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An Analysis of Tehran's Bulk Food Retails for Developing Sustainable Design Guidelines

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Abstract

Problems with disposable packaging can only be resolved by considering the products in the whole supply chain. Hence, this research was conducted to identify different aspects of bulk systems and devise guidelines for designing such systems. A literature review was carried out to identify the factors affecting bulk sales. Semi-structured interviews were conducted with 20 bulk food retailers to discover the influencing factors in the context of Tehran. Afterwards, these Qualitative data were analyzed using one stage of open coding and three stages of pattern coding, producing 23 sections that influence bulk systems. The field research and literature review findings were analyzed based on their related sales process stage for extracting design guidelines. These guidelines were developed to provide designers with comprehensive insight to alter current sales systems. Extracted guidelines are mostly applicable through service design and service-product design and also clarify which sectors need the most attention from designers.

Keywords

Sustainable Consumption, Zero Waste Shopping, Bulk Store, Unpackaged Food, Waste Prevention.

Introduction

The linear process of extracting land resources, producing disposable products, and their conversion to waste is one of the prominent problems concerning sustainability (Greenwood et al., 2021; Rhein & Schmid, 2020; Valerius & Wolf, 2019). Soil and water pollution, as well as climate change, are further consequences of this process (Chapman, 2009; Worldbank, 2019; Merchants of Doubt, 2014). One of the main causes of the mentioned problems is the inefficient and profit-oriented supply chain (Muranko et al., 2021). A supply chain is a set of interconnected activities that include planning, coordination, and control of materials and final products from suppliers to the customer (Stevens, 1989) that has multiple social, environmental, and economic impacts on communities (Clift, 2004).

One of the known causes of the unsustainable supply chain is fast-moving consumer goods, such as foods with disposable plastic packaging (Muranko et al., 2021). Globally, about half of plastic pollution is related to plastic packaging (Ritchie & Roser, 2018), and recycling only takes place for certain products and in limited quantities (Bartl, 2014). Although disposable plastic packaging provides opportunities (Greenwood et al., 2021), it has far-reaching negative impacts on the environment, society, economy (Beitzen-Heineke et al., 2017), and the exploitation of human and natural resources in developing countries (Golicic et al., 2020).

Therefore, appropriate alternatives to the disposable packaging system must be implemented while maintaining its function and advantages, and a viable alternative would be the reusable packaging (Greenwood et al., 2021). Bulk sales can be a part of these systems. Bulk goods (loose goods) are products without any packaging (Boßow-Thies et al., 2021), such as potatoes, nuts, and fresh food (Valerius & Wolf, 2019). Accordingly, it is crucial to design highly efficient and effective solutions for reusability (Coelho et al., 2020) or devise solutions that enable or restrict the user to behave in a specific way (Ertz et al., 2017). In designing such systems, the identification of challenges and opportunities in the current supply chain is required to reach the best solution. Retailers are key influencers in the supply chain who are connected to both suppliers and consumers and can affect their decisions.

This research was carried out to identify different aspects of bulk systems, develop a comprehensive perspective on this industry, and attain the initial guidelines for designing such systems. Thus, three questions were addressed; what are the recognized aspects of selling in bulk? What are the circumstances in bulk sales, particularly in Tehran, given the wide range of selling methods, from modern (single-use packaging) to widespread traditional sales? According to the identified aspects of bulk sales in this research, what guidelines should be taken into consideration in the design process?

Based on these questions, the research was structured in three main phases. First, to identify the factors regarding bulk sales, the literature was reviewed. Second, with the identification of Tehran as the design context, qualitative research was conducted through semi-structured interviews with 20 bulk food retailers, and the data were analyzed using open and pattern coding. Then, outputs were categorized (e.g. price, accessibility), and their positive or negative effects on the system's acceptance were demonstrated. These categories were presented separately for each phase.

Third, extracted results were distributed among the four main stages of the sales process (*supplying the store*, *shop keeping*, *purchase*, and *transportation and consumption*). Then, based on the results in each stage, the guidelines were created to lead designers to increase the acceptance and development of these systems. Afterwards, design guidelines were evaluated from the perspective of relation to supply chain sectors and their placement in the field of product, service, or product-service design.

These guidelines are devised by considering the context of Tehran in order to provide a foundation for designing alternative systems and guide businesses into implementing sustainable systems.

Literature Review

The expansion of bulk shopping systems faces obstacles, and it can only be reached by redefining the sales processes (Fuentes et al., 2019). It is always challenging to change the existing systems; however, in every change lies undiscovered opportunities. After reviewing previous studies as a basis for understanding the dimensions of the subject, key elements were extracted and categorized. This section presents the challenges and opportunities discovered in the literature.

1. *Challenges*

Convenience (CH1)

Ease of use is one of the influential factors in shopping (Bashir et al., 2020). Unlike loose goods, packaging provides comfort, which has been appreciated by users (Beitzen-Heineke et al., 2017; Coelho et al., 2020; Valerius & Wolf, 2019). Related challenges include the need for pre-planning (Beitzen-Heineke et al., 2017; Fuentes et al., 2019), providing the containers needed for purchasing (Beitzen-Heineke et al., 2017; Fuentes et al., 2019), carrying containers throughout the day (Beitzen-Heineke et al., 2017), and generally requiring more effort (Bashir et al., 2020). Ease of transport and use, bringing reusable packaging, and management at home are mentioned as well (Coelho et al., 2020). Retailers also face problems such as difficulty in filling containers (Sattlegger, 2021), increased effort to maintain hygiene, and the need for more maintenance (Coelho et al., 2020).

Time (CH2)

In the course of bulk purchases, time is a limiting factor for most customers (Boßow-Thies et al., 2021); as a consequence, they prefer fast-paced options (Ertz et al., 2017). A factor affecting a bulk purchase is the need for more time, both for the buyer (Bashir et al., 2020) and the sellers (Beitzen-Heineke et al., 2017). Food packaging has become a marketing tool in light of the acceleration of the purchase process, and consumers have a strong tendency to use packaged or pre-packaged foods (Chakori et al., 2021).

