Investigating and stimulating sustainable dairy consumption behavior: An exploratory study in Vietnam

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Abstract

Responsible consumption and production patterns have been defined as a stand-alone Sustainable Development Goal, hence ensuring its achievement sits high on national and international policy agendas. Getting a better understanding of food consumer behavior towards sustainable patterns could help achieve this goal. This study aims to address this issue by exploring drivers and barriers to sustainable dairy consumption in Vietnam. It also identifies potential policy interventions that could promote more sustainable dairy consumption. To achieve these, the research carried out five focus groups and adopted the Capability–Opportunity–Motivation Behavior model and the Behavior Change Wheel. The analysis explores 32 drivers and 14 barriers influencing sustainable dairy consumption behavior. Health, brand and product quality, family, and promotion are the most prominent drivers, while price, habits, and taste are the most prominent barriers. The findings show that though the awareness and level of sustainable dairy consumption are still low, there is a positive trend toward sustainable dairy consumption in Vietnam. The study also identifies several intervention actions for policymakers, firm managers, and other supply chain decision-makers. These are related to building capability, increasing motivation, and promoting opportunities. Vietnam's results are similar to the findings of other research conducted in Europe, hence reinforcing the existing literature on sustainable food consumption. While consolidating the current state of the art, the study is particularly relevant to decision-makers and practitioners in Vietnam in achieving food sustainability policy goals.

Keywords: sustainable dairy consumption behaviour, drivers, barriers, interventions, COM-B model, Vietnam

1. Introduction

In recent decades, sustainable food systems have attracted special attention of researchers, policymakers, and practitioners worldwide. Sustainable food production, processing, distribution, and consumption are significantly associated with human health, social welfare, ethical standards, economic development, and environmental protection, especially due to their ambivalence as a

contributor to, and being also affected by, climate change (Bellassen et al., 2022; Hoang et al., 2021; Pocol et al., 2020; Malak-Rawlikowska et al., 2019; Reisch et al., 2013). Additionally, there are growing societal concerns and consumers' requirements for reassurance on how food products are produced, where they come from, what the environmental consequences are, and what are left or how they are disposed of at the end of its life cycle (Morris & Dunne, 2004). The progress of the food value chain in governance, production methods, consumption behavioural patterns, and technology has significantly influenced the sustainability of food value chains (Hoang, 2021a).

Sustainable Consumption (SC) relates to and combines knowledge from various academic disciplines including economics, psychology, sociology, anthropology, biology, and environmental science. However, it is often regarded as a contradiction in terms as scholars widely agree that food consumption leads to and encourages *inter alia* food waste and it negatively affects the environment, whereas sustainability indicates the preservation and reduction of waste and environmental destruction (Stern, 1997; Graeber, 2011). Despite this apparent contradiction, SC has flourished as a wide field of research per se, supported by its inclusion in the Sustainable Development Goals (SDGs), and more specifically Goal 2, Goal 3, Goal 12, Goal 14, and Goal 15 (UN, 2022). Generally, SC can be conceptualized by the following common features and dimensions: (a) satisfying basic human needs; (b) prioritizing the quality of life; (c) consuming less and efficiently; (d) caring for future generations by consuming responsibly; (e) making socially and environmentally friendly consumer's choices; and, (f) minimising waste and pollution (Fien et al., 2008; Quoquab & Mohammad, 2020).

The sustainability of food value chains is defined by three pillars and their related aspects: (a) environmental sustainability: e.g., climate change, land and water use, pollution, biodiversity, food waste, carbon footprint; (b) social sustainability: e.g., hunger, poverty, health, well-being, affordable energy and food, ethical standards, educational attainment, and justice and strong institutions and; (c) economic sustainability: e.g., responsible consumption and production, equality, labour productivity, income growth, and economic growth (UN, 2022; Bellassen et al., 2022; Hoang, 2021b; Hilal et al., 2021; Drut et al., 2021; Monier-Dilhan et al., 2021). The sustainability of food value chains can be improved by private governance (e.g., firm codes of conduct and certifications), public governance (government policies), and social governance (civil society pressure on business) (Gereffi et al., 2005; Hoang, 2021a). Therefore, consumers' selection of certificated and healthy food products (e.g., Viet GAP, Global GAP, Organic) can represent sustainable food consumption patterns in food value chains. The promotion of sustainable consumption depends amongst other on helping consumers understand its benefits and overcome barriers to SC, and promoting their pro-social and pro-environmental attitudes. Drivers of SC must be also identified to intervene in food consumption behaviours toward SC patterns.

Dairy products are essential sources of nutrients and provide livelihoods for millions of people in dairy value chains worldwide and in Vietnam. The dairy industry can sustainably contribute to global food security by efficiently converting milk into dairy ingredients and products (Feil et al., 2021). The cow milk production stood at about 545,436 Mt with EU-27, US, India, China, and Russia as the main producers worldwide in 2021; world milk export value was USD 33.1 billion with the leading exporters of EU-27, New Zealand, US, Argentina, and Australia, accounting for about 8% of world milk production; the total dairy domestic consumption was 191,789 Mt with the top countries of India, EU-27, US, China, and Brazil (OECD & FAO, 2022; USDA, 2022). Due to increased incomes and population, more dairy products are expected to be produced and

consumed over the medium term, especially in low-income countries. However, dairy value chains can cause significant consequences on the environment, including water, soil and air pollution and GHG emissions (Ritchie, 2022; Burek et al., 2017). There is unfair power and unequal income distribution to small milk farmers in the dairy value chain, especially in developing countries (Hoang et al., 2021). Dairy products industrialise a wide range of products and, consequently, highly polluted waste (Feil et al., 2020). The dairy industry is regarded as a relatively large-scale pollutant due to high water consumption, the large volume of wastewater, and the wide range of industrialised products and wastes (Farizoglu & Uzuner, 2011; Salzman et al., 2017; Feil et al., 2020). In general, dairy production is estimated to contribute about 3-4% to the global man-made GHG emissions (Laca et al., 2020).

Though the sustainability of dairy production and consumption is significant and essential field of research, there is a wide research gap in sustainable dairy consumption. Feil et al. (2020) systematically reviewed and showed that the sustainability of the dairy industry is emerging and lacking research. Research on the sustainability of the dairy industry is dispersed among a wide variety of scientific journals, geographical areas, and educational institutions. Particularly, there is a dearth of studies that identify drivers and barriers to sustainable dairy consumption patterns, and design potential interventions to enhance the sustainability of dairy consumption behaviours, especially in developing countries. This study aims to address this issue and add to the existing literature on sustainable consumption, with a particular focus on the dairy industry. Specifically, the aims are two-fold. First, the study identifies the drivers and barriers to sustainable dairy consumption patterns in Vietnam. Second, it explores potential strategies for more sustainable dairy consumption behaviours in Vietnam and proposes relevant policy recommendations. The findings of this study are aimed to support policymakers and actors across the food (i.e., milk) value chains to prioritise the most promising interventions that will allow for a fair and sustainable food consumption in the system. After this section, the study is structured as follows: Section 2 summarises the background of the study with the landscape of Vietnam's dairy sector and literature view, Section 3 describes the methodology and the research design, Section 4 presents the research findings, discussion, and interventions, and finally, Section 5 concludes and provide some policy implications.

2. Background

2.1. Dairy value chain, governance, and production in Vietnam

In recent decades, Vietnam's dairy value chain has been rapidly and modernly developed. Dairy has become one of the most important food sectors that provides nutritious food products for the domestic market, creates jobs and incomes for farmers, and partially replaces imported dairy products (Hoang et al., 2021; Investvietnam, 2019). Vietnam is the sixth biggest milk producer in Asia and the second-largest producer in ASEAN, with a dairy production of about one million tonnes in 2018 and an average growth rate of 14.4% from 2010 to 2018 (Ha An, 2019; Mai Chien, 2019). The dairy value chain has been considerably upgraded due to the development of large dairy enterprises (e.g., Vinamilk, TH True Milk, and NutiMilk), application of high technology and science, big investment, high-quality breeding cows, and expansion of large-scale milk farms (Stoxplus, 2018). The dairy value chain in Vietnam consists of various direct actors such as farmers, processors, distributors, and consumers and indirect actors such as input suppliers, importers, exporters, government and associations (Figure 1) (Hoang et al., 2021).

