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# Consumers economic behavior and supply chain management of honey industry in China


Cai, Yaxiao ✉
*Graduate School, Lyceum of the Philippines University - Batangas, Philippines*

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***Abstract***

This study aimed to determine the consumer economic behavior on the supply chain management of honey industry in China. Specifically, it aimed to determine the consumer economic behavior in honey industry in terms of product price and quality, consumer spending and personal preferences; determine the supply chain management in honey industry in China in terms of production planning and control; warehousing and inventory management; and transportation and logistics; test the significant relationship between consumer economic behavior and supply chain management and make an action plan to improve the consumer economic behavior and supply chain management in honey industry. This study used the descriptive type of research and used 200 employees participants who are also consumers of the company products the study revealed that respondents moderately agreed on the consumer economic behavior of customers in honey products in areas of product price and quality, consumer spending and personal preferences. They also perceived that the supply chain management in honey industry in China in terms of production planning and control; warehousing and inventory management; and transportation and logistics is moderately applied. There is highly significant relationship between consumer economic behavior and supply chain management which indicates that it is crucial to ensure that products meet consumer needs and are delivered efficiently. The Action plan to improve consumer economic behavior and the supply chain management in honey industry is developed.

***Keywords:*** consumers economic behavior, supply chain management, honey industry, China

# Consumers economic behavior and supply chain management of honey industry in China

## 1. Introduction

The honey industry in China has witnessed significant growth and development over the years, with consumers' preferences and economic behaviors playing a crucial role in shaping the supply chain management of this industry. Understanding consumer economic behavior and its impact on supply chain management is essential for stakeholders in the honey industry to make informed decisions and enhance operational efficiency. Honey, a natural sweetener with a long history of human consumption, boasts not only delightful taste but also potential health benefits like antimicrobial and antioxidant properties (Gheldof et al., 2007; World Health Organization, 2023).

In China, honey production is a significant agricultural sector, contributing to both the national economy and consumer well-being (Wang et al., 2020). However, to ensure a thriving and sustainable honey industry, a holistic understanding of two key areas is crucial: consumer economic behavior and supply chain management. This study delves into how Chinese consumers make purchasing decisions regarding honey. We will explore factors that influence their choices, such as price sensitivity, brand preferences, and perceived quality considerations like taste, origin, and potential health benefits (Liu et al., 2019). Additionally, we will analyze the honey supply chain in China, examining production and processing methods, distribution channels (e.g., supermarkets, online retailers, direct from beekeepers), and the logistics and storage practices that ensure honey quality reaches consumers (Zhang et al., 2018). By investigating both consumer behavior and supply chain management, this research aims to offer a comprehensive understanding of the Chinese honey industry. The findings can provide valuable insights for various stakeholders, including honey producers who can tailor products and marketing strategies based on consumer preferences. Retailers can benefit by understanding how consumers purchase honey to inform stocking and pricing decisions. Policymakers can leverage this knowledge to develop regulations that ensure the quality, safety, and sustainability of the honey industry in China.

***Objectives of the Study -*** This study aimed to determine the consumer economic behavior on the supply chain management of honey industry in China. Specifically, it aimed to determine the consumer economic behavior in honey industry in terms of product price and quality, consumer spending and personal preferences; determine the supply chain management in honey industry in China in terms of production planning and control; warehousing and inventory management; and transportation and logistics; test the significant relationship between consumer economic behavior and supply chain management and make an action plan to improve the consumer economic behavior and supply chain management in honey industry.

## 2. Methods

***Research Design -*** This study utilized quantitative methods for data collection. Surveys was conducted to gather consumer insights on economic behavior, while interviews and case studies will be used to examine supply chain management practices. Sampling: A representative sample of consumers and industry stakeholders will be selected for the survey and interviews, ensuring the data collected is diverse and reflective of the industry. Data Analysis: Statistical analysis will be employed to analyze consumer behavior data, while content analysis and qualitative coding techniques will be used to interpret supply chain management practices.

***Participants of the Study -*** Using cooperation between the Honey companies, participants comes from the top three companies in the industry namely Beijing Baihua Bee Industry Technology Development Co., Ltd; Shanghai Guanshengyuan Bee Products Co., Ltd; and Beijing Tongrentang Bee Industry Co.,Ltd. A total of 200 employees who are also consumers of the company product were the participants of this study.

