

A Study on College Students' Food Delivery Consumption Behavior and Demand for Smart Food Delivery Cabinets

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ABSTRACT

With the rapid development of internet technology and big data analytics, the food delivery economy has become a significant component of the catering industry, particularly among college students, where it exhibits high prevalence and dependency. Drawing on domestic and international research, this paper systematically analyzes the characteristics and driving factors of food delivery consumption behavior among college students, while exploring the functional needs and usage motivations related to smart food delivery cabinets. The findings indicate that the primary drivers of food delivery consumption among college students include technological convenience, time efficiency, environmental constraints, and social influences. However, potential issues such as health risks and nutritional imbalances are also identified. In the design and promotion of smart food delivery cabinets, students show significant demand for functions such as temperature control, intelligent categorization, food safety assurance, and privacy protection. Additionally, the diversification of food options and economic convenience are the main drivers of food delivery consumption, while emotional regulation and social interaction also play important roles in consumption decisions. By integrating the Theory of Planned Behavior (TPB), this paper constructs a "perceived convenience-social pressure-emotional regulation" motivation model and combines case studies from China, the UK, and Indonesia to propose a "globalization-localization" dual-dimensional framework. This provides a more comprehensive explanatory paradigm for food delivery consumption behavior among college students and offers scientific insights for industry optimization and policy development.

KEYWORDS

College Student; Food Delivery; Smart Food Delivery Cabinets

1 Background

Driven by the advancement of Internet technology and the proliferation of big data analytics, the catering industry has undergone a profound integration with the digital ecosystem, giving rise to the emerging business form known as the takeout economy. Currently, China's takeout market exhibits three core competitive advantages: a mature and diversified supply chain system, a convenient and efficient full-channel coverage encompassing both online and offline platforms, and a consumer group characterized by youthfulness and a preference for quality. Under the dual impetus of the continuous deepening of digital transformation and the upgrading of the consumption demand structure, the takeout industry is positioned at a new growth opportunity, demonstrating robust market expansion potential^[1]. The innovation of digital technology has profoundly reshaped the landscape of modern life. Intelligent delivery platforms, represented by Meituan and Ele.me, are leading the new trend of catering consumption. As the main force of digital natives, the young college student group exhibits a strong stickiness to online consumption^[2]. This phenomenon is particularly prominent in the catering field. The new consumption mode represented by "ordering takeout" is essentially the product of the deep integration of network dependence and life needs. From a macro perspective, the phenomenon that college students prefer to order takeout is not accidental but the result of the combined effect of multiple factors such as the economy, technology, social culture, and campus environment. The preference of college students for ordering takeout is essentially caused by the structural contradiction between the traditional campus catering service system (such as the single operation mode of the cafeteria and the fixed service time) and the needs of the new generation (personalization, efficiency, and diversification). As a representative of convenient consumption, takeout occupies an important position in the lives of college students.

2 Literature review of China research

Based on the existing domestic research, the consumption of takeout among college students has emerged as a prevalent social phenomenon. In recent years, propelled by the widespread adoption of the Internet and the robust growth of takeout platforms, takeout has solidified its position as a pivotal dietary option in the daily lives of college students.

Empirical research findings have revealed that upwards of 70% of college students engage in takeout ordering on a weekly basis. Notably, approximately 50% of these students place orders for takeout three or more times per week^[3]. This trend is further evident when examining the takeout consumption patterns across various regions. For instance, in the survey conducted in Bengbu, Anhui Province^[4], 61.5% of the sampled college students reported ordering takeout at least once a week. Similarly, at a university in Jiangxi Province, the takeout consumption rate soared to an impressive 74.8%^[5]. Moreover, a study carried out in Chengdu indicated that roughly two-thirds of college students in the area opt for takeout on a weekly schedule.

Collectively, these data underscore the extensive penetration of takeout services within the college student demographic and suggest the presence of consistent patterns of takeout consumption across different geographical locations in China.