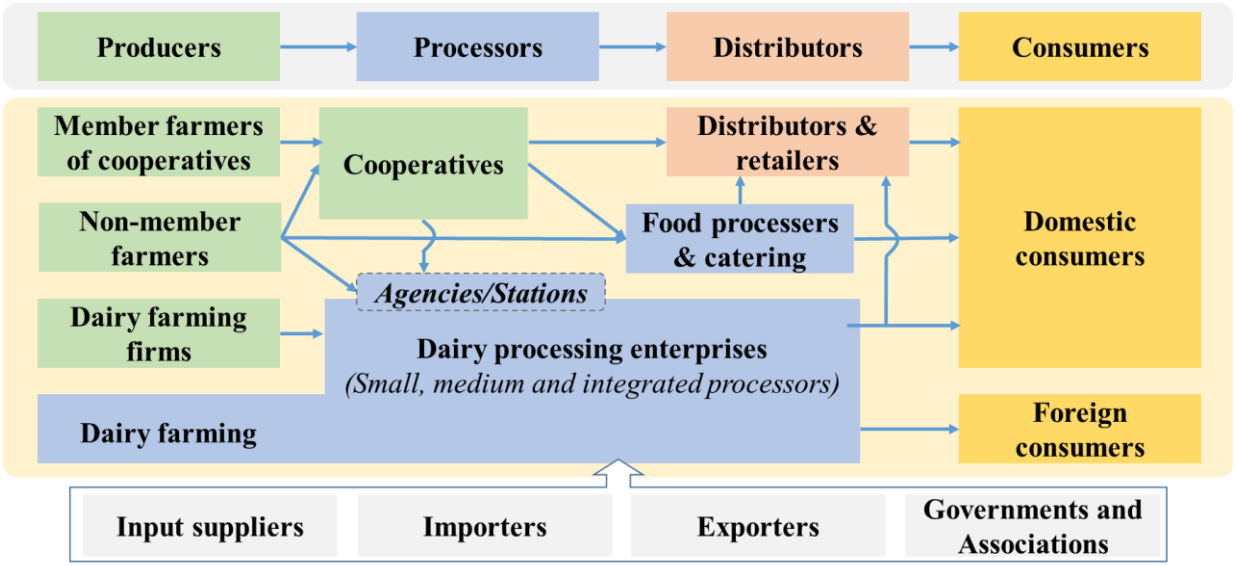

Figure 1. The dairy value chains in Vietnam

Source: adapted from Hoang et al. (2021)

The governance of Vietnam's dairy value chain is structured in three types, i.e. relational, captive, and hierarchal governances (Hoang et al., 2021). In the relational value chain, dairy farmers in a location with sufficient farming resources participate in dairy cooperatives with both raising dairy cows and processing milk products at small and medium scales. These processors require basic quality standards of raw milk. Large dairy processors in the captive value chain demand more stringent quality standards that require more knowledge, skills, technique and technology, and financial capital. Thus, dairy farmers need support, interventions, and commitment to purchase from large dairy firms. The hierarchy value chain is the most upgraded, modern, and high-technology milk value chain. Big dairy enterprises integrate most activities, such as cattle feed production, farming, processing, and distribution (Hoang et al., 2021). The quality standards of dairy products in Vietnam's dairy value chain are regulated by the Vietnamese national standards (TCVN), the CODEX, VietGAP, GlobalGAP, and Organic (BNEWS, 2019).

Vietnam has about 30,000 milk cow farmers, of which most have a small herd size of dozens of heads, and a few farms have a large herd size of thousands of cows (Tam An, 2019). There are 20 dairy cooperatives, and the largest one is EverGrowth producing 22 tonnes of raw milk per day from 2,300 members and 7,000 cows (Huu Duc, 2019). There were over 60 milk processing and trading firms in 2019, with over 300 brands in Vietnam. The largest local dairy enterprises are Vinamilk, TH True Milk, Moc Chau milk, IDP, and Nutifood and the most significant foreign enterprises are FrieslandCampina, Nestle, and Abbott (Hoang et al., 2021; Nongnghiep, 2019; Thanh Nguyen, 2019). The concentration level of the milk processing enterprises is relatively high, with the largest four dairy companies (7% of the industry) accounting for 79% of the drinking milk market share, including Vinamilk (55%), TH True Milk (11%), FrieslandCampina Viet Nam (7%), and Moc Chau (6%) (Minh An, 2019; Hoang et al., 2021).

2.2. Distribution, consumption, and trade of dairy products

In general, dairy distribution systems in Vietnam consist of five channels, including (1) Traditional sale channels: grocery stores, wet shops, and firms' distributors with retail points; (2) Modern channels: supermarkets and convenience stores; (3) Online shopping channels: Social networks, e-commerce shop, website; (4) HoReCa: hotels, restaurants, and canteens; (5) Export

markets: Exporting or investment in foreign markets. Big dairy firms can access all these sales channels (Hoang et al., 2021). The rapid development of Vietnam's economy has enhanced the demand for dairy products. The dairy revenue reached over €4 billion in 2018, accounting for an average growth rate of 13.6% from 2013 to 2018. The revenue from liquid milk was about €2 billion in 2018 (Babuki, 2019; WDI, 2019). The main dairy markets are in large urban areas such as Hanoi, Ho Chi Minh, Da Nang, Hai Phong, and Can Tho. The consumption of dairy products in rural areas is relatively low as opposed to urban areas but increasing (Babuki, 2019).

Vietnam's milk consumption has increased and reached 2.6 billion litres in 2018, accounting for 10% of the total food expenditure. Milk consumption in rural areas also increased in 2018, with a growth rate of 6.6% in quantity and 7.9% in value (VIRAC, 2019). The average per capita fluid milk consumption has notably risen over time, from 14 litres per capita in 2010 to 27 litres per capita in 2018 (Nghi, 2019). The changing patterns and sharp increase in dairy consumption in Vietnam can be explained by several drivers such as the increase in the GDP per capita and living standards, rising health concerns and awareness, change in food consumption habits, growing education levels, the development of modern and online retail distributions, rapid urbanisation and the development of rural markets (Babuki, 2019; VIRAC, 2019). However, Vietnam's average per capita milk consumption is still much lower as opposed to countries such as Thailand, China, and the EU (Hoang et al., 2021).

Due to this significant increase in dairy consumption, Vietnam's milk production cannot meet its demand, and it needs to import dairy products (Mai Chien, 2019). In 2018, the local dairy production covered only 40% of its domestic demand, with the rest met by imports (Nhu Huynh, 2019). Vietnam imports dairy products from 17 countries, mainly from New Zealand (38% of the total import value), Singapore (16%), the USA (14%), hence making Vietnam the world's top 20 largest dairy import countries (Babuki, 2019). Vietnam also exports dairy products to 43 countries, especially infant milk formula. Its dairy export increased from about €77 million in 2016 to over €110 million in 2018. Its main export markets are Iraq, China, Hong Kong, the Philippines, Laos, Myanmar, the USA, Afghanistan, the UAE, the EU, and Japan (Hoang et al., 2021).

2.3. Drivers and barriers to sustainable food consumption

There are various drivers or motives for SC behaviours that positively influence people to purchase and consume healthy food products sustainably. Drivers of sustainable food consumption can be internal motives of consumers, situational or external factors, and product features. Internal drivers of SC include health consciousness, personal preferences and interest, personal norms, knowledge and awareness of SC, trust in quality and organizations, and pro-environmental and social attitudes (Sundaraja et al., 2021; Yadav et al., 2019; Tan et al., 2016; Gleim et al., 2013). Situational drivers of SC are social norms, ethical standards, culture and tradition, availability of choices, convenience, political motives, vigorous enforcement of environmental regulations, good communication and marketing, and effective environmental education and accountability (Stancu et al., 2020; Yadav et al., 2019; Honkanen et al., 2006). Health, nutrition, pure taste or flavor, vitamins, and minerals are product-features motives for SC (Lucan et al., 2010). In another way, value motives for SC behaviours can be categorised into five types: (i) Functional value: The perceived benefits derived from the functional features of the underlying product; (ii) Social value: The perceived ability of the product to provide the desired social status to the buyer, which is inconsistent with its reference group; (iii) Emotional value: The perceived ability of the underlying product to evoke positive or negative feelings within

consumers; (iv) Conditional value: The choice of the product due to situation and circumstances faced by the choice maker; (v) Epistemic value: The perceived ability of the product to infuse a desire for seeking knowledge, seeking novelty, or mental curiosity (Kushwah et al., 2019).

On the other side, food consumers may face various barriers to new sustainable products and sustainable consumption patterns. Barriers to new sustainable products can be summarized into five types: (i) Usage: arising when a product is incongruent with the consumer's previous experiences, workflow, habits, and acceptance requirements; (ii) Value: arising when a consumer finds the value of a new product lower than the existing alternative; (iii) Risk: depending on consumer perception or encounter of risk in a new product; (iv) Tradition: arising due to conflict between norms and values, and usage of the product; and (v) Image: arising due to any of these negative associations. Consumers may not consider the differences between certificated and conventional food (Kushwah et al., 2019; Torres-Ruiz et al., 2018). The rankings of barriers to SC can be different between different types of food, e.g., fruit, vegetables, and fast foods (Lucan et al., 2010). There are two broader classifications for barriers to new sustainable products, i.e., functional and psychological. Functional barrier arises when consumers perceive that adopting the new product can bring severe change in their present consumption pattern. Psychological barriers arise due to conflict between existing consumer beliefs and new product (Kushwah et al., 2019; Yadav et al., 2019; Tan et al., 2016). Food consumers also face various barriers to SC patterns, such as internal obstacles of consumers, situational or external factors, and product attributes. The internal obstacles can be preferences, habits, traditions, responsibility and ethics issues, quality perceptions, trust issues, and lack of information and knowledge (Yadav et al., 2019; Tan et al., 2016; Koller et al., 2011; Lucan et al., 2010). Situational factors include economic constraints, lack of availability and choices, lack of consuming facilities and places, weak enforcement of environmental regulations, lack of communication and marketing, and lack of environmental education and accountability (Liu et al., 2021; Yadav et al., 2019; Tan et al., 2016; Gleim et al., 2013; Lucan et al., 2010). The attributes of food products may be taste, smell, freshness, variety, appearance, and consumption convenience (Lucan et al., 2010).