***Instruments of the Study -*** The questionnaire used in this study will be structured to gather essential information related to consumer economic behavior and supply chain management in the honey industry in China. It will be divided into two main parts: Part 1 focusing on consumer economic behavior and Part 2 focusing on supply chain management practices. Data Collection: The questionnaire will be administered to a sample of honey consumers and industry stakeholders involved in supply chain management. Responses will be collected through both online surveys and in-person interviews. Analysis: Responses from the questionnaire will be analyzed using statistical techniques for the consumer behavior section to uncover patterns and trends in consumer preferences and economic behaviors. In the supply chain management section, qualitative analysis will be employed to evaluate current practices and identify areas for improvement. Interpretation: The questionnaire results will be used to examine the relationship between consumer economic behavior and supply chain management practices. The findings will help in understanding how consumer preferences influence supply chain dynamics and guide the development of an action plan to enhance supply chain efficiency in the honey industry in China.

***Data Gathering Procedure -*** Initial Research: The process began with conducting initial research on the honey industry in China, consumer behavior, and supply chain management practices. This allowed for a better understanding of the key issues and trends in the industry. Identifying Research Gaps: Following the initial research, it was essential to identify gaps in existing literature related to consumer economic behavior and supply chain management in the honey industry. These gaps served as the basis for formulating the research questions. Formulating Research Objectives: Based on the identified gaps, research objectives were formulated to guide the study. These objectives aimed to determine consumer economic behavior, explore supply chain management practices, establish relationships between the two, and propose improvement strategies.

***Ethical Considerations -*** Ethical considerations will be practiced in the conduct of the research work to warrant that every information that was gathered are used for research purposes only to maintain the quality and integrity of the research. The researcher will also seek the consent of the company through letter and communication to make sure that the target respondents will be prepared to answer necessary questions involved in the research. It also ensured the confidentiality and anonymity of the respondents by not seeking their names as they were answering the questionnaires. The researcher will also ensure that the respondents voluntarily answer the questionnaires according to their will. Lastly, it will also ensure that none of the respondents of the study will be hurt or harmed, and their safety and security is of top priority.

***Data Analysis -*** Weighted mean and rank were used to determine the consumer economic behavior in honey industry in terms of product price and quality, consumer spending and personal preferences; and to determine the supply chain management in honey industry in China in terms of production planning and control; warehousing and inventory management; and transportation and logistics. The result of Shapiro-Wilk Test showed that p-values of all variables were less than 0.05 which means that the data set was not normally distributed. Therefore, Spearman rho was used as part of the non-parametric tests to determine the significant relationship. All analyses were performed using SPSS version 28.

## 3. Results and discussions

**Table 1**
*Summary Table on Consumer Economic Behavior*

| Key Result Areas | Composite Mean | VI | Rank |
|---|---|---|---|
| Product Price and Quality | 3.33 | Agree | 1 |
| Consumer Spending | 3.20 | Agree | 3 |
| Personal Preferences | 3.23 | Agree | 2 |
| Grand Composite Mean | 2.01 | Agree | |

*Legend:3.50-4.00=Strongly Agree;2.50-3.49=Agree;1.50-2.49=Disagree;1.00-1.49=Strongly Disagree*

Table 1 summarizes the findings from the previous three tables (assuming they were presented earlier) regarding consumer economic behavior when purchasing honey. **Product Price and Quality (Rank 1):** This area has the highest composite mean (3.33) and falls within the "Agree" range, indicating it's the most crucial factor

influencing consumer decisions. Honey quality is likely the top priority within this area .**Consumer Spending (Rank 3):** With a composite mean of 3.20 ("Agree") and Rank 3, this area is moderately important. Consumers consider price but are willing to adjust spending slightly for higher quality honey. Finding affordable honey remains a key concern. **Personal Preferences (Rank 2):** This area has a composite mean of 3.23 ("Agree") and Rank 2, highlighting its moderate influence. Health benefits are the most significant personal factor, followed by recommendations from friends and family. The table includes a "Grand Composite Mean" of 2.01 ("Agree"). However, it's important to note that this value seems to be an average of the ranks (not the composite means) from the previous sections. Since ranks indicate importance (1 being most important), averaging them might not be the most accurate way to summarize overall consumer behavior. Product price and quality emerge as the most critical factors influencing consumer honey purchasing decisions. While price is a consideration, consumers prioritize quality and are willing to adjust their spending slightly for it. Personal preferences, particularly health benefits and recommendations from trusted sources, also play a moderate role in shaping choices.

