 participants joined in the study, with an average interview length over 30 mins, excluding the introduction section where the purpose and main questions of the interview were communicated.

Our analysis of the dataset mainly utilized an inductive approach to extract insights from the interview data corpus. After familiarizing ourselves with the transcribed and translated interviews, we started to identify initial codes. We reached a point where no new meaningful code could be developed at around the 20<sup>th</sup> interview. We confirmed this with four additional interviews and proceeded to generate themes, focusing initially on “berry-picking behavioral patterns” and subsequently exploring the underlying latent meanings within “influencing factors”. This led to the development of main subthemes: consumer motivations, social media marketing, convenience, and service capability, each capturing key insights of “influencing factors of urban consumer experience.” To enhance credibility, we employed triangulation techniques, such as visiting farms, learning local dialects, and verifying data with interviewees (Lincoln & Guba 1984). We noticed that the second half of participants were selected via social media, which may lead to a certain younger age group being more represented in the data. Hence, we reported taking demographic variables into account when interpreting results.

The results revealed three urban consumer berry-picking patterns, including wild picking (WP), pure commercial picking (U Pick, where consumers paying farmers by the amount of berry picked), commercial picking with extra services (Pick and Plus, where consumers paying for berry-picking and additional services) (Fig. 4.). The finding also suggested diverse aspects of urban consumers’ motivation, including desire for high-quality berries, recreation and social connection, back-to-nature experience, connection to *Jie Qi* culture, and nature-based education. In many cases, fresh berries acted as territorial products, suggesting the cultural and social significance of berry-picking activities. In addition, while motivated by previously stated incentives, participants were particularly concerned with the service capability of berry farms, convenience brought by travel distance and transportation, the visibility of berry-picking activities on social media, as well as the price level (Fig. 5.).



**Fig. 4.** Three berry-collecting models with various actors involved (Adapted from article II). WP indicates wild berry-picking. U Pick indicates simple commercial picking. Pick & Plus indicates commercial picking with extra services provided.



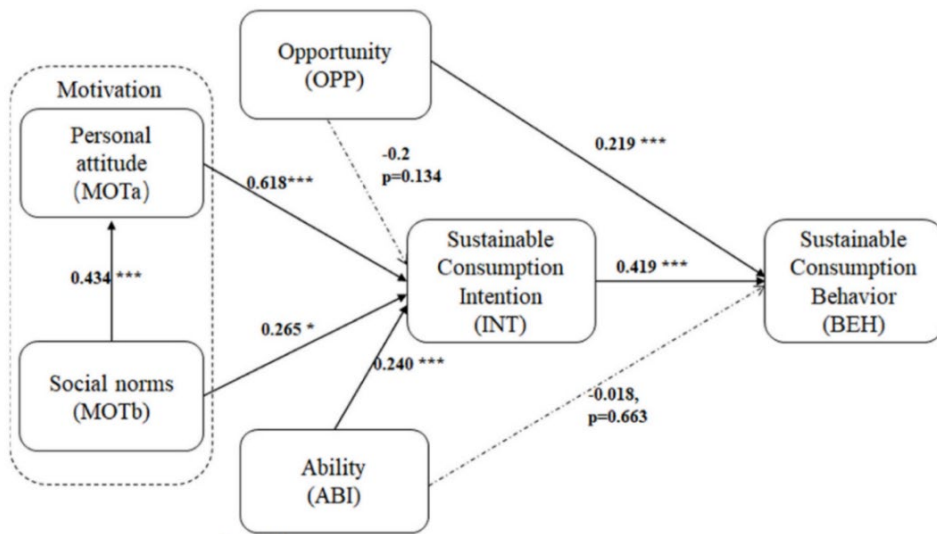
**Fig. 5.** Factors influencing urban consumers' engagement with berry-picking experience (Adapted from article II).