Product Protection (CH3)

It is vital to preserve the packaging's protective role in bulk food. Preventing leakage, loss, and damage during transportation are among these roles (Risch, 2009) as cited in Beitzen-Heineke et al., 2017). Furthermore, in bulk, the detection of flaws depends purely on the product's appearance, while in packaging, it is easier to detect due to the appearance of the packaging (Sattlegger, 2021). The possibility of spoilage and contamination of bulk food is an additional concern (James Ross Consulting Ltd et al., 2007).

Shelf Life (CH4)

Packaged foods tend to have a longer shelf life (Chakori et al., 2021), which matches the customers' concerns about the product's shelf life (Shepherd et al., 2005), while non-packaged foods sometimes perish sooner (Beitzen-Heineke et al., 2017).

Quality (CH5)

The quality of the product influences the customer's choice regarding non-packaged food (Dubihlela & Ngxukumeshe, 2016; Lofthouse et al. (2009) as cited in Muranko et al., 2021), and since the brand is absent in non-packaged food, the quality plays a more critical role in customer's choice (Valerius & Wolf, 2019).

Pricing (CH6)

Bulk food prices are a determining factor in purchases (Bashir et al., 2020; Dubihlela & Ngxukumeshe, 2016; James Ross Consulting Ltd et al., 2007). Despite their expected lower cost, heavy competition in industrialized packaged products and the need to offset additional handling costs and possible losses might make bulk food more expensive (Costa, 2018).

Poor pricing policies can also lead to this issue (Coelho et al., 2020). Moreover, the final price is unknown before the product is weighed, making the customer uncomfortable (Valerius & Wolf, 2019).

Customer Attraction (CH7)

Bulk food needs to compete with the attractiveness of packaging for customers (Risch, 2009) as cited in Beitzen-Heineke et al., 2017).

Lack of Awareness for Implementing Eco-Friendly Behavior (CH8)

The environmental friendliness of food products is not a priority for customers (Shepherd et al., 2005). Furthermore, they do not consider themselves to be change-makers; rather, they believe this is the responsibility of companies (Rhein & Schmid, 2020). Another reason for neglecting such issues might be the assumption of adequate management of waste (Bashir et al., 2020). Moreover, while some might be aware of the environmental impacts of packaging, a lack of knowledge about bulk food purchase opportunities might prevent customers from making eco-friendly decisions (Coelho et al., 2020; Valerius & Wolf, 2019). The misconception about the price and the quality of bulk food (Valerius & Wolf, 2019) as well as the disposal of reusable containers due to miscommunication (Coelho et al., 2020) are other issues in this case.

Challenging the Current Stakeholders (CH9)

Corporations have made enormous profits from selling packaged goods (Chakori et al., 2021; Monteiro et al., 2013). Furthermore, the implementation of zero-waste systems may result in the loss of businesses and jobs in the waste management sector (Bartl, 2014).

Variety of the Products (CH10)

Bulk stores might face many challenges due to environmental considerations, as they would only offer seasonal and regional products while customers are demanding a broader range of products (Beitzen-Heineke et al., 2017).

Preventing Food Waste (CH 11)

In order to eliminate packaging, the goods need to be protected so that food waste can be prevented (Beitzen-Heineke et al., 2017; Sattlegger, 2021).

Hygiene (CH12)

Another factor influencing consumers' mindset towards the bulk system is hygiene (James Ross Consulting Ltd et al., 2007; Muranko et al., 2021), and people are aware of the hygienic advantage of packaged food (Rhein & Schmid, 2020). In most bulk stores, products are kept exposed and within reach, and some people attempt to touch or taste them (Valerius & Wolf, 2019; Costa, 2018). Another concern is the improper cleaning of containers brought by consumers (Beitzen-Heineke et al., 2017). These factors can discourage people from adopting this type of shopping (Lee Johnson et al., 1985; Valerius & Wolf, 2019). Therefore, improving hygienic conditions is one of the challenges of bulk systems (Boßow-Thies et al., 2021). Retailers also face challenges such as the pressure of industrial hygienic standards, making them reluctant to use bulk containers (Coelho et al., 2020).

Despite the sanitary concerns voiced by those who remain hesitant to embrace the bulk systems, regular customers of these systems expressed almost no concerns over hygienic matters (Coelho et al., 2020; Costa, 2018; Valerius & Wolf, 2019). It's worth noting that problems caused by poor sanitary practices can be reduced by using new technologies and educating individuals (Beitzen-Heineke et al., 2017).

Accessibility (CH13)

Accessing bulk stores can be challenging (Costa, 2018; Fuentes et al., 2019; Valerius & Wolf, 2019).

Influencing factors include the remoteness of the store from usual shopping routes (Costa, 2018; Fuentes et al., 2019), limited open hours (Fuentes et al., 2019), and inaccessibility via public transportation and lack of parking space near the store (Valerius & Wolf, 2019).

Absence of Portfolio/Brand (CH14)

Packaging defines the interaction with customers, and companies use it as a medium to present and introduce their identity and product (Chakori et al., 2021). In the absence of a brand, bulk systems are faced with challenges, such as products with unknown identities (Valerius & Wolf, 2019), traceability issues (Beitzen-Heineke et al., 2017), and difficulty in influencing customers through appearance, packaging, or brand (Beitzen-Heineke et al., 2017; Boßow-Thies et al., 2021; Dubihlela & Ngxukumeshe, 2016; Sattlegger, 2021). Additional problems include intactness (Sattlegger, 2021), lack of access to a consumption guide (Fuentes et al., 2019), and the unavailability of products' nutritional information and expiration date (James Ross Consulting Ltd et al., 2007). Packaging also makes it easier for the staff to assess product quality in goods such as fruits and vegetables; thus, in the elimination of packaging, assessing probable damages and disposing of expired goods requires greater effort (Sattlegger, 2021). Therefore, other strategies are needed to solve these issues in bulk stores (Boßow-Thies et al., 2021); for instance, in bulk systems, the emphasis should be on the product's quality (Valerius & Wolf, 2019). Additionally, reuse systems can portray companies as sustainable, which is an important factor for sustainability-conscious customers (Coelho et al., 2020).