3. Methodology

This study's specific aim was to explore the perspectives of Vietnamese consumers in their choice of dairy products and to pinpoint interventions and strategies for more sustainable dairy consumption. This study employs focus groups and the Capability–Opportunity–Motivation Behaviour (COM-B) model (Michie al et., 2011) to fulfil the research objectives. The research design, data collection and focus groups, and data analysis model are explained as follows:

3.1.Research design and research framework

Figure 2 illustrates the overall research framework proposed to determine the drivers and barriers to sustainable dairy consumption and design potential interventions and strategies to enhance the environmental sustainability of dairy consumption. The research framework is based on the Valumics project framework (Nicolau et al., 2020), the COM-B model (Michie et al., 2011), and the qualitative process (Hoang, 2021b). There are four main stages. First, research questions and analysis models were developed at the project level with guidelines on the focus group procedures and analysis of findings based on a common framework defined as the COM-B model. Second, this model allowed for primary data collection via focus groups, following a literature review. Third, the analysis and coding of the data proceeded following universally accepted

qualitative approaches in the stage 1. This stage includes three steps: codes, concepts, categories, and theories. Finally, the findings and theories are developed and consolidated (Figure 2).

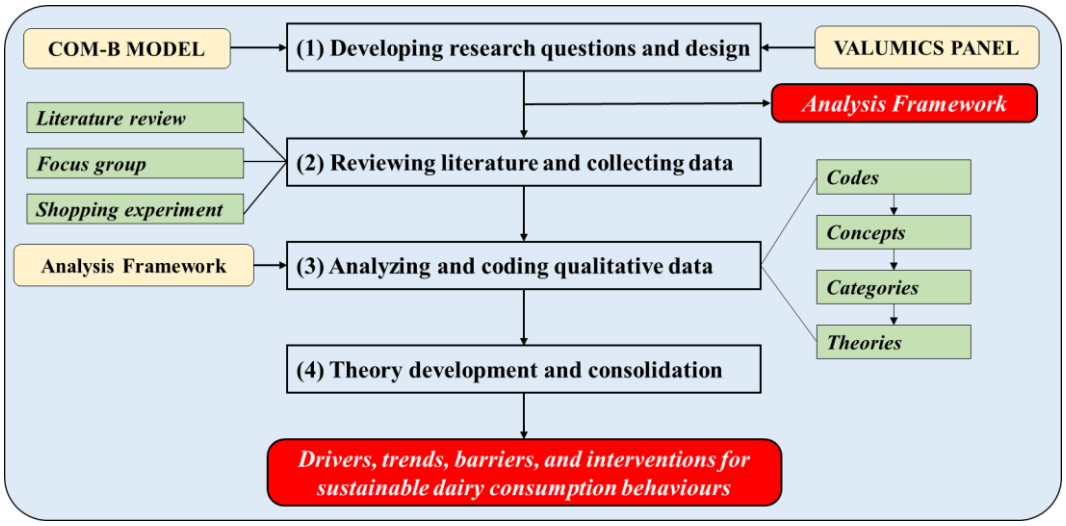

Figure 2. The overall research framework

Source: adapted from Hoang (2021b), Nicolau et al. (2020), and Michie et al. (2011)

3.2. Data collection and focus groups

Data was collected from 2019 to 2020 in Vietnam's leading dairy production and consumption areas. Five focus groups were conducted for this study which consisted of 6-8 dairy consumers for 2-hour sessions each. The participant selection criteria emphasised homogeneity in terms of household income level in each group (with a diverse representation of income levels across groups) but diversity in terms of types of food, level of environmental awareness, level of health awareness, food price consciousness, age, household composition, education level, and gender. This was done to ensure the coverage of an entire gamut of different dairy consumption behaviours. Focus groups with 6-8 participants have been found to be the ideal size for best performance in terms of length, the opportunity for everyone to express their opinion and the resulting diversity of opinions (Millward, 2000).

The procedure for the focus groups followed common guidelines developed at the project level (Nicolau et al., 2020). The procedure consisted of the following steps: (1) Welcome & Consent; (2) Discussion rules; (3) Introduction round; (4) Introduction to structures; (5) First main stage - Your Shopping Cart (Photographs and receipts): writing task and presentation; (6) Second main stage - Selecting food products: presentation and discussion; (7) Third main stage - Shopping cart values: presentation, in-depth interviews, and discussion; and (8) Debriefing meeting with note-taker. The question framework included the following themes: (i) Drivers of milk consumption behaviours; (ii) Barriers to more sustainable and healthier milk consumption; and (iii) Trends toward sustainable milk consumption patterns (Figure 3). This study focused the analysis on drivers and barriers to dairy consumption leading to points of intervention based on the conceptual framework. All the focus groups were conducted in Vietnamese with relevant quotations translated into English during the analysis phase.

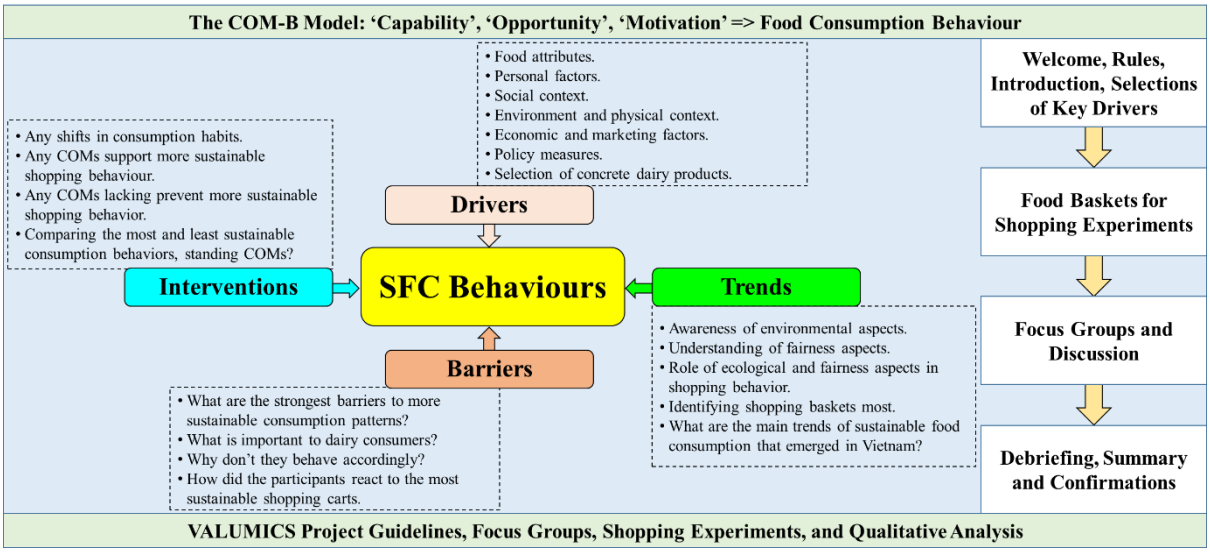

Figure 3. The analysis framework

Source: adapted from Nicolau et al. (2020), Saviolidis et al. (2020), and Michie et al. (2011)

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3.3. Data analysis

Primary data was analysed to identify the drivers, trends, barriers, and interventions for sustainable food consumption behaviours using the analysis framework (Figure 3) developed based on the COM-B model and the Valumics project guidelines under the qualitative analysis process (Figure 2). The qualitative analysis process included four-steps coding, conceptualising, categorising, and finally identifying the findings (drivers, trends, and barriers) and matching the emerging themes to the COM-B framework to elucidate intervention points. The analysis framework includes four pillars with various aspects: (i) *Drivers of food consumption behaviours*: Food attributes, personal factors, social context, environment and physical context, economic and marketing factors, policy measures, and selection of concrete dairy products; (ii) *Barriers to sustainable food consumption*: What are the most substantial barriers to more SC patterns? What is essential to dairy consumers? Why don't they behave accordingly? How did the participants react to the most sustainable shopping carts? (iii) *Trends toward sustainable food consumption*: Awareness of environmental aspects, understanding of fairness aspects, role of ecological and fair aspects in shopping behaviour, identifying shopping baskets most, most relevant values and critical points, misunderstandings or lack of knowledge of environmental aspects; and (iv) *Potential interventions for more sustainable food consumption patterns*: Any shifts in consumption habits, any COMs supporting more sustainable shopping behaviour, any COMs lacking prevent more sustainable shopping behaviour, comparing the most and least sustainable consumption behaviours, and what are the standing COMs.