### 3.6 Analysis and results from article III

In the broader context of advancing the development of the fresh berry sector, Article III investigated the emotional and non-emotional factors that encourage the sustainable fresh berry consumption behavior of urban consumers. This article first conceptualized aspects contributing to sustainable consumption behavior regarding fresh berry products. The theoretical model consisted of six latent variables (Table A.3.): namely sustainable consumption behavior (BEH), sustainable consumption intention (INT), pro-environmental personal attitudes (MOTa), pro-environmental social norms (MOTb), ability (ABI), and opportunity (OPP). BEH was defined as the actual practice of sustainable consumer consumption and operationalized as the processes of sustainable berry consumption behavior, from the purchasing event to consumption. INT referred to the intention to engage in sustainable consumption behavior and was operationalized as the willingness to behave in a sustainable way during the whole consumption process. MOTa pertained to personal attitude and beliefs and was operationalized as individual stances towards sustainable consumption. MOTb, on the other hand, encapsulated social norms and opinions and its operationalization involved perceptions regarding society, communities, and close friends' views on sustainable consumption behavior. ABI was indicative of the consumers' capacity to engage in sustainable berry consumption and its operationalization involved their sustainability-related knowledge. Lastly, OPP denotes the opportunity for sustainable consumption behavior and is operationalized as the availability of products and marketing information.

The data was collected from adult urban consumers in four cities in Zhejiang province: Hangzhou, Ningbo, Wenzhou, and Taizhou. 12 trial interviews were tested and face-to-face interviews were conducted at shopping malls or on high streets, thus making it a convenience sample. Initial sample size was 429. However, sixteen observations were detected as outliers and removed according to the Q-Q plot, ultimately leading to 413 responses. Based on the theoretical framework (Fig. 6.), the covariance-based structural equation modelling (SEM) technique was applied to verify the model, because the sample size was over 400, and the data satisfied the normality assumption and did not suffer from multicollinearity (Hair et al. 2007).

The result suggested that four proposed factors (motivation, opportunity, intentions, and ability) played significant roles in promoting sustainable consumption behavior, although the way these antecedents influenced consumption behavior varied. More specifically, consumers under strong sustainable consumption-oriented social norms developed more pro-environmental consumption attitudes ( $\beta = 0.434$ ,  $p < 0.001$ ). Consumer sustainable consumption-related attitude ( $\beta = 0.618$ ,  $p < 0.001$ ) and sustainable consumption-oriented social norms ( $\beta = 0.265$ ,  $p = 0.049$ ) had positive and significant impacts on intention of sustainable consumption behavior, which had a positive and direct effect ( $\beta = 0.419$ ,  $p < 0.001$ ) on self-claimed sustainable consumption behavior. It was observed that opportunity directly influenced consumption behavior ( $\beta = 0.219$ ,  $p < 0.001$ ), while ability indirectly affected consumption behavior through its impacts on sustainable consumption intentions ( $\beta = 0.24$ ,  $p < 0.001$ ). The measurement model ( $\chi^2/df = 2.428$ , NFI = 0.882, CFI = 0.926, RMSEA = 0.059) and test of reliability (the composite reliability value varying from 0.76 to 0.89) and validity (both convergent and discriminant validity) confirmed the established variables.



**Fig. 6.** Analysis framework and results of structural equation modelling (Adapted from article III). Path coefficients are standardized. \*\*\* indicates  $p < 0.001$ . \* indicates  $p < 0.05$ .

## 4. DISCUSSION AND CONCLUSION

### 4.1 Synthesis of key findings and managerial implications

Theoretically, the findings help fill in the research gap on how urban consumers in China engaged with edible NWFPs, in addition to the more often perceived subsistence and livelihood use assigned to NWFPs (Shackleton & De Vos 2022). In fact, this thesis reveals diverse forms of the behavior of urban consumers and their experience with edible non-wood forest products and services, including self-use purchase, gift-giving purchase, and berry-picking behavior. It can be observed that urban consumers' demand for edible NWFPs is potentially increasing in the emerging markets, due to the progressive advancement of urbanization and the growth in residents' income (Shanley et al. 2005). The demand, indicated by diversified consumer behavior, extend beyond non-wood forest products themselves, encompassing cultural significance and broader social implications. For berry-picking behavior per se, consumer experience varies from wild picking to commercial picking with additional activities (so called "Pick & Plus"). Hence, while the previous literature claims that growing economic importance overshadows the cultural and experiential significance of many NWFPs (Weiss 2020), the results also illustrate the critical experiential, cultural and social importance associated with them in one of the emerging market (Márquez et al. 2023), reflecting their significance in providing cultural ecosystem services (Milcu et al. 2013). To further explore the development potential of edible NWFPs, this thesis has made additional attempts to investigate the manifestations of sustainable consumption behavior towards fresh berries of consumers, involving consumption behavior within the purchase and after purchase stages. It also hints at a pro-environmental role for