Altering habits (CH15)

Redefining the purchasing systems involves the challenging process of adopting new habits (Fuentes et al., 2019; Rhein & Schmid, 2020; Valerius & Wolf, 2019; Zeiss, 2018). The challenges include paying more attention to the process, more planning (Fuentes et al., 2019), buying products without expiration dates or with shorter shelf life (Beitzen-Heineke et al., 2017), time-consuming purchases (Valerius & Wolf, 2019), availability of single-use and packaged goods, awkward social situation while asking for filling the containers (Ertz et al., 2017), changing cooking and eating habits, and shopping patterns (Zeiss, 2018).

Infrastructure (CH16)

Changing the current sales system requires reorganizing the supply chain infrastructure (Coelho et al., 2020) and re-framing the purchasing process (Fuentes et al., 2019). This demands a focus on issues such as the empowerment of consumers (Fuentes et al., 2019), hiring additional staff, developing new methods for maintenance and shop keeping (Beitzen-Heineke et al., 2017), and changing store equipment which requires an additional investment (Coelho et al., 2020; Fuentes et al., 2019; Minami et al., 2010).

Product Arrangement (CH17)

Retailers can categorize products according to the information and features provided via the packaging, such as brand, expiration date, and shape (Sattlegger, 2021). Using bulk containers reduces the flexibility of product arrangement, which is more product-specific than packaged goods (Sattlegger, 2021) and requires more space (Minami et al., 2010).

2. *Opportunities*

Growing Interest in Waste Reduction (O1)

The main goal of bulk purchases is to reduce the environmental impacts of packaging (Fuentes et al., 2019; Valerius & Wolf, 2019). In this regard, new trends toward waste reduction have emerged due to observed environmental problems (Fuentes et al., 2019), increasing environmental awareness, concerns for future generations (Rhein & Schmid, 2020), and actions taken by governments (Rhein & Schmid, 2020; Valerius & Wolf, 2019).

Packages are seen as problematic to the extent that they evoke strong negative feelings (Fuentes et al., 2019), and people also believe in the environmental benefits of zero waste (Boßow-Thies et al., 2021; Watson & Smith, 2020; Zeiss, 2018). Therefore, they have turned to bulk products (Valerius & Wolf, 2019). These approaches are attractive to customers with an environmental perspective (Minami et al., 2010). They provide an opportunity for a waste-free supply chain (Zeiss, 2018).

Customization (O2)

Consumers appreciate that bulk stores enable them to buy products in the desired amount and combination (Beitzen-Heineke et al., 2017; Boßow-Thies et al., 2021; Coelho et al., 2020; Costa, 2018; James Ross Consulting Ltd et al., 2007; Minami et al., 2010; Valerius & Wolf, 2019). This type of purchase allows the consumer to buy in small quantities to test new items conveniently and purchase unique, organic, and high-quality goods (James Ross Consulting Ltd et al., 2007). Retailers can also offer customized, affordable options using low-cost refill and reuse systems (Coelho et al., 2020).

Environmental Policies (O3)

In some countries, another reason for the transition to waste-free systems is enforcing new environmental laws (Coelho et al., 2020; Lam & Chen, 2006).

Seeing Products from Up-Close (O4)

Another advantage is examining items closely (James Ross Consulting Ltd et al., 2007; Valerius & Wolf, 2019), which eliminates the need to trust brands beforehand (Valerius & Wolf, 2019).

Reducing Costs (O5)

The products reach consumers at a lower price because producers in these systems do not need to spend on branding, marketing (Beitzen-Heineke et al., 2017), and packaging (Minami et al., 2010). Regarding costs, eliminating packaging causes lighter transportation, hence lowering fuel consumption (Beitzen-Heineke et al., 2017). Additionally, lowered customization costs in these systems lead to higher profits for retailers (James Ross Consulting Ltd et al., 2007).

Eliminating Brand Bias (O6)

In the absence of a brand, the customer can choose the product more easily without being confused or influenced by misleading advertisements of some brands (Beitzen-Heineke et al., 2017).

Reducing Environmental Impacts (O7)

One of the benefits of eliminating packaging and replacing it with reusable solutions is reducing waste (James Ross Consulting Ltd et al., 2007; Minami et al., 2010). By purchasing in desired quantities, food waste can also be reduced (James Ross Consulting Ltd et al., 2007). Timely sales, donation of products close to the expiration date or conversion and presentation in other forms, and personal use of products before spoiling also reduce food waste (Beitzen-Heineke et al., 2017). Reducing greenhouse gas emissions by eliminating packaging production and reducing the weight of transportation are other positive environmental effects of these systems (Beitzen-Heineke et al., 2017; James Ross Consulting Ltd et al., 2007).

Better Shopping Experience (O8)

In bulk stores, customers benefit from more customer-seller interaction and free consultation in a less stressful environment (Beitzen-Heineke et al., 2017). These systems provide the opportunity of having pleasant discoveries and redefining how customers spend their time, e.g., offsetting increased shopping time by reducing waste management time (Zeiss, 2018). Enjoying the weighing process and the theatre-like procedure was also mentioned (Minami et al., 2010). In general, it is more likely to feel positive in these buying processes (James Ross Consulting Ltd et al., 2007).

Methodology

A qualitative study was conducted, and data were collected using semi-structured interviews to identify aspects of bulk sales in Tehran, where industrial and traditional sales co-exist. The qualitative approach is suitable for cultivating a new topic and studying the subject in a real-life context (Brinkmann, 2008; Flick, 2006). These pieces of research have been done to create new perspectives; however, the sampling is not suitable for generalizing the results (Flick, 2006). It is better to interview in a person's space to gather more information (IDEO, 2015). Hence bulk food stores were selected for the interviews' location.

In qualitative studies, the criteria for the completion of data collection is theoretical saturation (Corbin & Strauss, 2007). In this regard, a total of 20 interviews were conducted. Since the purpose of sampling in qualitative research is to broaden perspectives as much as possible, sampling of this study was for identifying multiple cases in different areas with different backgrounds. Hence, bulk stores in six districts were selected for interviews, with three different income levels, from low to medium (6 stores), medium (11 stores), and medium to high (3 stores).