The COM-B model is a behavioural model that has been utilised to promote behavioural interventions (West et al., 2020), and which is based on the assessment of three factors: Capability, Opportunity, and Motivation. Capability refers to personal attributes, either psychological (such as understanding and memory) or physical (such as dexterity), which, when combined with Opportunity, can lead to behavioural change or at least facilitate it. Opportunity refers to physical attributes (such as material and financial resources) and social attributes (such as cultural and social norms) of the environment, which can facilitate behavioural change. Motivation refers to mental processes that can galvanise and direct behaviour. It can be either reflective (conscious

thought processes) or automatic (habitual thought processes) (Mitchie et al., 2011). These factors can further interact with each other to result in different outcomes.

4. Findings and Discussion

4.1. Drivers of dairy consumption behaviours

Dominant drivers of dairy consumption

There are various drivers of dairy consumption behaviour that can be classified into food attributes, personal factors, economic and marketing factors, social context, environmental and physical context, and political and policy measures. Before the discussion started in the focus groups, participants were asked to select and rank the most critical drivers of their dairy product consumption. Health and nutrition were the top-of-mind factor of food consumption when consumers select dairy products. In ranking order, the top drivers were (1) health [personal factors], (2) brand and product quality [food attributes], (3) family [social context], and (4) promotion [economic and marketing factors]. Notably, most participants agreed that if they had babies and lived with families, family [social and physical context] was their first driver of dairy consumption (Table 1). These drivers were the most chosen and also mentioned in the discussion.

Table 1. Dominant drivers of dairy products consumption in Vietnam

No.	Drivers	Frequencies
1	I try to buy healthy products (health)	68%
2	I like the brand (brand)	60%
3	High product quality is crucial to me (quality)	55%
4	We purchase and eat food in family regularly (family)	53%
5	I prefer the products on special offer (promotion)	40%
6	I just grab and buy some usual items (habit)	35%
7	I prefer cheaper food with advertising (marketing)	33%
8	I am concerned about environmental sustainability aspects (environmental concern)	20%
9	There are not many alternative food choices for me to change (physical context)	13%
10	I am concerned about the fairness aspects (social concern)	13%

Source: authors, based on the responses of the focus groups.

Today's dairy consumers are relatively busy and have less time to purchase food. They just grab and buy some usual items, and there were few alternative food choices for them to change [environmental and physical context]. Besides promotion, the participants prefer cheaper food to which they've been alerted to through advertising [economic and marketing factors]. Unexpectedly, the participants seemed less concerned about environmental sustainability and fairness aspects, with a few mentions. Especially, political and policy measures were not mentioned in dairy consumption behaviour. The relative importance of drivers usually varies across the different empirical studies and contexts (Kushwah et al., 2019; Lillywhite et al., 2013). The key drivers of dairy consumption behaviours in Vietnam were further explored in depth in the focus group discussions reported in this section.

Dairy attributes

Consumers' attitudes towards sustainable dairy products are generally complex; their first minds always connect sustainable food to health and nutritional value (Kearney, 2010; Kushwah et al., 2019), and maintaining a healthy life is the common denominator in their consumption (Oke

et al., 2020). This aspect appeared to be their primary concern when most participants selected "healthy" first and mentioned it in the focus group. The food attributes of health and nutrition can be presented and explained in different aspects by various consumers:

"I often buy dairy products with high quality, good package and certification, e.g., Organic or VietGAP for my family's health and nutrition in the supermarket" (Coded: C1.P2.R3),

"I am concerned about my health and nutrition. Thus I will read the ingredient on the package first. In my experience, the first three ingredients are the main contents of the product. If those three ingredients are chemicals or something, I don't buy them" (Coded: C1.P6.R3),

"For consumers who are like me, I need transparent information and high-quality certifications, but now I don't trust the certification of VietGAP" (Coded: C2.P12.R3),

These statements indicate that consumers paid more attention to health, nutrition, and quality. They assessed these aspects of dairy products by different attributes, s certifications (Organic, Global GAP, Viet GAP), brand (Vinamilk, FrieslandCampina, Nutifood), package and information on the package (ingredients, nutrition, origin). Food attributes are connected to and supported by other drivers such as trust (personal factors), communication (economic and marketing context), and family (social context). Recently, health aspects have become more prominent in consumers' minds due to increasing problems of unsafe food, environmental pollution, food safety scandals, and the rise in food borne diseases in Vietnam. Consumers require transparent, complete and clear information. No participants select non-branded milk products.

"I think food and drink are also causes of human diseases. The environment is increasingly polluted, many unsafe foods are on the market, and my health is decreasing. So I must pay more attention to my health and think about what to eat and brink" (Coded: C4.P23.R5),

"Once, I knew a scandal of low-quality dairy products of a brand. Since that, I reduced to purchase and consume the products of that brand" (Coded: C3.P15.R2),

"I think that there is no accurate information in Vietnam. We cannot check whether this certification is true or not. I have no faith in this brand and product" (Coded: C4.P13.R3).

Taste or flavour is the critical driver and motive of food consumption, especially dairy products (Bryła, 2016; Lucan et al., 2010). This attribute of dairy products is usually connected to brand names or company brands. In other words, dairy brand names or company brands have different and typical tastes or flavours. Thus, consumers who prefer a typical taste or flavour will also choose a specific brand or company. Young dairy consumers usually have typical and personal tastes and dislike changing for external reasons. On the contrary, older dairy consumers appreciate health aspects rather than taste or flavour, and they are willing to change their taste to try different products for their own and their families' health:

"To me, the taste is the most essential and it is more important than any attributes else. I only buy dairy products that can fit and match my taste" (young participant) (Coded: C1.P18.R5),

"At present, I use dairy products with my favourable taste. But in the future, when I get older I will care about my health and change" (middle-aged participant) (Coded: C2.P7.R1),

"This dairy product is not delicious, but I still drink it because it is good for my health" (older participant) (Coded: C4.P9.R4).

Personal factors

Habit is one of the key drivers or basic constructs in the planned behaviour to predict and determine food choices and consumption. It is a stronger predictor of intention than any other planned-behaviour factors for food consumption (Huang et al., 2020). Therefore, habit is one of the strongest drivers of food consumption and also a dominant barrier to changing food consumption behaviours toward sustainable food consumption patterns (Kushwah et al., 2019). Dairy products are especially typical, and dairy consumers have the habits of using the brands and product lines with typical taste and characteristics, relative trust, and good experience:

"I mostly buy dairy products according to my habits and likes" (Coded: C2.P12.R2),

"That familiar dairy product seems to be in my mind and belief. Thus, I have the habit of looking for and buying it when I go shopping" (Coded: C6.P9.R2),

"I think dairy consumption is based on people's habits. If dairy firms want to change consumers' habits, they must have intense and frequent advertising" (Coded: C3.P6.R5).

The statements show that consumers initially use a dairy product, prefer its flavour, trust its quality, and enjoy it regularly. This process builds their habit. Consumers will not change their choice behaviour if there are no sufficiently strong interventions (Huang et al., 2020). Trust is also related to the health aspect. However, Vietnam's food markets are under a trust crisis regarding food quality and safety; there have been various scandals about food safety and hygiene (Hoang et al., 2021). Consumers may distrust farmers and firms and doubt labelling and certification (Misra & Singh, 2016). Therefore, trust becomes a more vital driver of dairy consumption:

"I don't fully trust these advertising and certifications. There are many scandals and information on unsafe food, fake products, counterfeiting certifications, etc. So that I only purchase prestigious and familiar brands and products" (Coded: C5.P14.R3),

"I think it is difficult and [it] takes time to build clients' trust or confidence again in Vietnam; because it has been lost too much" (Coded: C1.P18.R1).

Lifestyle can affect the intention to purchase sustainable products and is one of the drivers of increased sustainable dairy consumption (Misra & Singh, 2016). Lifestyle may include various aspects such as interests, opinions, working, entertainment, and social and daily activities. The participants may allocate time to different activities in different ways. They can cook by themselves or eat outside, eat with others or eat alone, travel for business frequently or not, eat healthy foods or convenience foods, and vary the frequency of their food shopping:

"I am very busy and can not get up early in the morning to go to the wet market. I mainly come to convenience stores to buy food and milk in the evening" (Coded: C3.P4.R2),

"I drink milk because my schedule is not fixed, sometimes I forget to eat like I just have lunch now, so I usually drink milk to supplement nutrition" (Coded: C2.P1.R3),

"I often go to the gym, so consuming vegetables and milk is good for me" (Coded: C1.P2.R5),

Consumer's knowledge or awareness is essential to food consumption as a key motivator and epistemic value (Smith & Paladino, 2010). The lack of knowledge regarding food products and sustainable consumption behaviour and can result in low trust and become a barrier to sustainable food consumption (Zakowska-Biemans, 2011; Lillywhite et al., 2013). The participants indicated they mainly purchased dairy products they knew well (familiar dairy brands and dairy products).