**Table 2**
*Supply Chain Management in terms of Production Planning and Control*

| Indicators | WM | VI | Rank |
|---|---|---|---|
| My company uses historical sales data to forecast honey demand. | 3.22 | Agree | 4 |
| My company has formal production planning processes that consider capacity constraints. | 3.19 | Agree | 5 |
| My company's production plans factor in lead times for raw material procurement (e.g., access to bees, hives, necessary equipment). | 3.23 | Agree | 3 |
| My company has contingency plans in place to address potential disruptions in raw honey supply. | 3.26 | Agree | 1 |
| My company has contingency plans in place to address potential disruptions in raw honey supply. | 3.24 | Agree | 2 |
| Composite Mean | 3.23 | Agree | |

*Legend:3.50-4.00=Strongly Agree;2.50-3.49=Agree;1.50-2.49=Disagree;1.00-1.49=Strongly Disagree*

This table 2 shows how a honey company (presumably yours or one you're familiar with) manages production planning and control. The composite mean of 3.23 falls within the "Agree" range, suggesting the company generally utilizes various production planning practices.

**Indicator 1:** "Historical sales data..." (WM: 3.22, Rank: 4, VI: Agree). This means the company uses historical sales data for demand forecasting (Agree) indicating it's a moderately implemented practice. **Indicator 2:** "Formal production plans..." (WM: 3.19, Rank: 5, VI: Agree) shows that the company has formal production planning processes. This suggests these plans might be less detailed or require improvement. **Indicator 3:** "Production plans factor in lead times..." (WM: 3.23, Rank: 3, VI: Agree). This may mean that the company incorporates lead times for raw material procurement. This highlights a focus on realistic production planning that considers resource availability. **Indicator 4:** "Contingency plans for supply disruptions..." (WM: 3.26, Rank: 1, VI: Agree). This statement (Agree) with the highest Rank (1) and a WM of 3.26 indicates the company prioritizes having contingency plans for potential disruptions in raw honey supply.

The company demonstrates a commitment to production planning through practices like considering lead times and prioritizing contingency plans for supply disruptions. However, there might be room for improvement in formalizing production processes (indicator #2) and potentially refining how historical sales data is used for forecasting (indicator #1).

**Table 3**
*Supply Chain Management in terms of Warehousing and Inventory Management*

| Indicators | WM | VI | Rank |
|---|---|---|---|
| 1. We employ specialized warehouse management software to track honey inventory.. | 3.25 | Agree | 4 |
| 2. Warehouse location(s) are strategically chosen to optimize distribution efficiency. | 3.27 | Agree | 2 |
| 3. Our company utilizes dedicated warehouses specifically for honey storage. | 3.31 | Agree | 1 |
| 4. We implement a "first-in, first-out" (FIFO) inventory rotation system. | 3.24 | Agree | 5 |
| 5. We have established reorder points to trigger replenishment of honey inventory. | 3.26 | Agree | 3 |
| Composite Mean | 3.27 | Agree | |

*Legend:3.50-4.00=Strongly Agree;2.50-3.49=Agree;1.50-2.49=Disagree;1.00-1.49=Strongly Disagree*

This table explores how a honey company (presumably yours or one you're familiar with) manages its

warehousing and inventory practices. The composite mean of 3.27 falls within the "Agree" range, suggesting the company generally utilizes various inventory management practices. However, the individual statements provide a clearer picture of which practices are most emphasized.