It should be noted that the selected bulk stores included herbal stores (6 stores), grocery stores (12 stores), and a combination of both (2 stores), all of which offered long shelf-life products. Only one out of 20 stores used dispensers, while the rest used traditional containers, e.g., sacks and buckets.

Interview questions have been designed to identify the challenges and opportunities of selling food without packaging in bulk stores in Tehran. In this regard, 14 questions were proposed with three main objectives. The first group of questions aimed to identify the behaviors and perspectives of retailers, the second group pursued the identification of behaviors and perspectives of customers from the retailers' viewpoint, and the third group sought to identify the various dimensions of products and loose goods' sales process [in three stages of the purchase, maintenance and sales]. These questions were designed in a way that allowed the interviewees to express their opinions beyond the limits of the questions. It should be noted that the initial questions were corrected and finalized after the tests and feedback.

In the interview, people's responses were recorded and the data was coded in several stages for qualitative analysis. In the first stage, the open coding method was used (Corbin & Strauss, 2007; Saldana, 2013). The interviewees' words were utilized to create the codes, that is, *in vivo coding* (Corbin & Strauss, 2007). In this stage, 403 codes were assigned.

In order to create a better understanding of the codes, they were categorized based on pattern coding into subsets that were similar in meaning and concepts (Corbin & Strauss, 2007; Saldana, 2013). In pattern coding, 403 original codes were first categorized into 241 basic concepts, and then by a similar process, 186 categories were created. Finally, considering the more general concepts, these 186 categories clustered into 23 general sections to present the findings.

The pattern coding in this study was performed using the K.J technique. This technique is suitable for discovering the dimensions and creating common comprehension of a problem (Ulrich, 2003).

Since group and visual processes play an important role in design research (Costa et al., 2018), and the purpose of the article was to create a context for design, this process was collectively done by authors on the miro.com platform.

Afterwards, in order to extract design guidelines from the identified dimensions, the findings of field research and literature review were analyzed based on their related sales process stage. The extracted guidelines that overlapped were then combined using the K.J technique.

Hence, the design guidelines that should be considered to improve each stage of the sales process were established. Finally, to create design focal points, the parts of the supply chain that should be modified the most to implement each design guideline were distinguished, and the guidelines were evaluated to specify their field of design.

Results

According to the aim of the field research, after performing the analyses described in the methodology, findings were categorized into 23 general sections and presented in six groups. Each general section was divided into Opportunities, Challenges, and Neutrals. Neutrals are those that do not pose an advantage or disadvantage when comparing bulk and packaged product sales. A miscellaneous group was included in the 23 sections, which isn't presented because it wasn't contributing to the analysis.

1. *Customer's Bulk Buying Aspects*

Considering the identification of customers' behavior as one of the aims of the interviews, Table 1 presents retailers' viewpoints on factors customers pay attention to in bulk purchases.

Table 1: *Customer's bulk buying aspects.*

Hygiene	
-	Customers perceive packaged products as more hygienic than bulk. The hygiene of bulk products can be affected by factors such as touching and exposure to the environment.
+	Less sanitary concerns about common bulk products and foods that must be cooked beforehand.
Price	
-	Bulk Iranian products are typically priced higher than imported ones.
+	One of the reasons for preferring bulk products is their lower prices because they do not involve packaging and branding expenses (excluding goods that still have a low price despite packaging costs).
N	Price is generally important for customers.
Quality	
-	Packaging products (mostly imported) are sorted and have a better appearance than bulk products (mostly Iranian that need to be cleaned). Unlike bulk sales, packaging has a better ability to maintain the original quality of products.
+	Bulk products that are often Iranian have better taste and cooking quality than packaged ones. Packaged products might contain one good with inconsistent qualities mixed together.
N	Quality is generally important for customers.
Customization	
-	The need for a variety of products in bulk stores was mentioned by retailers.
+	In bulk stores, products can be purchased by the desired amount, quality, and price (e.g., retailers mentioned the advantage of buying based on the price of expensive products). Since the seller knows the customer, the product is given according to their needs, and also, it is possible to order in customized packages in bulk stores.
Testing	
+	The customer can see the product up-close, purchase in small quantities to test, and have the refund option in bulk purchasing.
Product Information	
-	There is a lack of product information (e.g., expiration date) in bulk goods.
+	Packaging forces the customer to choose based on the brand while they can't evaluate the actual product, which is not the case in bulk.
N	Retailers can comment on product features and prices in bulk stores. Customers can buy products based on their experiences.

2. *Aspects of Buying and Maintaining Products in the Store*

Table 2 presents different aspects of providing and maintaining products in bulk stores.

Table 2: *Aspects of buying and maintaining products in the store*.

Product Purchasing Ways for the Store	
N	Ways to provide products for bulk stores include buying from a salesperson, wholesaler shops at a grand bazaar, previously known shops (in person or remotely), online stores, and directly from the farmer.
Containers	
-	Problems regarding bulk containers include the absence of product information, heaviness, cleaning, refilling, appearance, and unsuitable size for the product's selling volume leading to the spoiling of the remains. In containers, products' exposure to the environment leads to poor hygiene and the loss of the product's scent.
N	Some products are sold in their bulk packaging (sack), while in other cases, containers are made of plastic, cardboard, or wood. Containers of products with less sanitary concerns can be cleaned less frequently. Some retailers did not have any difficulties using bulk containers. Others mentioned dispensers as a suitable alternative, despite some drawbacks.
Bulk Packaging	
-	Buying goods in bulk packaging for stores comes with disadvantages such as the product's unknown identity, difficulties with buying in the desired quantity, and the unknown weight of the packaging itself (costly for expensive products).
N	Different kinds of bulk packaging include cardboard boxes, plastic bags for smaller quantities, and sacks for products in larger quantities.
Product Selection Process for Retailers	
-	Challenges that retailers face when selecting their products include the wide range of products in the market (making the selection process time-consuming), the difficulty of finding sellers with high-quality bulk products (packaging companies are not willing to sell bulk to retailers due to declining profits), the samples differing from the received products, the demand of cash purchase from suppliers, and price fluctuations. Moreover, retailers grind the products themselves to ensure the quality because suppliers mix products with different qualities to leave some bargaining room for the seller.
+	The retailer can inspect the products up-close and refund the low-quality goods.
N	The possibility of refunding, choosing from pre-selected options, remote purchasing, and buying from small businesses are preferred by bulk retailers. Retailers use their experience to determine the type and quantity of products they should purchase each season.
Products Packaged by Retailers	
-	The advantages of products packaged by retailers include better hygiene and manageability, rapid sales, increased profits, a more stylish appearance, and standard packaging (especially for expensive products).
+	plastic packaging needs to be constantly replaced by retailers to maintain a fresh, clean look.
N	Based on price and average buying size, retailers package bulk products.