consumers in establishing a more sustainable relationship with edible NWFPs and the natural environment in general.

The managerial implications derived from consumption behavior and experience of urban consumers are multifaced. Firstly, the varied interactions between urban consumers and edible NWFPs, exemplified through activities like gift-purchasing and berry-picking, underscore the distinctive status of edible NWFPs as territorial products (Rovira et al. 2022). As natural food growing or cultivated in rural and forest settings and consumed by urban consumers (Pettenella et al. 2007), edible NWFPs can help build a closer urban-rural nexus. On top of that, the significance NWFPs in supporting rural livelihoods via rural excursions and rural tourism has also been observed. In Europe, these traditionally-conceived “secondary products” has often become the primary source of income for local forest owners (Merlo & Croitoru 2005). Likewise, sale of recreational services (e.g., selling mushroom collection permits) has become an important source of revenue (Pettenella et al. 2007). To enhance the supply of these territorial products and services, it is imperative for farmers and organizations to identify consumer demand, which may be dynamic (Kylkilähti et al. 2022), and to design combinations of edible non-wood forest products and associated services. Hence, establishing an effective dialogue between industry and urban consumers is key to staying in tune with evolving preferences and adapting new products and services accordingly. Further, there is a need to bring in additional stakeholders since the individual farmers of edible NWFPs alone may struggle to meet the demand for diversifying complex services. The urban-rural nexus hinges on a multidimensional support system involving NWFPs farmers, local networks (Weiss 2020), intermediary and informal institutions (Abteu et al. 2014), policymakers (Schreckenber & Newton 2006), and additional expertise. For instance, the range of activities around edible products can be enhanced through the integration of professional equipment, tour guides, transportation, meals, and accommodation, which also presents opportunities for ecotourism and gastronomic and hotel businesses (Margaryan & Stensland 2017; Amici 2020; Martínez et al. 2021).

This thesis has also contributed to understanding the drivers of consumption behavior and experience regarding edible NWFPs among urban consumers. It has applied the motivation, opportunity, ability model supported by the planned behavior model to show both the volitional and nonvolitional enablers. The findings underscore the significance of consumer motivation as a key driver of consumption behavior. Consumer motivation includes mainly consumer attitudes and beliefs towards, as well as culture and social norms regarding the behavior, which determine intentions of consumer behavior (Ajzen 1985). Moreover, this thesis identifies the impact of culture and social norms, the collectively acknowledged agreements, in shaping consumers' attitudes and beliefs (Ajzen 1985). In other words, Chinese urban consumers are likely to be influenced by Chinese culture. For instance, motives such as Chinese *mianzi* and *renqing* play a pivotal role in driving the purchase of tea for social purposes. The traditional Chinese agricultural practice, specifically the *Jie Qi* culture (Yu 2017), guides urban consumers to engage in berry-picking during certain seasons. Non-volitional factors, namely, opportunity and ability, also are proved to significantly influence consumption behavior and experience. It is essential to note that while supporting the fundamental structure of the original MOA (Motivation-Opportunity-Ability) model, this study adds to the model's details in how the opportunity and the ability influence consumer behavior, which may provide a nuanced understanding of urban consumers' consumption behavior in the Chinese context.