They seemed to lack knowledge of sustainable dairy products, such as nutrition, certification, origin, processing, and health and sustainable values:

"I think most consumers don't know organic or any new certifications. So they buy their familiar dairy products, not buy these new products" (Coded: C4.P26,28.R2),

"I don't know the health value of organic products, the difference between conventional and organic products, and the use of organic or VietGAP certifications" (Coded: C6.P14.R2),

"I still think that the more educated and knowledgeable people will choose healthier products and more sustainable consumption" (Coded: C1.P20.R1).

Demographic factors are the main control variables and important drivers of food consumption (Hansen et al., 2018). The statements in focus groups also show that demographic characteristics are important drivers of food consumption behaviours (mentioned above). Namely, older people prefer health aspects while younger consumers want flavour; higher educated people choose more sustainable products; busy people tend to use convenience food; and higher-income consumers are more willing to pay for organic dairy products (McFadden & Huffman, 2017).

Social context

Family and social norms are the most influential factors of social context. The family factor can include various attributes such as family size, family composition, and family members. Social norms work on consumers' perception of action as coherent to a particular social group, namely unwritten standards and rules of attitudes, beliefs, and behaviours (Kushwah et al., 2019; Testa et al., 2021). Family is related to various social norms. People living with family are often more interested in the health, quality, and safety characteristics of dairy products. In contrast, the single participants living alone prefer flavour and convenience attributes:

"I have a child, and he consumes dairy products every day. Thus, I buy milk very often, especially healthy milk" (Coded: C1.P3.R2),

"My family has a two-year-old child, so I must pay attention to food safety and hygiene. I go to the supermarket to buy food for my kid" (Coded: C1.P2.R3),

"I think it depends on age and family status. Young people choose the food they like without thinking about health, such as sweet or fast foods. Older people with the family will buy food and something good for the health and taste of their family" (Coded: C4.P20.R4).

In addition, social norms may consist of social responsibility, community benefit, and animal benefit. Consumers with more stringent social norms may have more sustainable food consumption patterns (Hansen et al., 2018). The participants were happy and willing to purchase dairy products from firms with social responsibility, community benefit or animal benefit:

"I buy milk from that firm since it has brought benefits to communities with social activities, e.g., "Đèn đom đóm", even I don't like its taste very much" (Coded: C2.P13.R1),

"I buy Vinamilk, Milo, not TH milk as they have community activities and social responsibility, e.g., "Sữa học đường, Năng lượng xanh, Tiếp sức đến trường" (Coded: C1.P12.R1),

"I am worried that cows can be over milked in Vietnam. This can be harmful to milk cows and cause low-quality dairy products" (Coded: C3.P6.R3).

Reference groups are social groups, work groups, family members, or close friends who are essential to consumer decision-making. They can shape behaviour, contribute to the adoption of certain lifestyles and the formation of values and attitudes, and significantly impact food purchases and consumption; these influences may vary across cultures and among different consumer groups (Fernandes & Panda, 2019). The participants indicated that their food and dairy products consumption was affected by different reference groups in which doctors, family members and relatives, and close friends are the most influential groups:

"The doctor advises that my son is fat and his digestive system is well working, no need to drink dairy products, even Yakult. So I stop my son drinking milk" (Coded: C1.P22.R2),

"My cousin's family has consumed milk from a farmer with good experience. She suggests me, and I try, yes it is good. I never drank non-branded milk before" (Coded: C1.P8.R5),

"My friends recommend me to use Organic milk, it is delicious and healthy. So I buy and try it, yeah, I feel it fat and delicious" (Coded: C5.P9.R5).

In addition, working and professional groups, sports and entertainment groups, and online common-interest groups can significantly affect dairy product consumption behaviours. Tradition and ethical beliefs or religion also influence dairy product consumption; they can be drivers and sometimes barriers to food consumption (Tan et al., 2016; Kushwah et al., 2019). The participants confirmed that when they purchased and consumed food products, they would be based on the tradition, ethical beliefs or religion of their family and communities. They tended to use food products that not only benefited themselves but also benefited the community:

"I think it's related to tradition. I've eaten that food since I was a kid" (Coded: C1.P15.R1),

"My mother often goes to wet markets and purchase food products for my family in the morning as a tradition of my family for a long time" (Coded: C2.P2.R3),

"In my religion, we have ethical beliefs and faith that I can achieve happiness, health, and fun when I have good food consumption and right behaviours"(Coded: C3.P24.R5).

Economic and marketing factors

Price and promotion (discount and non-monetary promotions) are the dominant factors of food consumption. Promotion is an important motive, especially for new products, whereas price is the main barrier to food consumption (Lowe & Barnes, 2012; Bryła, 2016). The focus group shows that price is the first restriction in sustainable food choice since most consumers prefer reasonably-price food products. They can also consider low-priced foods as poor-quality products and unhealthy consumption. The promotion encourages consumers to overcome price barriers and purchase sustainable food products while it can ensure trust in quality:

"The first thing is the monetary problem. Actually, it is difficult or impossible for me to buy Organic milk products with too high prices regularly" (Coded: C6.P13.R4),

"The matter is its price. I will not buy the same dairy product that is too expensive. But if it is too cheap, I will be worried about the poor quality" (Coded: C1.P5.R1),

"I like going to supermarkets to buy milk and food products because they are usually on sale, especially new dairy products" (Coded: C3.P2.R3).

Effective communication can notably impact purchasing and consumption decisions, especially regarding sustainable and healthy food products. The lousy bad communication or the lack of information can be substantial barriers to sustainable food consumption (Bray et al., 2011; Tan et al., 2016). The participants in Vietnam expressed that they lack information on sustainable food products. Thus, their awareness and trust in these products are low. They suggest that dairy firms need to enhance good communication via various channels:

"I have never used organic milk since I do not know and understand the quality, production process, and values of organic dairy products. The communication on sustainable food products must be stronger and better, especially to the young" (Coded: C1.P18.R5),

"I'll not try to find information if it does not catch my eyes. I think there should be better communication via different channels" (Coded: C5.P15.R3),

Advertisements and social networks can strongly affect consumers' awareness of sustainable food products, perception of ethical practices and social norms and enhance the competitive advantage of sustainable producers as a result (Testa et al., 2021; Bray et al., 2011). The participants state that social networks and advertisements are essential tools for their more understanding and information on new sustainable food products:

"I bought and tried the organic dairy products due to an advertising. In the ad, my son and I can see cute and happy cows eating natural grass without pesticides" (Coded: C1.P10.R4),

"I use social networks daily, and I think many people are like me. Social network is my vital reference to buy foods, especially new products" (Coded: C4.P16.R5).

Environment and physical context

The place of purchase, the area of residence, and the working location can significantly affect sustainable food consumption behaviours (Madureira et al., 2021; Kushwah et al., 2019). Retail channels have different price policies, product types, quality standards, and services. Therefore, customers can vary in choosing places of purchase that can meet their demands and be convenient to their places of work and residence. The availability of products, product access possibilities, and visibility of stores are essential drivers of sustainable food consumption (Sundaraja et al., 2021; Testa et al., 2021). Thus, sustainable dairy products should be available in an extensive distribution system, stores should be accessible and close to living and working areas, and the retail display of sustainable products should be attractive and visible:

"I don't choose organic dairy products because I haven't seen these products on the shelves of supermarkets or convenience stores" (Coded: C6.P9.R2),

"I and my kid often go to supermarkets and nearby convenience stores because it's convenient, exciting, and safe while my mom prefers to go to wet markets" (Coded: C2.P2.R3),

Additionally, people interested in environmental protection and living quality can be more potential consumers of sustainable food (Testa et al., 2021). The participants argue that the living environment has become more degraded and polluted with many dirty food products in markets. Therefore, they are more worried about their health and pay more attention to sustainable food consumption. The increase in sustainable food consumption can also enhance sustainable production, environmental protection, and the quality of the living environment:

"Now, whatever you eat and drink makes you sick easily. The living environment is more polluted, many dirty foods. So I pay more attention to health and food" (Coded: C4.P23.R5),

"If we increase the consumption of organic dairy products, their prices will reduce, their production can be more sustainable, and the environment is protected" (Coded: C2.P15.R4).

4.2. Barriers to sustainable food consumption behaviours

The previous section shows that various factors can impact sustainable food consumption behaviours. Many factors are motives for enhancing SC behaviours, while others can impede SC patterns. This section explored barriers to more sustainable dairy consumption patterns and categorised them into five groups based on drivers' classification. In general, the participants indicated that the most dominant barriers to sustainable dairy consumption patterns were cost, inadequate value, lack of trust, lack of knowledge, and insufficient information.

Dairy attributes

New tastes or different and unfamiliar flavours can act as barriers to the purchase of new dairy products. Organic dairy products may have different tastes that are not favored by some participants. In addition, they may not recognise any differences between organic and conventional milk. In other words, the value of sustainable dairy products is not clear to them. This can hinder consumers from paying more money for organic dairy products.