3. *Process of Purchasing and Transporting Products*

Regarding the aim of understanding different aspects of wholesaling, Table 3 presents findings regarding the interaction between retailers and buyers.

Table 3: *Process of purchasing and transporting products.*

Bag or Packaging for Transportation	
-	Reliable, portable, organizable, inexpensive, and opaque packaging is required to transport the goods from the shop to the customer's residence. High demands for free plastic bags from customers are also challenging. Furthermore, most customers are reluctant to bring containers and bags from home, and the retailer does not expect it, either.
+	Retailers often welcome customers to bring their containers due to the reduction in the cost of plastic bags. Except for one, all retailers have no trouble filling customers' containers. Despite the overall unpopularity among customers, bringing containers was mentioned for buying in small amounts (e.g., spices). Containers can also be more hygienic.
N	Some customers wanted an additional plastic bag for different grouping products further, while retailers believe it is unnecessary.
Pouring the Bulk Product	
-	While the customer would like to pour the bulk product, the retailer prefers to pour it them self and does not trust the customer to do so. It is necessary to keep loose goods intact. Other related challenges are the time-consuming process, inaccurate weighing, and difficulty in transferring some powder products due to dispersion.
Remote Sales	
N	The trend toward remote sales is anticipated.

4. *Business-Related Remarks*

Table 4 presents the commercial aspects of selling bulk products.

Table 4: *Business-related remarks.*

Suitable Products for Selling in Bulk	
-	Bulk products would be more acceptable by customer when they are already common as bulk sale product in stores, have less sanitary concerns for customers, absorb fewer contaminants, are sold along with similar and related items, or get sold out more quickly (to prevent spoiling and space occupation).
+	Products that are cheaper than their packaged counterparts are suitable for selling in bulk due to the high prices of bigger packages of products and packaging costs. Also, bulk products that are necessary for households, have high-profit margins, or compensate for their low profits with high sales, are suitable for selling in bulk.
Encouraging the Customer	
-	Customers need to be encouraged through acts such as not interfering with their selection, speeding up the shopping process, maintaining a complete range of products (necessary, foreign, and in-demand goods and goods that are currently only available in packaging), considering hygiene (preventing exposure to environment), and advertising.
+	The customers are able to buy their desired amount, and the retailers recognize customers' preferences.
N	Customers can be persuaded by participation in pouring, provided dispensers, easy access to stores, the retailer's proper manners, and increasing their trust in the retailer (e.g., store's history).
Business Expansion	
N	Growing the business requires additional physical, mental, financial, and store spatial capacity and being less occupied with other activities.
Eco-Friendly Offers	
N	For promoting eco-friendly sales, the following suggestions were made: Establishing deposit packaging systems for reusable packaging (that can be washed by a dishwasher along with remote sales options), providing reusable containers from customers, managing on retrieving and refilling by the suppliers, focusing on the stronger influence on children and their high impact on their families, and considering that the public mindset towards environmental issues changes slowly.

5. *Behavior and characteristics of the retailer*

Additional points worth considering include career motives, behaviors, and perspectives of retailers as stakeholders of these systems, which are presented in Table 5.

Table 5: *Behaviour and characteristics of the retailer*.

Career Motives and Features	
N	Interests due to positive experience, inheritance, limited choices, and low financial capacity are the reasons for choosing bulk sales. Being busy, having no space, and experiencing difficulties are parts of this job. Due to limitations, retailers go along with career challenges willingly or reluctantly.
Behaviour and Perspectives of the Retailers	
+	Some retailers expressed environmental concerns.
N	The behavioural characteristics of retailers include informing buyers, being familiar with customers' choices, sales skills such as comportment, respecting the customer by pouring the goods for them, and differing views on hygiene sensitivity.

6. *Behavior and characteristics of the buyers*

Recognizing the behavior and characteristics of customers of bulk stores from retailers' perspectives, which was one of the study's objectives, is presented in Table 6.

Table 6: *Behaviours and characteristics of the buyers*.

Purchasing Behavior	
-	The behaviours of non-bulk buyers include reluctance in cleaning the bulk goods, lack of price concerns in buying from big stores, and the importance of the brand for the young.
+	Paying more attention to environmental issues, bringing containers (also mentioned, some bring containers in their cars), and preferring shopping in traditional ways are some behaviours of buyers.
N	Bulk buyers' shopping behavior includes undetermined shopping lists, routine shopping every two weeks or after finishing the products, using their car, decreased spending, and purchases from shops on the way.
Customer Demographics	
N	Homemakers, singles, students, workers, traditional buyers, locals, other shopkeepers, and different economic classes and age groups make up the bulk customers' community.

Discussion

The findings of field research and literature review were analyzed according to their respective sales process stages (Figure 1), with the aim of extracting the design guidelines (Table 7). First, the sales process was divided into four main stages *supplying the store*, *shop keeping*, *purchase*, and *transportation and consumption*. Then, claims were extracted from the findings and categorized into four mentioned stages based on their influence. As an example, 15 claims of qualitative research and 11 claims of literature were arranged in the *supplying the store* stage. After analyzing these claims at each stage of the sales process and based on the new understanding this division had created for each, the design guidelines that should be considered for each claim were extracted.