Regarding the motivations behind college students' takeout orders, numerous domestic scholars have made significant contributions to the research on the current state of college students' takeout consumption and its influencing factors. For example, in a journal article published in 2018, Shi Weifang posited that environmental factors and weather conditions can exert an impact on college students' demand for takeout^[6]. At the same time, in 2016, through a questionnaire survey^[7], Zhao Yao also presented his own insights. He contended that college students have diverse reasons for choosing to order meals, among which the three most prominent ones are time-saving convenience, the influence of weather, and missing regular meal hours. In the questionnaire, approximately 8.4% of college students opted for takeout due to other reasons. Empirical investigations have revealed that these reasons encompass subjective emotional aspects such as curiosity, the yearning for novelty, and mood.

According to the survey results of XYZ Research, on a global scale, China has become the country with the largest number of takeout users globally. The scale of online takeout users in China reaches 553 million, accounting for 50.3% of the total number of Internet users^[8]. This trend is also mirrored in the college student population. The convenience and diversity of takeout have rendered it an essential means of meeting the dietary needs of college students.

Therefore, based on the research conducted by these scholars, we can draw the conclusion that takeout consumption is highly prevalent and relied upon among college students. The underlying reasons mainly include environmental factors, weather conditions, the pursuit of time-saving convenience, and missing regular meal hours, among others. However, simultaneously, considering that the takeout industry emerged relatively recently, domestic research in this field is not sufficiently in-depth, and it awaits our further and thorough exploration and resolution.

3 Literature review of International Research

3.1 Characteristics of Consumer Behavior

In recent years, the international academic community has conducted systematic research on university students' online food delivery consumption behavior, with a primary focus on the interaction mechanisms between behavioral characteristics and driving factors.

From the perspective of consumer behavior characteristics, economic cost stands out as one of the core determinants influencing decision-making processes. For instance, Efendi et al. (2023), scholars from Indonesia, have demonstrated through empirical analysis that the predominant driver for university students opting for online food delivery services stems from their consistently lower pricing relative to on-campus cafeteria meal options.^[9] Further empirical evidence indicates that socioeconomic disparities engender consumption stratification: Australian students from low-income households demonstrate a marked propensity toward purchasing high-calorie, low-nutrition takeaway foods^[10], while high-income counterparts exhibit greater concern for dietary quality, preferentially selecting healthy options such as salads or sushi. This phenomenon elucidates the trade-off dynamics between economic capacity and dietary selection patterns.

Payment methods, as a representative technology-driven variable, exert significant influences on consumption behaviors. Studies from Malaysian research papers have found that the convenience of payment tools such as e-wallets and credit cards serves as a key predictor of students' usage of food delivery platforms, with its impact even outweighing time costs and promotional campaigns. It is noteworthy that significant disparities exist in payment preferences across regions: UK university students rely predominantly on credit cards (42%) and PayPal (35%), whereas Indonesian students widely adopt local e-wallets (e.g., OVO, Shopee Pay), with 68% of their transactions being processed electronically. The study further reveals a significant synergistic effect between payment instruments and platform promotional strategies. For instance, Shopee Pay users can reduce consumption costs through spend-and-save promotions, prompting students to frequently switch between food delivery platforms for expenditure optimization, a behavioral pattern that reflects the consumption tactics of price-sensitive.

The analysis through a cultural lens demonstrates that the proliferation of food delivery consumption is deeply

intertwined with regional developmental trajectories. While Western countries' food delivery industry traces its origins to the emergence of fast-food culture in the 1950s, Asian nations have achieved rapid market expansion by leveraging internet technology proliferation and urbanization processes. The statistical evidence indicates that 82% of UK university students and 86% of their Malaysian counterparts engage in regular fast-food consumption, with approximately 20% of UK households incorporating food delivery into daily dietary practices, demonstrating its deep integration into contemporary lifestyles. Furthermore, the efficacy of policy interventions in regulating food delivery consumption warrants critical examination. German scholars have observed that pandemic-era campus dining restrictions indirectly accelerated students' shift toward takeaway services. In contrast, the UK's approach of designating 'takeaway management zones' around educational institutions, which restrict the availability of high-salt and high-fat food items, has resulted in a marked 23.6% decrease in new food outlet openings (2019-2022), demonstrating a public health-oriented policy design rationale.