"Taste is the most important to me. My priority is taste, before other factors. I only consume my favourite dairy products" (Coded: C1.P18.R5),

"The important factors are the taste and smell. What is really good for the health may usually be not delicious" (Coded: C2.P27.R2),

"I also tried and convinced my son to drink organic milk. But he didn't like it, he still liked the previous taste better. So I don't want to change" (Coded: C1.P7.R1),

"Organic milk is more expensive, but its taste is not really outstanding" (Coded: C1.P9.R5).

Personal factors

Habits, preferences, lack of trust, lack of knowledge, and insufficient information can act as barriers to more sustainable dairy consumption. Consumers usually have their food consumption habits and preferences are resistant to change. This is especially true is they are satisfied with the available conventional products. The participants seem to have low trust or doubts about the legitimacy of sustainable certification agencies and processes, sustainable products, and firms. In addition, they have very little knowledge and information on certification, production processes, and value of more sustainable dairy products.

"I think most people often used some food products and it becomes a habit and preference. They only use these types of product and hard to change" (Coded: C3.P9.R4),

"I often choose the Vinamilk brand. I have consumed its dairy products since I was a child. The products are also delicious, and I have been familiar with the taste" (Coded: C4.P5.R1),

"Vietnamese people have lost confidence in food certifications and products for a long time, especially new and unknown products, many food safety scandals" (Coded: C1.P14.R1).

Social context

Tradition, family habits, and social pressure and norms can also impede the consumption of more sustainable dairy products. Most participants have traditions and family habits of food consumption, e.g., food types and brands, appearance, nutrients, storing and handling, preparing and cooking, smell, taste, and odour. Their change to new and sustainable food products can be dependent on their traditions and family habits:

"I think it's also dependent on my family tradition. We have eaten those types of foods and tastes for a long time and don't want to change" (Coded: C1.P15.R1),

"I and my kid often go to supermarkets to buy packaged food products while my mom always goes to wet markets to buy fresh foods; it has been a tradition" (Coded: C2.P2.R2).

Consumers' social pressures and busy lifestyles also hinder sustainable food consumption. The busy people usually buy and consume fast foods and drink in a quick and convenient way; they have no time to pay attention to health and sustainability aspects:

"Because people keep chasing their work and money, they don't have time to look at the health, environmental and social aspects of food consumption" (Coded: C3.P16.R5),

"When I get older, I will care more about my health and environment and change. Now, I am busy and prefer processed food and bottled drinks" (Coded: C2.P7.R1).

Economic and marketing factors

Cost, especially high prices, and miscommunication can be significant barriers to sustainable dairy consumption. The price of sustainable dairy products is considered relatively high for most participants' income. In addition, the time and cost of buying and consuming organic dairy products can be higher than those of conventional products:

"The biggest barrier is the price. It is relatively expensive to my income; I can't choose those organic dairy products only for environmental and social aspects" (Coded: C2.P30.R2),

"Commonly, unhealthy food is cheap while healthy food is expensive. Therefore, only high-income consumers can afford healthy and sustainable food" (Coded: C3.P20.R4),

"Food products in the second and third baskets are high-end with organic and healthy goods that are very expensive. I often buy foods in the third basket only" (Coded: C2.P21.R4).

Miscommunication is a significant barrier to sustainable consumption. Miscommunication about organic dairy products may cause dairy consumers to misunderstanding, inadequate information and knowledge, and distrusting sustainable food products and certifications:

"Communication about organic dairy products is very weak and ineffective. Food consumers have no information and knowledge about what sustainable certifications and products are" (Coded: C4.P26,28.R3),

"I don't fully trust in these advertising and certifications. There are many scandals and information on unsafe food, fake products, counterfeiting certifications" (Coded: C5.P14.R3).

Environment and physical context

Two main barriers in environment and physical context are unavailability of sustainable food products and difficulty accessing the place of purchase. Due to the limit of market segments and

consumers, the distribution and display of sustainable food products are not very popular and widespread. Consumers have difficulty looking for and purchasing sustainable dairy products:

> *"Organic dairy products commonly are not sold at popular and common grocery stores nor in wet markets. I cannot see these products in these places" (Coded: C2.P28.R2),*
>
> *"Organic milk is usually not accessible because it is too expensive or it is not popular. I often buy milk from the grocery store" (Coded: C2.P6.R4),*
>
> *"I hope organic dairy products are more popular and accessible; their taste and price should also be suitable for every consumer" (Coded: C6.P12.R4).*

4.3. Summary findings of drivers and barriers

Although there are signs in western nations (e.g., the EU countries) of a shift to more sustainable dairy consumption and especially a rise in alternative, plant-based milk products (Wickramasinghe et al., 2021; Nicolau et al., 2020), the situation in Vietnam is qualitatively different due to the particular socio-economic conditions. Thus, for Vietnam, more attention needs to be paid on the economic and social sides of sustainability (Table 2). Sustainable food consumption should be a multidimensional concept with a multi-benefit viewpoint (Sesini et al., 2020). Vietnamese food consumers have begun to gradually pay more attention to health aspects and social and environmental issues in food consumption due to the development of the economy, education, ethics, social knowledge, global integration, and information technology. Vietnam's dairy value chains have also improved toward more sustainable governance patterns. The findings indicate that Vietnamese dairy consumption has recently progressed toward more sustainable patterns. However, it is still in the early stage of sustainable consumption evolution with various barriers and hindrances as can be summarily seen also from Table 3. Table 3 summarises the drivers and barriers to sustainable dairy consumption as they emerged from the focus groups with Vietnamese consumers conducted for this study.

Table 2. The five dominant food and dairy consumption drivers in Vietnam and EU countries (green: most frequently mentioned (to yellow) to red: least frequently mentioned by consumers).

	Countries			
Dominant drivers	***Vietnam***	***Germany***	***Italy***	***UK***
Health				
Brand				
Quality				
Family				
Promotion				
Price				
Seasonal products				
Environmental concern				
Regional products				

Source: authors' own analysis based on this study and data reported in Nicolau et al. (2020)

Table 3. Summary of drivers and barriers to sustainable dairy consumption

DRIVERS	**BARRIERS**
Food attributes	
Health, Nutrition, Quality, Certification, Brand, Package, Taste or Flavour.	New taste or Strange flavour, Low perceived value.
Personal factors	

Habit, Trust, Preference, Lifestyle, Knowledge, Demographic characteristics.	Habit, Preference, Lack of trust, Lack of knowledge, and Insufficient information.
Social context	
Family, Social norms, Reference groups, Tradition, Ethical beliefs or Religion.	Tradition or Family habits, Social pressures.
Economic and marketing factors	
Price, Promotion or Discount, Communication, Advertising, Social networks.	High price, Miscommunication.
Environment and physical context	
Place of purchase, Area of residence, Working location, Retail display, Quality of living environment.	Unavailability of sustainable products, Difficult access to the place of purchase.

Source: authors' own analysis and summary

4.4. Potential interventions for more sustainable dairy consumption patterns

Based on the COM-B model (described in Section 3.3), we have defined some intervention actions which can be taken by the relevant stakeholders to promote sustainable dairy consumption. The most important stakeholders are those who can affect these three categories of behaviour most effectively, e.g., through policy, promotion, communication, or education (see Table 4). The findings show that policymakers and value chain actors are the most important stakeholder groups in Vietnam. Policy makers can be at all levels of governance, from local and regional to national governments, while value chain actors span the whole value chain from producers, processors, integrated enterprises, and distributors to retailers (Figure 1).

Table 4. Interventions for sustainable dairy consumption behaviour based on the COM-B model

Capacity
(1) Improve consumers' knowledge and understanding of the benefits of sustainable food production and consumption for health, society, and the environment.
(2) Promote transparency and integrity in food value chains to increase consumer trust.
(3) Effective marketing and advertising with clear and transparent information.
Motivation
(1) Promote the attributes of health and taste in connection to sustainable dairy products.
(2) Promote the connection of certifications to food safety and quality guarantees.
(3) Aim at sustainable dairy products with diverse taste, smell, and appearance profiles.
(4) Complement and enhance social and personal values of sustainable food consumption.
Opportunity
(1) Ensure the price is affordable.
(2) Increase the availability of and access to certified dairy products.
(3) Ensure product safety and quality through regulation and monitoring.
(4) The retail channels and product placement of sustainable dairy products should be improved and widely distributed.
(5) Modernise farming technologies and ensure efficient and effective food supply chains.
(6) Develop marketing strategies that target different consumer groups based on cultural attributes and social norms.