In some cases, more than one guideline was extracted from each claim. Using the K.J technique, the overlapping guidelines were grouped and presented as a guideline. Regarding the example of *supplying the store*, the 15 claims generated 16 design guidelines. The design guidelines were formulated to be comprehensive, meaning they do not lead to any pre-determined solution since the solutions found in each context will differ based on design questions and processes.

With the aim of creating design focal points, Table 7 also highlights which sector of the supply chain should undergo the most modifications to implement each design guideline. The sectors are producers (P), suppliers (S), retailers (R), and customers (C) and are prioritized based on their relevance (They are assigned a priority from 1 to 3, with 1 being the highest). Also, to specify the field of design, the guidelines are divided as such: product, service, or product and service.

Table 7: *Design Guidelines The identified sectors for each guideline are counted along with the.*

Supplying the Store Stage
Design Guidelines based on Field Study
CH4.2.3: Considering bulk packaging problems like the unknown weight of the packaging itself, unknown identity, and difficulties with buying in desired quantity (P1, S2 / product).
CH4.4.2 and CH4.1.4: Reflecting on providing a complete range of products such as necessary, foreign, in-demand products, or those usually unavailable in bulk (P1, R1, S1 / service).
CH4.2.4: Considering the retailers' purchase problems, including being overwhelmed by the variety of options in the market, the difficulty of finding sellers with high-quality products, untrustworthy samples, and product quality inconsistency (S1, R2, P3 / service).
CH4.2.4: Addressing payment problems, e.g., cash purchase, and price fluctuations (P1, S2 / service).
O4.4.1: Considering the opportunity of providing products whose packaging competitors are expensive or packaged in an excessive amount (P1, S2, R3 / product-service).
O4.2.4: Taking advantage of up-close inspection and refunding the low-quality goods (S1 / service).
O4.1.1, CH4.4.1: Considering products' contaminant absorption, the customers' sanitary concerns, alongside fewer concerns about goods that must be cooked (R1, P2 / product-service).
CH4.4.1: Selecting products that are commonly sold in bulk (R1, S2, P3 / service).
CH4.6.1: Providing products that require less cleaning (R1, P2, S3 / service).
CH4.4.1: Providing similar and related products (R1 / service).
Design Guidelines based on Literature
O5: Reflecting on reducing energy consumption in transportation by less packaging (S1, P1/ service).
CH11: Considering the role of packaging in preventing food loss (P1, S2, R3/ product).
CH14, CH4: Providing high-quality products because of demands (P1, S2, R2/Service).
CH10: Considering limitations of becoming eco-friendlier because of buying only regional and seasonal products (R1, P2, S3/ Service).
O5, CH6: Considering the possibility of reduced expenses of bulk products (besides addressing the additional handling costs) (R1, P1, S2/ Service).
O3: Taking advantage of the enforcement of environmental regulations (P1, R2/ Product-service).
CH16, CH9: Addressing the difficulty of changing the current complex supply chain and eliminating some markets. (P1, S1, R1, Service).

Shop Keeping Stage
Design Guidelines based on Field Study
O4.4.1: the possibility of adjusting the pricing strategy based on each product's sales volume (R1, Service).
CH4.2.2: Addressing containers problems such as the absence of information, appearance, heaviness, and refilling difficulties (R1, P2/ Product).
CH4.4.2, CH4.2.2, CH4.1.1: Solving containers' hygienic issues (wash ability and the exposure to environment and people's touch) (R1, C2/ Product).
CH4.2.2: Addressing problems of keeping the product in containers such as the reduced quality (e.g., loss of scent) and spoilage due to an unsuitable size for the product's selling volume (R1, P2/ Product).
CH4.4.1: Considering management of products' selling duration due to spoilage and space occupation (R1/ Service).
CH4.4.2: Considering the influence of advertisement on persuading the customers (R1, P1/ Service).
CH4.2.5, CH4.1.1: Paying attention to competitors which are more standard, hygienic, profitable, appealing, and manageable, such as packaged products (R1, P1/ Product-Service).
O4.2.5: Attending to the importance of keeping the goods fresh and clean (R1/ Product-Service).
Design Guidelines based on Literature
CH17, CH1: Considering the difficulty of filling and moving the bulk packaging and the need to arrange based on the store layout (R1, P2/ product-service).
CH12, CH1: facilitating container cleaning and encouraging retailers to do so carefully (R1, P2/Product-Service).
O7, O8: Using the potential of bulk stores for positive social and environmental effects (R1/ Service).
CH12: Facilitating compliance with sanitary standards (R1/Product-Service).
CH11, CH12, CH5, CH3: Addressing the need to protect the products from exposure to the environment and human touch to maintain the quality and hygiene and extend the products' shelf life (R1, C2/Product-Service).
CH1, CH14, CH16: Considering the limited retailer's resources to hire new staff, afford the initial cost of bulk systems, and the necessity of familiarity with bulk products (R1/ Product-service).
Purchase Stage
Design Guidelines based on Field Study
CH4.3.2, CH4.4.2: Addressing the time-consuming aspect of the bulk purchasing process (R1, C2/ Product-service).
O4.6.1: Relying on the increase in customers' environmental concerns (R1, P2/ Service).
O4.6.1: Considering the transportation means of the customers (R1, C1/ Product-service).
O4.6.1: Counting on the tendency of some customers to buy in traditional ways (R1/ Service).
CH4.3.1: Addressing the popularity of free plastic bags in bulk stores (R1, C1/ Product-service).
CH4.6.1, CH4.1.3: Considering the customers' unwillingness to buy products that need to be cleaned (R1, P2/ Product-service).
CH4.1.3: Noticing the importance of the products' appearance for customers (R1, P1/ Product).
CH4.3.2: Addressing the problems in weighing the bulk product (R1, C1/ Product-service).
CH4.3.2: Considering the contrast between customers' tendency to pour the bulk product themselves, and retailers' reluctance to allow them to do so (R1, C1/ Product-service).
CH4.4.2: Paying attention to assisting the customer in the selection process without interfering (R1/ service).
CH4.4.2: Noticing the importance of having a complete range of products (P1, R1, S1/ Service).
CH4.4.2, CH4.3.2, CH4.1.1: Considering protecting products from human touch and the environment for a cleaner purchasing process alongside creating a hygienic perception for customers (R1, C2/ Product-service).
CH4.6.1: Noticing the supermarket customers' tendency to buy products with a brand and their indifference to prices (R1, C2/Service).
CH4.1.2: Addressing the higher price of Iranian products (most bulks are Iranian) compared to imported ones (P1, S2, R3/ Service).
O4.4.2, O4.1.4: Taking advantage of bulk retailer's familiarity with customers' needs (R1/ Service).
O4.3.1: Taking advantage of retailers' profiting from reduced plastic bag provision (P1, C2, R3/ Product-service).
O4.1.2: Taking advantage of the price reduction made possible by removing brand and packaging expenses (P1, R2, S3/Service).
CH4.3.1: Considering the customers' need for reliable, portable, inexpensive, opaque, and organizable packaging (R1, C2/Product).
CH4.3.1: Considering the unpopularity of customers bringing the container and the retailers' lack of expectation of such an act (C1, R2 / Service-Product).
O4.4.2, O4.1.4: Considering the bulk's potential to buy in the required quantity and quality or with a specific budget (R1, P2, S3/ Service).
CH4.1.3, CH4.3.2: Paying attention to the preservation of quality and intactness while pouring and the difficulty in transferring some goods like spices or flour in the pouring process (R1, C2/ Product).
O4.1.4: Taking advantage of purchasing in personalized packaging (R1/Service).
O4.3.1: Paying attention to the advantages of customers bringing their containers, such as more hygiene and reduction in costs, while not having any inconvenience for retailers (C1, R2/ Product-service).
O4.1.5: Considering the possibility of refunding in bulk purchases (R1, S2/ Service).
O4.1.6: Considering the possibility of providing information without the need for brand influence (R1, P2, S3/ Service).
O4.1.3: Taking advantage of the better quality of loose goods (mostly Iranian) compared to packaged goods (R1, S2/ Service).
O4.1.5: Taking advantage of viewing the bulk products up close (R1/ Product-Service).
CH4.1.6: Considering the customer's need to receive product information, e.g., expiration date (R1, P2, S3/Product-Service).