This thesis provides managerial implications for farmers, marketers, and policy-makers based on above driving factors. Firstly, we note the dynamic and changing nature of consumer

motivations as well as their diversity. In fact, motivations arising from social norms and social trends, such as the motive to take berry-picking activities as family excursions, can be dynamic, whereas those originating from culture tend to be more enduring. Building on this insight, marketers stand to benefit from a clearer comprehension of social and cultural drivers when devising marketing strategies to Chinese consumers. For instance, gifts from edible NWFPs associate with strong social attributes, appropriate packaging, and expressive presentations, while self-use products may rather focus on practicality, simplified packaging, and cost-effectiveness. In another example, motivations among urban families with children tend to concern more about engaging and educating their children about the nature via collecting berries and tea. These key groups of consumers can be valuable for developing further non-wood forest products-related business. Policy-makers and marketers may also influence individual consumers' attention towards green purchase and green consumption through social pressure.

With findings suggesting the importance of market opportunity, several key attributes to increase the opportunity for NWFP-related natural food consumption are revealed, including convenience to consumers, service capabilities, product quality, visibility of high-quality products through effective marketing strategies. While convenience and service capabilities are critical, the foundation of effective marketing may reside in the provision of high-quality natural foods and services. On top of that, the non-branded small-scale berry farms and marketers in local suburban or rural markets will benefit from leveraging the social media platforms to promote their products (Polman et al. 2004; Schneider et al. 2016). Particularly, positive experience often yields favorable feedback online and through word-of-mouth, drawing in a broader consumer base via social media platforms. The marketing of territorial products can capitalize on local tradition and cultural distinctiveness (Masiero et al. 2019). Non-governmental organizations and informal institutions proficient in natural food marketing services may offer collaborations and further supports. As an important part of effective marketing strategies, product visibility of high-quality natural food can be further enhanced through online business platforms and online distribution channels, especially for farmers remotely located. The recently emerging key opinion leaders, network anchors, vloggers, and bloggers may provide great assistants to reaching and retaining online consumers.

Furthermore, this thesis also underscores the role of personal knowledge and the ability in shaping consumption of non-wood forest product among urban consumers. A combination of market dynamics, policy guidance, regulatory frameworks, and cultural heritage can help educate and guide consumers towards making better informed choices. Retailers have the opportunity to raise individuals' awareness of green consumption, for example, through the use of green packaging. Meanwhile, farmers and intermediary organizations can enhance their offerings by providing transparent and credible information about the origins of food, expanding their services to knowledge-sharing, and creating tailored berry-picking experience. By focusing on consumer education and implementing information-driven policies, we can foster a sense of environmental responsibility and awareness among individuals, encouraging more mindful consumption practices.

The current cultivation of berries and tea products may play a dual role in the conservation of natural resource. While it supports the preservation of wild resources (Pardo et al. 2007), it may also result in negative outcomes such as overexploitation and land degradation (Abtew et al. 2014). Aligning with the vision of sustainable resource utilization (FAO 2016), government policies should be reevaluated to adopt a more comprehensive and sustainable approach to NWFP-related forest and land management, which is crucial for providing

consumers with corresponding products and services. Engaging local communities and indigenous knowledge in the management and decision-making processes related to NWFPs is essential (Liu et al. 2008; Pan et al. 2022). There is also room for investment in research to improve the efficiency of NWFP cultivation with less environmental harm. Education and training for farmers and producers on sustainable practices, market dynamics, and biodiversity conservation are vital, as they can also enhance the competitiveness of the brand and its products. Aligning with global sustainability goals (Gasper et al. 2019), policymakers will benefit from comprehending the factors driving consumer interests in edible non-timber forest products. This understanding may promote eco-friendly purchasing habits among urban consumers at least, while also emphasizing the diverse roles that edible NWFPs fulfill. Policies may also emphasize the importance of maintaining an interactive discourse with consumers and various stakeholders, so as to ensure flexibility within policy frameworks to align with evolving market dynamics and community aspirations.

## **4.2 Limitations of research**

This thesis, while contributing fresh insights to the edible non-wood forest products market, has limitations that should be noted. Firstly, the edible NWFP food market is highly diverse, encompassing a wide range of products. However, the conclusions presented in this thesis are primarily based on two narrowly selected categories, namely fresh berries, and tea. Consumer demand for other categories, such as reishi mushroom, may vary due to different product characteristics and functions.