Source: authors' own analysis and summary

5. Conclusion and implications

The demand for sustainable and healthy foods has increased substantially in recent decades. Sustainable food consumption has become a central topic and emerging concern of scholars and policymakers. Dairy is an essential food sector that contributes to social and economic development and provides vital nutrients to the human body. However, studies on sustainable

dairy consumption are lacking, while Vietnamese consumers' awareness of sustainable food consumption is still in its infancy. Therefore, research on sustainable dairy consumption in Vietnam is significant and original. The study explored drivers that affect dairy consumption behaviours in Vietnam. The dominant drivers are health, brand and product quality, family, and promotion. Notably, the participants believe the family factor is the priority if they had babies and lived with families. Drivers are identified in five groups, including (i) food attributes: nutrition, certification, package, and taste; (ii) personal factors: habit, trust, preference, lifestyle, knowledge, and demographic characteristics; (iii) social context: social norms, reference groups, tradition, and ethical beliefs; (iv) economic and marketing factors: price, communication, advertising, and social networks; (v) environment and physical context: place of purchase, area of residence, working location, retail display, and quality of living environment.

However, dairy consumption in Vietnam toward sustainable patterns is encountering different barriers that can impede SC behaviours. The focus groups show that the main barriers to more sustainable dairy consumption patterns could be new taste or strange flavour, inadequate value [food attributes]; habit, preference, lack of trust, lack of knowledge, and insufficient information [personal factors]; tradition or family habit, social pressure [social context]; high price, miscommunication [economic and marketing factors]; unavailability of sustainable products, difficult access to the place of purchase [environment and physical context].

The participants generally agreed that their understanding of sustainable food production and consumption is inadequate, their knowledge about the benefits of sustainable food consumption for health is limited, and their trust in sustainable food products and certifications is low. This encourages defining and proposing key intervention actions for relevant stakeholders based on the COM-B model to promote the SC, including *Capacity*: improving consumers' knowledge and understanding of the benefits of sustainable food production and consumption, promoting transparency and integrity, effective marketing and advertising; *Motivation*: promoting the health and taste attributes, connecting certifications to food safety and quality, diversifying taste, smell, appearance profiles of products, enhancing social and personal values of sustainable food consumption; *Opportunity*: ensuring the affordable price, increasing the availability of and the access, ensuring product safety and quality, improving the retail channels and product placement, increasing farming technologies and effectiveness of food supply chains, developing marketing strategies based on cultural attributes and social norms.

The findings are similar to the results of other Valumics case studies (including the UK, Italy, and Germany) (Nicolau et al., 2020), so the suggestions for interventions to promote more sustainable dairy consumption in Vietnam are relevant for an international audience. However, taking into account the different levels of production (scale of production, technology), the different characteristics of consumer behaviour, and the need to improve the nutritional components in the diet of Vietnamese citizens, the intervention policy goals can differ. Specifically, in the EU, the main target has been to reduce dairy consumption to meet the goals of the EU Green Deal due to overproduction, and sustainable trade has become more notable. In contrast, Vietnam should focus on consumers' awareness of sustainable and healthy consumption, food safety regulations and conditions, and food production technology and productivity.

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References

Babuki (2019). Vietnam's dairy market in 2018. Accessed: 09 August 2022. Available: https://babuki.vn/thi-truong-sua-nuoc-viet-nam

Bellassen, V., Drut, M., Hilal, M., Bodini, A., Donati, M., de Labarre, M. D., ... & Arfini, F. (2022). The economic, environmental and social performance of European certified food. *Ecological Economics*, *191*, 107244.

BNEWS (2019). Vinamilk's largest dairy farm system in Asia with Global GAP. Accessed: 09 August 2022. Available: https://bnews.vn/he-thong-trang-trai-dat-chuan-global-g-a-p-lon-nhat-chau-a-cua-vinamilk/119739.html

Bray, J., Johns, N., & Kilburn, D. (2011). An exploratory study into the factors impeding ethical consumption. *Journal of Business Ethics*, *98*(4), 597-608.

Drut, M., Antonioli, F., Böhm, M., Brečić, R., Dries, L., Ferrer-Pérez, H., ... & Bellassen, V. (2021). Foodmiles: the logistics of food chains applied to food quality schemes. *Journal of Agricultural & Food Industrial Organization*, *19*(2), 127-143.

Farizoglu, B., & Uzuner, S. (2011). The investigation of dairy industry wastewater treatment in a biological high-performance membrane system. *Biochemical Engineering Journal*, *57*, 46-54.

Feil, A. A., Schreiber, D., Haetinger, C., Haberkamp, Â. M., Kist, J. I., Rempel, C., ... & da Silva, G. R. (2020). Sustainability in the dairy industry: a systematic literature review. *Environmental Science and Pollution Research*, *27*(27), 33527-33542.

Fernandes, S., & Panda, R. (2019). Influence of social reference groups on consumer buying behavior: A review. *Journal of management research*, *19*(2), 131-142.

Fien, J., Neil, C., & Bentley, M. (2008). Youth can lead the way to sustainable consumption. *Journal of Education for Sustainable Development*, *2*(1), 51-60.

Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of global value chains. *Review of International Political Economy*, *12*(1), 78-104.

Gleim, M. R., Smith, J. S., Andrews, D., & Cronin Jr, J. J. (2013). Against the green: A multi-method examination of the barriers to green consumption. *Journal of Retailing*, *89*(1), 44-61.

Graeber, D. (2011). Consumption. *Current Anthropology*, *52*(4), 489-511.

Ha An (2019). Vietnam's milk production ranks second in ASEAN. Accessed: 09 August 2022. Available: https://nhipsongdoanhnghiep.cuocsongantoan.vn/kinh-doanh/san-luong-sua-cua-viet-nam-dung-thu-2-trong-asean-3505351.html

Hansen, T., Sorensen, M. I., & Eriksen, M. L. R. (2018). How the interplay between consumer motivations and values influences organic food identity and behavior. *Food Policy*, *74*, 39-52.

Hilal, M., Leedon, G., de Labarre, M. D., Antonioli, F., Boehm, M., Péter, C., ... & Bellassen, V. (2021). Organic and Geographical Indication Certifications' Contributions to Employment and Education. *Journal of Agricultural & Food Industrial Organization*, *19*(2), 161-176.

Hoang, V. (2021a). Modern short food supply chain, good agricultural practices, and sustainability: a conceptual framework and case study in Vietnam. *Agronomy*, *11*(12), 2408.

Hoang, V. (2021b). Impact of contract farming on farmers' income in the food value chain: A theoretical analysis and empirical study in Vietnam. *Agriculture*, *11*(8), 797.

Hoang, V., Nguyen, A., Hubbard, C., & Nguyen, K. D. (2021). Exploring the Governance and Fairness in the Milk Value Chain: A Case Study in Vietnam. *Agriculture*, *11*(9), 884.

Honkanen, P., Verplanken, B., & Olsen, S.O. (2006). Ethical values and motives driving organic food choice. *Journal of Consumer Behaviour: An International Research Review*, *5*(5), 420-430.

Huang, J., Antonides, G., & Nie, F. (2020). Social-psychological factors in food consumption of rural residents: The role of perceived need and habit within the theory of planned behavior. *Nutrients*, *12*(4), 1203.

Huu Duc (2019). EverGrowth completes building the dairy cow farming chain. Accessed: 09 August 2022. Available: https://nongnghiep.vn/evergrowth-hoan-thien-chuoi-chan-nuoi-bo-sua-d246960.html

Investvietnam (2019). Dairy and milk products report. Accessed: 09 August 2022. Available: http://investvietnam.gov.vn/vi/nghanh.nghd/15/sua-va-cac-san-pham-sua.html

Kearney, J. (2010). Food consumption trends and drivers. *Philosophical transactions of the royal society B: biological sciences*, *365*(1554), 2793-2807.

Koller, M., Floh, A., & Zauner, A. (2011). Further insights into perceived value and consumer loyalty: A "green" perspective. *Psychology & Marketing*, *28*(12), 1154-1176.

Kushwah, S., Dhir, A., Sagar, M., & Gupta, B. (2019). Determinants of organic food consumption. A systematic literature review on motives and barriers. *Appetite*, *143*, 104402.

Laca, A., Gómez, N., Laca, A., & Díaz, M. (2020). Overview on GHG emissions of raw milk production and a comparison of milk and cheese carbon footprints of two different systems from northern Spain. *Environmental Science and Pollution Research*, *27*(2), 1650-1666.

Lillywhite, J. M., Al-Oun, M., & Simonsen, J. E. (2013). Examining organic food purchases and preferences within Jordan. *Journal of International Food & Agribusiness Marketing*, *25*(2), 103-121.

Liu, Y., Wood, L. C., Venkatesh, V. G., Zhang, A., & Farooque, M. (2021). Barriers to sustainable food consumption and production in China: A fuzzy DEMATEL analysis from a circular economy perspective. *Sustainable Production and Consumption*, *28*, 1114-1129.

Lowe, B., & Barnes, B. R. (2012). Consumer perceptions of monetary and non-monetary introductory promotions for new products. *Journal of Marketing Management*, *28*(5-6), 629-651.

Lucan, S. C., Barg, F. K., & Long, J. A. (2010). Promoters and barriers to fruit, vegetable, and fast-food consumption among urban, low-income African Americans - A qualitative approach. *American Journal of Public Health*, *100*(4), 631-635.