Design Guidelines based on Literature
CH10: Addressing customers' demand for the off-season, non-local and diverse products (P1, S2, R3/ Service).
CH1, CH2, CH5, CH6, O5, O2: Considering the convenience, time, quality, and price (e.g., the possibility of cheaper personalization) (R1, P2, S3/ Service-product).
CH1, CH2, CH7: Considering faster, easier, more attractive competitors with more waste (R1, P2, S3/ Service-product).
CH1: Facilitating the planning for purchasing and provision, and carriage of reusable containers (C1, R2/ Service- Product).
CH6: Enhancing the tangibility of the price-weight relationship (R1/ Service- Product).
CH8: The necessity of informing people about the bulk option, their store locations, price, quality, and system usage (R1, P2/ Service).
CH3, CH11: Addressing the possibility of product damage in the purchasing process and the difficulty of flaw detection in the bulk products (R1, P1, S1, C2/ Service- Product).
O1: Counting on the people's awareness about the zero-waste movement and the preference to buy in bulk and desired quantity. (R1, P2/ Service).
O4: Taking advantage of the possibility of testing the product for customers' better choice (R1/ Service- Product).
O8: Considering the enhancement of customers' shopping experience through interaction with retailers and using their advice (R1/Service).
O6, O14: Considering presentation of product's features without persuasion by brands (R1, P2, S3/ Service).
O2: Attracting the customers with the possibility of choosing from a variety of products in the desired amount and combination (R1, P2, S3/Service).
CH12: Considering hygiene maintenance as a strategy for attracting potential customers, while hygiene is not a concern for regular bulk customers (R1, C1, P2, S3/Product-Service).
CH13: Paying attention to the stores' proximity, and availability of public transportation or parking space for better customers access (R1, C1/ Service).
CH14: Addressing the lack of information (maintenance guide and expiration date), and the brand (which leads to loss of product identity, traceability, and influence through appearance) (R1, P2, S3/ Service-Product).
CH15: Considering challenges of overcoming habits of using disposable packaging; which means getting used to spending more time, additional planning, and purchasing for new cooking habits (C1, R2/ Service-Product).
CH8: Addressing lack of awareness, priority, or sense of responsibility towards environmental issues during the purchasing process (C1, R2, P3 /Service).
CH16: Facilitating the customer's transition to new shopping experiences (R1, C2/ Service-Product).
CH14: Improving the sustainable image of the brand by using a packaging system aligned with its vision (P1/Service-Product).
Transportation and Consumption Stage
Design Guidelines based on Field study
CH4.6.1: Considering customer's unwillingness to clean the loose goods (P1, S2, R2, C2 /Service).
CH4.3.1: Considering the unpopularity of bringing containers and shopping bags by the customer (C1, R2/Product-Service).
CH4.3.1: Considering the requirements for the packaging to transfer the product to the customer's house, like reliability, portability, organizability, inexpensiveness, and being opaque (R1, C2/ Product).
Design Guidelines based on Literature
CH1: Addressing user's discomfort during transportation and use (e.g., inconvenience of carrying containers throughout the day, use, and management at home) (C1, R2/Product-Service).
CH3, CH11: Considering the protection of products during transportation to prevent damage and waste of goods (C1, R2/Product-Service).
CH15: Paying attention to the shorter expiration date of some loose goods and the need to change customers related habits (C1/Service).
CH12: Paying attention to the sanitation of bulk products and resolving customers' related concerns (R1, C2, P3, S3 /Product-Service).
CH2: Reflecting on the differences between ready meals and bulk food in terms of time and method of consumption (C1, P2, R2/Service).
CH14: Considering the lack of the consumption guide, e.g., cooking and storing information (C1, P2, R2/Product-Service).

Consideration of their priority (Figure 2) to highlight the importance of the different sectors at each stage of the sales process. As a result, to improve the *supplying the store* stage, by considering the priorities, the guidelines of field studies emphasize more on the retailer, while in literature, the producer seems more important. Generally, without considering the priorities, at this stage, the three sectors of the seller, producer, and supplier can be considered effective.