In addition, the exclusive reliance on data from Zhejiang province may indicate a contextual limitation. While this selection aids in-depth exploration and Zhejiang province may serve as a good indicator for consumption patterns among urban consumer in China at large, caution is warranted in extrapolating these observations beyond the specific regional and ethnic context. Future research endeavors may consider diversifying the geographic scope to include a broader array of regions and markets. Such an expansion would contribute to better understandings of the edible NWFP market dynamics in China. Further, the outbreak of the pandemic has had a significant impact on this research. The COVID-19 outbreak constrained the ability to undertake more in-depth interviews in China.

## **4.3 Avenues for further research**

This thesis has embarked on an exploration of urban consumer demands and behavior, unveiling the intricate role of consumer decision-making. The subsequent research may involve an exploration of integrating consumers into the wider sphere of NWFP business development. With consumer needs and expectations of urban consumers for edible NWFPs identified in this thesis, further scrutiny of the evolution towards consumer-inclusive business development system may involve analyzing multiple actors. In fact, this thesis predominantly delves into analysis between mainly two elements of the business ecosystem, the urban consumer and edible NWFPs. Research on the interplay between multiple actors at different levels of business ecosystem towards value creation through non-wood forest product and service provision holds the potential to contribute to novel business practices.

Alternatively, from the marketing strategy point of view, by positioning edible NWFPs as territorial products, this thesis indicates an opportunity to leverage the specificity and cultural

significance of these goods in marketing efforts. Further marketing analyses are needed to operationalize the market segmentation and development of specific marketing strategies, based on identified factors such as urban consumers' willingness to pay and consumers' demographic characteristics. Social media, artificial intelligence and big data are playing ever-important roles in communication. There is an opportunity for further exploration into enhancing the effectiveness of marketing channels with more advanced technologies.



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## APPENDICES

### Appendix 1. Measurement items and factor analysis in article I

**Table A.1.** Measurement items and factor analysis.

<b>Consumer Motives</b>	<b>Factor Loading</b>	<b>Eigen Value</b>	<b>AVE (%)</b>
<b>Factor 1: Sustainability (SUS)</b>		4.4	21.8
Prefer biodegradable and reusable products	0.690		
Prefer organic food and minimum food additives	0.699		
Prefer products with FSC, MSC certification	0.737		
Try to reduce carbon footprint during consumption	0.716		
Try not to waste natural resources during consumption	0.662		
Prefer eco-friendly and sustainable consumption	0.685		
<b>Factor 2: Brand and Prestige Chasing (BP)</b>		3.6	39.5
Prefer branded products despite of limited income	0.824		
Prefer prestigious and high-end products	0.789		
Desire to show social status through brands	0.824		
Prefer brand name than practical value	0.758		
<b>Factor 3: Pragmatism (PRG)</b>		1.7	47.8
Always choose what is most needed	0.689		
Consider affordability	0.674		
Compare carefully the quality, performance, and value of products before purchase	0.716		
Prefer high practical and affordable products	0.748		
<b>Factor 4: Novelty and Uniqueness Chasing (NU)</b>		1.4	54.8
Prefer distinguished products	0.800		
Prefer goods with special appearances	0.751		
Enjoy the novelty and being different	0.678		
<b>Factor 5: Social Conformity (SC)</b>		1.2	60.7
Follow recommendations from friends and colleagues	0.770		
Prefer similar products possessed by peers	0.813		
Follow trends and recommendations from mass media	0.613		

*Note: Product and food here refer to tea leaves and tea bag products which consumer purchased. Accumulated Variance Explained (AVE). Model: Cronbach's  $\alpha$  =0.726, KMO=0.808, Bartlett's test of sphericity:  $p < 0.000$ . Factor degree: 1 = absolutely disagree; 5 = absolutely agree.*



## Appendix 2. Interview guidelines for article II

Urban consumers were interviewed with following guidelines. Before the official interview, we asked for short description about interviewees, regarding their age (if lower than 18, he or she is not part of the panel), gender, marital status (to be disclosed at the individual's discretion), child condition (to be disclosed at the individual's discretion).