Madureira, T., Nunes, F., Veiga, J., & Saralegui-Diez, P. (2021). Choices in sustainable food consumption: How spanish low intake organic consumers behave. *Agriculture*, *11*(11), 1125.

Mai Chien (2019). Vietnam ranks 6th in Asia in terms of milk production. Accessed: 09 August 2022. Available: https://nongnghiep.vn/viet-nam-dung-thu-6-chau-a-ve-san-luong-sua-d247931.html

McFadden, J.R., & Huffman, W.E. (2017). Willingness-to-pay for natural, organic, and conventional foods: The effects of information and meaningful labels. *Food Policy*, *68*, 214-232.

Michie, S., Van Stralen, M.M., & West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implementation science*, *6*(1), 1-12.

Millward, L.J. (2000): *Focus groups.* In G. M. Breakwell, C. Fife-Schaw & S. Hammond (Eds.), Research methods in psychology, 2nd ed., London: Sage, pp. 303-324.

Minh An (2019). How will Vinamilk expand if they acquire GTN successfully? Accessed: 09 August 2022. Available: https://vietstock.vn/2019/03/neu-gom-duoc-gtn-vinamilk-se-banh-truong-ra-sao-737-659601.htm

Misra, R., & Singh, D. (2016). An analysis of factors affecting growth of organic food: Perception of consumers in Delhi-NCR (India). *British Food Journal*.

Mitchie, S., van Stralen, M.M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science, 6* (42). doi:10.1186/1748-5908-6-42

Monier-Dilhan, S., Poméon, T., Böhm, M., Brečić, R., Csillag, P., Donati, M., ... & Bellassen, V. (2021). Do Food Quality Schemes and Net Price Premiums Go Together?. *Journal of Agricultural & Food Industrial Organization*, *19*(2), 79-94.

Morris, M., & Dunne, N. (2004). Driving environmental certification: Its impact on the furniture and timber products value chain in South Africa. *Geoforum*, *35*(2), 251-266.

Nghi, T.V (2019). Milk consumption increases, but one in four children is malnourished. Accessed: 09 August 2022. Available: https://tuoitre.vn/tieu-thu-sua-tang-nhung-cu-4-tre-thi-co-1-em-suy-dinh-duong-20190601102444453.htm

Nhu Huynh (2019). Vienam's dairy sector is winning and penetrate to the world market. Accessed: 09 August 2022. Available: https://vietnambiz.vn/nganh-sua-viet-nam-dang-thang-the-va-tien-sau-vao-thi-truong-the-gioi-20190531224551302.htm

Nicolau, M., Esquivel, L., Schmidt, I., Fedato, C., Leiman, L., Samoggia, A., Monticone, F., Prete, M. D., Ghelfi, R., Saviolidis, N.M., Sigurdardottir, H., Olafsdottir, G., Brimont, L.P., Aubert, M., Huber, E., Aditjandra, P., Hubbard, C., Arijit De, Odene, J., Schamari, D., Gorton, M., Čechura, L., Hoang, V., & Bogason, S.G. (2020). *Food Consumption Behaviour In Europe Mapping Drivers, Trends And Pathways Towards Sustainability*. The VALUMICS project funded by EU Horizon 2020 G.A. No 727243. Deliverable: D6.1, CSCP, Wuppertal, 214 pages.

Nongnghiep (2019). Rapid increase in export of dairy products. Accessed: 09 August 2022. Available: https://nongnghiep.vn/xuat-khau-sua-tang-manh-post234742.html

OECD and FAO (2022). *OECD-FAO Agricultural Outlook 2022-2031*. OECD Publishing, Paris. Available: https://doi.org/10.1787/f1b0b29c-en.

Oke, A., Ladas, J., & Bailey, M. (2020). Ethical consumers: an exploratory investigation of the ethical food consumption behaviour of young adults in the North East of Scotland. *British Food Journal*, *122*(11), 3623-3638.

Pocol, C. B., Marinescu, V., Amuza, A., Cadar, R. L., & Rodideal, A. A. (2020). Sustainable vs. Unsustainable Food Consumption Behaviour: A Study among Students from Romania, Bulgaria and Moldova. *Sustainability*, *12*(11), 4699.

Quoquab, F., & Mohammad, J. (2020). A review of sustainable consumption (2000 to 2020): What we know and what we need to know. *Journal of Global Marketing*, *33*(5), 305-334.

Reisch, L., Eberle, U., & Lorek, S. (2013). Sustainable food consumption: an overview of contemporary issues and policies. *Sustainability: Science, Practice and Policy*, *9*(2), 7-25.

Ritchie, H. (2022). *Dairy vs. plant-based milk: What are the environmental impacts?* Accessed: 06 August 2022. Available: https://ourworldindata.org/environmental-impact-milks

Salzman, S., Scarborough, H., & Allinson, G. (2017). Exploring the economic viability of using constructed wetlands to manage waste-water in the dairy industry. *Australasian Journal of Environmental Management*, *24*(3), 276-288.

Sesini, G., Castiglioni, C., & Lozza, E. (2020). New trends and patterns in sustainable consumption: A systematic review and research agenda. *Sustainability*, *12*(15), 5935.

Smith, S., & Paladino, A. (2010). Eating clean and green? Investigating consumer motivations towards the purchase of organic food. *Australasian Marketing Journal (AMJ)*, *18*(2), 93-104.

Stancu, C. M., Grønhøj, A., & Lähteenmäki, L. (2020). Meanings and motives for consumers' sustainable actions in the food and clothing domains. *Sustainability*, *12*(24), 10400.

Stern, P.C. (1997). Toward a working definition of consumption for environmental research and policy. In *Environmentally Significant Consumption: Research Directions*; Stern, P.C., et al., Eds.; National Academy: Washington, DC, USA, 12–25.

Stoxplus (2018). Vietnam Dairy Market 2018. Accessed: 09 August 2022. Available: http://biinform.com/Reports/2909-vietnam-dairy-market-2018-3530.html

Sundaraja, C. S., Hine, D. W., & Lykins, A. D. (2021). Palm oil: Understanding barriers to sustainable consumption. *PloS one*, *16*(8), e0254897.

Tam An (2019). Developing sustainable and effective small and medium dairy farms. Accessed: 09 August 2022. Available: http://nhachannuoi.vn/phat-trien-chan-nuoi-bo-sua-quy-mo-vua-va-nho-hieu-qua-ben-vung/

Tan, L. P., Johnstone, M. L., & Yang, L. (2016). Barriers to green consumption behaviours: The roles of consumers' green perceptions. *Australasian Marketing Journal (AMJ)*, *24*(4), 288-299.

Testa, F., Pretner, G., Iovino, R., Bianchi, G., Tessitore, S., & Iraldo, F. (2021). Drivers to green consumption: A systematic review. *Environment, Development and Sustainability*, *23*(4), 4826-4880.

Thanh Nguyen (2019). Vast opportunities for dairy export. Accessed: 09 August 2022. Available: https://haiquanonline.com.vn/thenh-thang-co-hoi-xuat-khau-sua-105792-105792.html

Torres-Ruiz, F. J., Vega-Zamora, M., & Parras-Rosa, M. (2018). False barriers in the purchase of organic foods. The case of extra virgin olive oil in Spain. *Sustainability*, *10*(2), 461.

United Nations (UN, 2022). *Sustainable Development Goals*. Accessed: 06 August 2022. Available: https://www.un.org/sustainabledevelopment/sustainable-consumption-production/

United States Department of Agriculture (USDA, 2022). *Dairy: World Markets and Trade.* Available: https://apps.fas.usda.gov/psdonline/circulars/dairy.pdf

VIRAC (2019). Vietnam Dairy Industry In-depth Report. Accessed: 09 August 2022. Available: https://viracresearch.com/industry/bao-cao-chuyen-sau-nganh-sua-viet-nam-q4-2018

West, R., Michie, S., Rubin, G. J., & Amlot, R. (2020). Applying principles of behaviour change to reduce SARS-CoV-2 transmission. *Nature Human Behaviour*, *4*(5), 451-459.

Wickramasinghe, K., Breda, J., Berdzuli, N., Rippin, H., Farrand, C., & Halloran, A. (2021). The shift to plant-based diets: are we missing the point? *Global Food Security*, *29*, 100530, doi: https://doi.org/10.1016/j.gfs.2021.100530

World Development Indicators (WDI, 2019). Accessed: 09 August 2022. Available: https://data.worldbank.org/indicator

Yadav, R., Singh, P.K., Srivastava, A., & Ahmad, A. (2019). Motivators and barriers to sustainable food consumption: Qualitative inquiry about organic food consumers in a

developing nation. *International Journal of Nonprofit and Voluntary Sector Marketing*, *24*(4), e1650.

Zakowska-Biemans, S. (2011). Polish consumer food choices and beliefs about organic food. *British Food Journal, 113(*1), 122-137.