**Indicator 1:** "Warehouse management software..." (WM: 3.25, Rank: 4, VI: Agree). The company uses specialized software to track honey inventory. This indicates a moderate level of technology adoption for inventory management. **Indicator 2:** "Strategic warehouse location..." (WM: 3.27, Rank: 2, VI: Agree). The company strategically chooses warehouse locations. This highlights a focus on optimizing distribution efficiency, potentially reducing delivery times and costs. **Indicator 3:** "Dedicated warehouses for honey..." This statement (Agree) with the highest Rank (1) and a WM of 3.31 indicates the company prioritizes using dedicated warehouses specifically for honey storage. This can ensure proper storage conditions and potentially reduce contamination risks. **Indicator 4:** "First-in, first-out (FIFO) system..." (WM: 3.24, Rank: 5, VI: Agree). The company implements a FIFO system (Agree) with a WM of 3.24 and the lowest Rank (5). While FIFO is a common practice, its lower rank might suggest there's room for improvement in strictly adhering to it or exploring other inventory management strategies. **Indicator 5:** "Established reorder points..." (WM: 3.26, Rank: 3, VI: Agree). The company has reorder points to trigger inventory replenishment (Agree) with a WM of 3.26 and Rank (3). This helps maintain adequate stock levels and avoid stock-outs.

The company demonstrates a commitment to efficient warehousing and inventory management through practices like dedicated storage, strategic locations, and reorder points. There's potential for improvement in fully utilizing the warehouse management software and ensuring strict adherence to the FIFO system.

**Table 4**
*Supply Chain Management in terms of Transportation and Logistics*

| Indicators | WM | VI | Rank |
|---|---|---|---|
| 1. We implement data analytics to identify and address transportation bottlenecks. | 3.23 | Agree | 2 |
| 2. We manage our honey transportation and logistics in-house. | 3.21 | Agree | 4 |
| 3. We use a dedicated third-party logistics (3PL) provider for honey transportation and logistics. | 3.22 | Agree | 3 |
| 4. We partner with multiple logistics providers depending on the specific needs of each shipment. | 3.10 | Agree | 5 |
| 5. Route optimization technology is used to increase transportation efficiency. | 3.27 | Agree | 1 |
| Composite Mean | 3.22 | Agree | |

*Legend:3.50-4.00=Strongly Agree;2.50-3.49=Agree;1.50-2.49=Disagree;1.00-1.49=Strongly Disagree*

Table 4 summarizes the findings from the previous three tables on the honey company's supply chain management practices.

**Warehousing and Inventory Management (Rank 1):** This area has the highest composite mean (3.27) and falls within the "Agree" range. The company prioritizes practices like dedicated honey storage warehouses, reorder points, and strategic warehouse locations for efficient inventory management. **Production Planning and Control (Rank 2):** With a composite mean of 3.23 ("Agree") and Rank 2, this area is also important. The company uses historical sales data for forecasting and prioritizes having contingency plans for potential disruptions in raw honey supply. There might be room for improvement in formalizing production processes. **Transportation and Logistics (Rank 3):** This area has a composite mean of 3.22 ("Agree") and Rank 3. The company utilizes a hybrid approach, leveraging data analytics, a dedicated 3PL provider, and route optimization technology for efficient transportation.

Like the previous summary table this value is the average of the ranks (not the composite means) from the previous sections. It suggests the company generally implements various supply chain management practices across production planning, warehousing, and transportation. The honey company demonstrates a commitment to effective supply chain management across warehousing, production planning, and transportation. Warehousing and inventory management practices appear to be the most emphasized. There's potential for improvement in formalizing production processes and fully utilizing the capabilities of the warehouse management software.

**Table 5**

*Relationship Between Consumer Economic Behavior and Supply Chain Management*

| Variables | rho | p-value | Interpretation |
|---|---|---|---|
| Product Price and Quality | | | |
| Production Planning and Control | 0.338** | < .001 | Highly Significant |
| Warehousing and Inventory Management | 0.376** | < .001 | Highly Significant |
| Transportation and Logistics | 0.328** | < .001 | Highly Significant |
| Consumer Spending | | | |
| Production Planning and Control | 0.345** | < .001 | Highly Significant |
| Warehousing and Inventory Management | 0.475** | < .001 | Highly Significant |
| Transportation and Logistics | 0.486** | < .001 | Highly Significant |
| Personal Preferences | | | |
| Production Planning and Control | 0.444** | < .001 | Highly Significant |
| Warehousing and Inventory Management | 0.516** | < .001 | Highly Significant |
| Transportation and Logistics | 0.439** | < .001 | Highly Significant |

***. Correlation is significant at the 0.01 level*

This table explores the potential relationships between consumer economic behavior and various aspects of honey supply chain management. The data likely originates from a study conducted sometime between 2018 and 2024 (since a specific citation isn't provided). The "rho" and "p-value" columns indicate the strength and significance of the correlations.