### Descriptions of berry-picking behavior and experience

1. Please describe your most recent berry-collecting activities in your own words in detail (when, where and who you were with).
2. What kind of berry products have your family collected?
3. What happened during the whole picking process? Was there any specific activity you were involved in apart from picking berries?
4. How long did it take you to finish the whole process?
5. Did you share your experience afterwards? If so, through what channel or in what way?

### Motivations towards berry-picking

1. Do you have any knowledge of the berries to pick?
2. What encouraged you to participate in collecting fresh berries? How?
3. What does berry-picking mean to you and your family?
4. What images and perceptions arise when talking about fresh berries? Are they positive or negative?
5. What do you think about health issues regarding fresh berries?

### Influencing factors of urban consumers' berry-picking activities

1. How did you end up choosing this place to pick? Name the 3–5 most important criteria.
2. Where did you receive the picking information?
3. Have COVID-19 and other environmental changes had any impacts on your berry-picking activities or other outdoor activities as a whole? Please describe.
4. How did you (and your companions) feel about this experience?
5. What did you enjoy the most during the whole berry-picking process? For example, was it the scenery, the berry fruits, or the people who accompanied you?
6. Did it meet your expectations? Did you enjoy the experience?
7. Do you think the price is fair?
8. How would you comment on the service provided? What kind of service have you enjoyed most and what least?
9. Would you pay more if better service is provided? If so, what kind of service?
10. Have you encountered any surprises during the process? Are there any issues during the process you are unsatisfied with and you would like to change? What can be further developed to enhance your experience?

### Appendix 3. Attributes of latent variables in article III

**Table A. 2.** Factor loadings, reliability, and convergent validity for latent variables.

<b>Construct and Measurement Items</b>	<b>Loading</b>	<b>AVE</b>	<b>CR</b>
<b>Personal attitudes (MOTa)</b>		0.69	0.87
Ma1: I think it is necessary to protect the environment and ensure food safety.	0.67		
Ma2: I think buying green or organic-certified berries is good for my family's health.	0.73		
Ma3: I think it is advisable to buy berries on demand instead of wasting them.	0.76		
<b>Social norms and opinions (MOTb)</b>		0.68	0.86
Mb1: Nearby communities actively carry out low-carbon consumption propaganda activities.	0.76		
Mb2: The government markets the sustainable consumption concept of green life and green consumption.	0.79		
Mb3: My close friends and family think that I need to pay attention to Yangsheng, i.e., I should eat natural foods and stay healthy.	0.56		
<b>Opportunity (OPP)</b>		0.67	0.86
O1: There are more online and offline channels for me to buy pollution-free, green, or organic berries.	0.68		
O2: Berry distributors prompt and promise to use part of their profits to support the green sustainable development of the industry (such as fair trade, ensuring green production of farmers, etc.).	0.80		
O3: Berry distributors offer discount promotions for green or organic berries.	0.63		
<b>Ability (ABI)</b>		0.73	0.89
A1: I can tell whether a berry packaging is environmentally friendly.	0.80		
A2: I understand the meaning of food labels for berries (such as organic certification, green certification, certification of origin, etc.).	0.80		
A3: I know where to buy genuine natural berries.	0.75		
<b>Sustainable consumption Intention (INT)</b>		0.58	0.81
I1: I am willing to use fewer delivery services and buy more fresh berries and vegetables to prepare my meals at home.	0.79		
I2: I am willing to adjust my diet to contain more berries and less meat.	0.73		
I3: I am willing to purchase berries in an environmentally friendly way.	0.77		
<b>Sustainable consumption behaviour (BEH)</b>		0.52	0.77
B1: I usually pay attention to food safety and buy certified or organic fresh berries.	0.69		
B2: I usually buy berries without non-recyclable plastic bags.	0.78		
B3: I do not consume excessively and usually buy fresh berries on demand.	0.72		

Note: Average Variance Extracted (AVE), Composite Reliability (CR).