3.2 Driving Factors

The analysis at the determinants level reveals an intriguing paradoxical relationship between health consciousness and food delivery consumption. Sahidi et al. (2022), Indonesian scholars, demonstrated that frequent reliance on food delivery services may lead to dietary structure imbalance, particularly noting nutritional issues arising from the disproportionately high intake of fast food; British researchers further identified a prevalent issue of excessive salt content in takeout meals, with long-term consumption potentially increasing health risks. In contrast, research in Australia has revealed a positive correlation between psychological stress and takeout consumption, indicating that students experiencing greater academic pressure tend to resort to convenient dining options to alleviate anxiety.

The role of social influence is equally significant: Indonesian students' consumption decisions are susceptible to environmental factors, manifesting as herd consumption driven by peer behavior, where individuals tend to imitate peers' purchasing choices; Meanwhile, Generation Z has fostered a "visualized dietary culture" through social media platforms (e.g., TikTok, Instagram), prioritizing aesthetically presented takeout meals suitable for photography and online sharing. This digital exhibition may partially substitute offline social interactions. Additionally, the "group ordering" feature on delivery platforms reduces delivery costs and incentivizes collective ordering among university students through cost-sharing mechanisms. It further facilitates social interactions during meals (e.g., discussing restaurant selections or dish aesthetics), thereby emerging as a critical driver of group-based consumption.

The role of social influence should not be underestimated either: The consumption decisions of Indonesian students are easily influenced by their surrounding environment. They tend to follow their peers in making purchases, forming a herd mentality in consumption, that is, driven by the behavior of their peers. In the Gen Z group, a "visualized food culture" has been formed through social media (such as TikTok and Instagram). They prefer to choose takeout categories that are exquisitely arranged and suitable for taking photos and sharing. Online display may replace some of the offline social needs. In addition, the "group ordering" function of takeout platforms reduces the delivery cost and encourages college students to order together, so that they can share the expenses. Moreover, it creates social topics during the meal (such as discussing the choice of location, the types of dishes, etc.) for interaction, which has become an important driving factor for group consumption.

Convenience as a foundational driver exhibits cross-cultural consistency in its operational mechanisms. Empirical multi-country studies reveal that contemporary university students demonstrate both significant commonalities and regional variations in their dependency on food delivery applications. In the Philippines, for instance, Tus et al. (2022) empirically demonstrated that students from both private and public universities predominantly prioritize online food delivery services as their primary consumption mode, with the core appeal lying in the convenience and efficiency of the service system. Research indicates that intense academic pressure and commuting demands compel university students to prioritize time-cost efficient dining solutions. As opposed to time-consuming dine-out alternatives, online ordering systems significantly enhance time management efficacy by transcending spatial-temporal constraints. This finding demonstrates broad applicability across Southeast Asia. Furthermore, studies by Indonesian scholars such as Pratiwi et al. (2023) targeting Generation Z (born 1995–2009) university students reveal that their behavioral choices are primarily driven by user experience dimensions, including service quality and operational convenience.

4 Research methods

Some scholars integrate quantitative and qualitative approaches for complementary validation :

Quantitatively Dominated Mixed Designs : For instance, Yun et al. embedded statistical analyses of payment tool usage frequency within case studies, combining them with qualitative interviews to explain regional variations. Tomaş et al. supplemented interview analyses with quantitative platform log data to enhance conclusion reliability.

Existing domestic and international studies have broadly identified core drivers of university students' takeout consumption: technological convenience, time-economic efficiency, environmental constraints, and social influence. At the health risk level, current research widely acknowledges the correlation between takeout dependency and nutritional imbalances.

However, current research still exhibits the following gaps. First, while domestic and international studies have predominantly focused on surface-level behaviors, they lack systematic explanations of psychological motivations such as academic anxiety and social needs. Second, cross-cultural comparative research remains underdeveloped - domestic studies emphasize quantitative regional comparisons while neglecting comprehensive integration of local cultural, geographical, and other contextual factors, whereas international research prioritizes technical models and policy case studies without thorough analysis of unique local environments. Furthermore, common research gaps exist across global scholarship: particularly the insufficient exploration of psychological drivers and the fragility of cross-cultural comparisons. Finally, neither domestic nor international research has established longitudinal databases connecting takeout dependence with long-term health outcomes (e.g., metabolic diseases, academic performance), coupled with severe deficiencies in qualitative research methodologies such as in-depth interviews.