In the *shop keeping* stage, retailers play the most influential role, followed by less significant roles of producer and customer, respectively. The retailer also contributes the most to the improvement of the *purchase* stage, accompanied by customers and producers as less major contributors and suppliers as the least significant. In these two stages, the top priorities of literature and field research were similar. Lastly, in the *transportation and consumption* stage, customers, retailers, producers, and suppliers were important in the mentioned order. Since the retailers do not directly participate in this stage, the guidelines from field research cannot be compared to the literature guidelines.

Regarding the field of design for each guideline, the majority of guidelines in both field and literature studies were related to service design. In the *shop keeping* stage, the guidelines from field studies mostly emphasize service design and product design, but in literature studies, product-service design is more prominent. Both service design and product design were emphasized in the *purchase* section, while in the *transportation and consumption* stage, the product-service design was more prominent. Overall, the transition of the supply chain towards sustainable bulk systems is not achievable by product design alone; therefore, service and product-service design must be the main focus of designers.

Conclusion

This research, which focuses on three main objectives, first identified known aspects of bulk systems and recognized 25 categories that influence these systems' processes. Secondly, field studies were conducted to understand the context of Tehran, and 23 general sections that influence bulk systems were extracted. Lastly, by analyzing these two phases of the study, design guidelines were established to provide a foundation for designers to alter the current systems.

These guidelines were evaluated from two aspects in relation to supply chain sectors and placement in different fields of design. It was specified that in order to improve the sales systems, it is preferable that designers act through service or product-service design since product design alone will not be fulfilling. It was also clarified which sectors need the most attention from designers in each stage of the sales process.

Overall, packaged products provide advantages; therefore, additional efforts are required to compensate for the absence of packaging, whether through rebuilding these advantages differently or by changing the consumers' view toward shopping.

Since the qualitative phase of this study focuses on retailers as participants of the supply chain, and due to the limited sample size, further studies could be carried out with an emphasis on other sectors of the supply chain (e.g., producers and consumers), or by implementing quantitative approaches with the aim of discovering the extent of these research findings. It is worth considering that bulk systems are only one of the recognized sustainable alternatives, and other systems should also be analyzed.

Since bulk systems are widely available in Tehran, designing based on extracted guidelines can improve the supply chain toward sustainable practices in this city. Some guidelines may also be applicable to other contexts due to similarities in guidelines of literature and field studies.

Overall, in order to promote sustainable consumption, it is necessary to facilitate access to sustainable options. It is through this course of action that individuals can do their part in reducing plastic waste and environmental pollution and therefore accelerate the transition to a sustainable future.

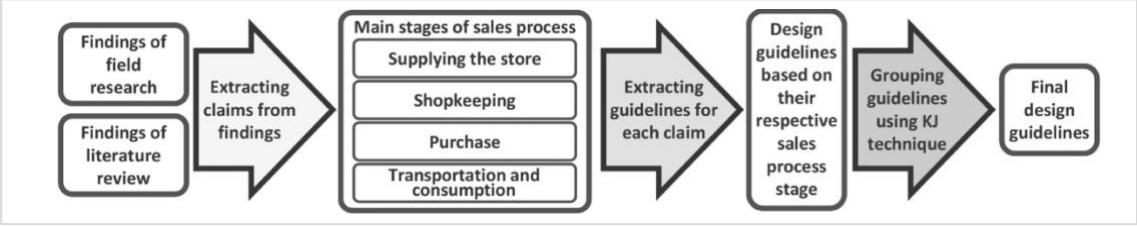

Figure 1: *Analyzing the findings of field research and literature review.*

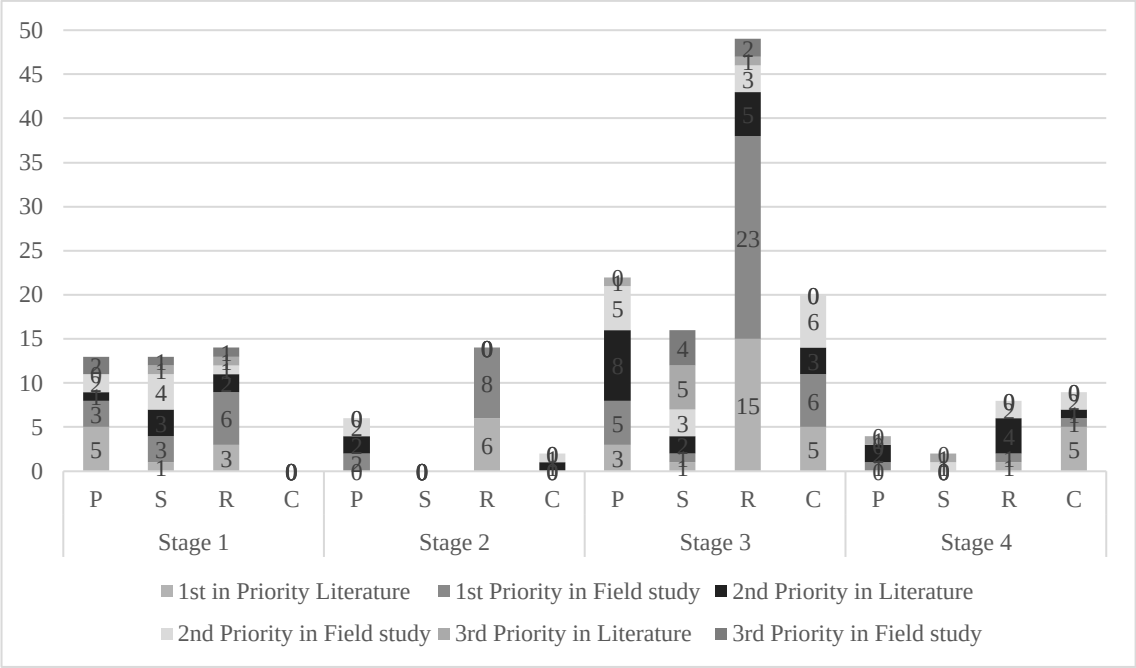

Figure 2: *Sum of sectors related to each principle for each stage along with their priority*.

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