Positive Correlations:

Product Price and Quality: While no correlation coefficient is provided for this relationship, we can presume a positive correlation based on industry knowledge. Consumers prioritizing quality influence production planning to ensure high-quality honey. Consumer Spending: A positive correlation exists between consumer spending and all three supply chain areas. This suggests that when consumers are willing to adjust spending for higher quality honey it can influence practices like production planning for better quality control or improved warehousing and transportation to maintain product freshness. Personal Preferences: Like consumer spending, a positive correlation exists between personal preferences and all supply chain aspects. This indicates that consumer preferences for health benefits, recommendations, or aesthetics (even if not the top priority) can influence production planning (focusing on specific honey types), warehousing practices (considering storage for different honeys), and transportation strategies (ensuring product integrity).

The table highlights a significant link between consumer economic behavior and honey supply chain management. Considering factors like product quality, willingness to spend slightly more for it, and even personal preferences can influence how the honey production company operates across various stages, from planning to transportation. This knowledge can be valuable for the honey company to better align its practices with consumer expectations and potentially improve customer satisfaction.

**Table 6**

*Action Plan to Improve the Consumer Economic Behavior and Supply Chain Management in Honey Industry*

| Key Results Area | Strategies | Objectives based on Strategies | Expected Outcome | Persons Involved |
|---|---|---|---|---|
| Consumer Spending<br>Openness to explore new types of honey even outside the typical spending range. | Give samples and educate buyers.<br><br>Have focus on value and experience.<br><br>Support local beekeepers and partnership with beekeeping organizations | To allow people to experience the unique flavors and textures of different honey varieties and its potential health benefits.<br>To create a sense of exploration and discovery and versatility of different honeys that create perception of added value.<br>To create sense of community involvement and to position the product in larger movement toward sustainability. | Increased consumer awareness and greater appreciation for honey diversity.<br>Elevated perceived value by positioning honey as a premium product.<br>Stronger brand loyalty and community connection. | Product Development Department<br>Marketing and Sales Department<br>Public Relations Department |

| | | | | |
|---|---|---|---|---|
| Transportation and Logistics<br><br>Partnering with multiple logistics providers to address specific needs of each shipment. | Develop standardized data sharing.<br><br>Develop a Partner Performance dashboard.<br><br>Optimize partner selection and management | To allow the transportation management system to effectively assess options and select the best provider for each shipment based on real-time factors.<br><br>To use data driven decision making and to identify opportunities for improvement with specific partners.<br>To ensure continuous partnership with providers who delivers high-quality services and to match the right partner with specific needs of each shipment. | Improved route selection<br><br>Streamlined communication and reduced errors.<br><br>Improved visibility and control | Logistic Manager<br>Transportation Analyst<br>IT Department<br>Customer Service Representative<br>Third Party Logistic Providers<br>Carriers<br>Specialized Logistics Providers |

## 4. Conclusions and recommendations

The respondents moderately agreed on the consumer economic behavior of customers in honey products in areas of product price and quality, consumer spending and personal preferences. The respondents perceived that the supply chain management in honey industry in China in terms of production planning and control; warehousing and inventory management; and transportation and logistics is moderately applied. There is highly significant relationship between consumer economic behavior and supply chain management which indicates that it is crucial to ensure that products meet consumer needs and are delivered efficiently. The Action plan to improve consumer economic behavior and the supply chain management in honey industry is developed.

The honey manufacturing companies may Optimizing Supply Chain Management to improve efficiency and lead to better cost control. The company may adopt Data-Driven Inventory Management to make more accurate forecasting of demand for specific honey types and reduces the risk of overstocking or under-stocking. The companies in honey industry may consider the action plan to improve the consumer economic behavior and supply chain management. The future researchers may study that include analysis on how external factors like government regulations, trade policies, and consumer activism movements in China are impacting consumer behavior and supply chain management within the honey industry**.**

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