Building upon these research gaps, our team will advance the current study through three key dimensions. First, by introducing the Theory of Planned Behavior (TPB), we will construct a "Perceived Convenience-Social Pressure-Emotional Regulation" motivational model to reveal interactive mechanisms of psychological drivers ^[25]; Second, through comparative case studies of globally representative nations (China, UK, Indonesia), we will propose a dual-dimensional "globalization-localization" framework to decode how cultural differences modulate motivational dynamics. Third, employing a mixed-methods research design (questionnaires + in-depth interviews) with six-month consumption data tracking, we will analyze behavioral trajectories and their health correlations. Ultimately, this study aims to establish a more comprehensive and dynamic explanatory paradigm for university students' takeout behavior motivations, while providing scientific foundations for industry optimization and evidence-based policy formulation.

5 Conclusion

This study analyzes the functional requirements, safety considerations, and usage motivations of college students regarding intelligent takeout lockers, and reaches the following conclusions.

In terms of the functional design of intelligent takeout lockers, the college student group shows a high level of concern for the practicality of the technology. The temperature control function is regarded as the key to solving the problem of the taste of takeout food. Users generally hope that the equipment can achieve two-way adjustment of heat preservation, cold preservation, refrigeration, and heating, and set different temperature zones for different types of catering (such as beverages, hot food, and cold food) to avoid the decline in quality caused by excessive storage time. In addition, there is a significant demand for the optimization of the intelligent classification function. Students suggest introducing AI recognition technology to automatically allocate storage space according to the types of takeout (such as liquids, fragile items, and fresh products), thereby reducing manual sorting errors and improving the efficiency of picking up meals.

Safety is another core factor influencing users' acceptance. From the perspective of food safety, college students emphasize that the equipment needs to establish a regular cleaning mechanism, including external surface disinfection and internal self-cleaning procedures. At the same time, ultraviolet sterilization technology should be combined to eliminate the risk of cross-contamination. In terms of takeout safety, the deployment of a real-time monitoring system, dynamic meal pickup reminders (such as SMS or mini-program push notifications), and the improvement of the regular maintenance mechanism are considered effective means to prevent problems such as takeout theft, damage, or deterioration caused by long-term retention. In terms of data security, users have prominent demands for privacy protection and suggest strengthening the security of personal information storage and transmission through end-to-end encryption technology.

The cooperation model and the equipment placement strategy also need to be adjusted accordingly. The study found that students generally expect intelligent takeout lockers to be deeply integrated with mainstream takeout platforms and that integrated mini-programs should be developed to achieve remote operation and management functions. In terms of spatial layout, it is recommended to prioritize covering densely populated areas such as the surroundings of the canteen, dormitory areas, and teaching buildings. By increasing the density of equipment, the high-frequency usage demand can be met, and at the same time, the problem of meal pickup congestion during peak hours can be alleviated.

In terms of the motivations for college students to choose takeout, the demand for food diversification and economic convenience are the main driving forces. The monotonous dishes and high repetition of flavors in the canteen prompt students to turn to takeout platforms to obtain a richer selection of catering, such as local specialties and popular online beverages. In terms of economy, platform coupons and activities like discounts for reaching a certain consumption amount significantly reduce the consumption cost. Moreover, the "contactless delivery" feature of takeout is in line with

the characteristics of students being busy with their studies and having fragmented time, enabling them to achieve the consumption experience of "satisfying their needs instantly without leaving the campus". It is worth noting that some students regard ordering takeout as a means of emotional regulation, relieving stress through non-essential consumption (such as late-night desserts and popular online snacks). This phenomenon reflects the profound influence of the "self-pleasing economy" on the consumption decisions of the young group.

Overall, the promotion of intelligent takeout lockers needs to take user needs as the core, and balance functional innovation and safety design during technological iterations. Future research can further explore the impact of regional differences on the adaptability of the equipment, or analyze the relationship between emotion-driven consumption and the frequency of use of intelligent terminals from the perspective of behavioral economics. In addition, how to achieve dynamic temperature control and energy consumption balance through algorithm optimization may become an important direction for technological upgrades.

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