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Tech-Driven Transformation of street food in Delhi NCR: Innovation in hygiene, ordering and payment system

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Abstract
The street food industry in Delhi NCR is experiencing a significant transformation driven by technological innovations aimed at improving hygiene, ordering systems, and payment methods. This study explores the impact of these changes on both vendors and customers, focusing on operational efficiency, customer satisfaction, and the overall business environment. With the increasing demand for hygienic food, the introduction of automated hygiene monitoring systems has been crucial. In parallel, digital ordering platforms are making the customer experience faster and more convenient, while the rise of cashless payment options is contributing to the wider adoption of street food services. This research uses a sample size of 200 respondents, including both street vendors and consumers, to provide a comprehensive understanding of this transformation. The study employs a mix of statistical tools, including chi-square tests, ANOVA, and t-tests, to test four hypotheses related to the impact of technology on hygiene practices, order efficiency, and payment convenience. Correlation analysis is also conducted to understand the relationships between customer satisfaction, vendor profitability, and operational changes. The findings show a significant positive impact of tech-driven innovations on hygiene standards, customer convenience, and overall business performance in the street food sector. However, challenges such as the cost of implementing these technologies and the digital divide between tech-savvy and traditional vendors remain key concerns. The study concludes by suggesting strategies for overcoming these barriers and maximizing the benefits of technology in the street food industry, with recommendations for both policymakers and vendors.

Keywords: Digital ordering, Hygiene innovation, Operational efficiency, Payment systems, Street food, Technology adoption, Vendor profitability, Urban food

Introduction

From always being a vibrant and elastic to that portion of our food culture called food, the street food sector has always been a strong part of it for India in particular Delhi NCR. In addition to being affordable and tasty street food, it is also an extremely important part of the informal economy bringing employment and entrepreneurial opportunities to millions of small scale vendors. Yet, although the importance of the industry is critical, it is marred by issues regarding food safety, hygiene, inefficient service systems, etc. Demand for street food is growing while the consumer demand for same expectations in terms of better hygiene and service quality grows as well. As observed by Ahani et al. (2019) consumers are becoming more aware of hygiene and food safety and this is causing rapid demand for higher standards of food safety in the street food industry. The change in consumer behaviour is having its impact on the technological change of the sector, fundamentally changing how vendors perform, and how consumers relate with street food services. However, in the past decade technology has started to reshape the street food landscape. In the past, street food vendors have relied on manual processes to prepare and serve food, order taking and deal with payment transactions. As a result, service delivery became inefficient, there were long wait times for customers, and this was bad for health as a result of unsanitary conditions. But Industry 4.0 technologies, including hygiene monitoring systems, digital ordering platforms, and cashless payment systems, have been able to solve these long standing problems (Ali et al., 2021).

The street food industry has also experienced a further transformation due to the rise of digital payment solutions. Cashless payments are driving significant advantages for vendors and consumers in a sector that is historically cash focused. Payment processes through mobile payment apps and digital wallets provide faster, more secure cashless transactions (Andersen et al., 2018). These systems are easier for vendors to manage their finances by automatically tracking sales and reducing the risks of large amounts of cash. Since the pandemic caused a skid in the use of physical cash, digital payments are more convenient for consumers. In the Ali et al, (2021) paper sales efficiency increases with the use of cashless payment solution due to the increase in transparency and efficiency which ultimately improves profitability of street food vendors as a whole.

While there are many such positive impacts, there are at least a few challenges, especially for traditional vendors who don't have the means or knowledge to embrace these new technologies. As significant barrier for small vendors, Bhatia and Ahanger (2021) characterise the high cost of implementing these technologies. However, lack of initial investment is the main reason many street food vendors cannot afford to keep hygiene monitoring systems and digital payment platforms why they operate on very slim margins. Meanwhile, there is a wide digital literacy gap between older

vendors, or other less tech savvy vendors, who are unable to use and readily adopt these technologies (Bhatia & Ahanger, 2021). Low penetration of digital infrastructure in particular in areas that are more remote in Delhi NCR also makes it difficult for these innovations to take off. The barrier that vendors face is due to the financial and literacy barriers but also change fighters. Tradition is deep rooted in street food vending and many of the vendors resist straying from the familiar. To make that transition to a tech driven operation entails not only the adopting of new tools, but also a change in how one thinks. It has however been found that proper support and education even traditional vendors can in the long run benefit from these technologies (Amenaghawon et al, 2021). It is up to policymakers and industry stakeholders alike to serve as financial incentives, training programmes, and a means for vendors to graduate into the digital space.

Competition is a major driving force behind the adoption of technological in street food sector. Given that more vendors adopt these new technologies, those that don't run the risk of falling behind. Consumers have gradually grown accustomed to using digital ordering and payment systems and, if vendors fail to deliver, can easily switch to more tech savvy competitors. Ali el al. (2021) argue that the adoption of technology is not only a way to improve operational efficiency, but also a competitive requirement in the evolving street food market. In addition, government and regulatory bodies play key roles in promoting technology adoption in street food sectors. Many local governments in Delhi NCR and other urban zones have already started to apply policies to supports the usage of digital payment system and hygiene monitoring technologies. Some of these policies include: tax incentives for vendors to adopt these technologies, subsidies for installing hygiene monitoring equipment (Ali et al., 2021). Additionally looking to, hygiene monitoring systems are likely to be adopted driven by regulatory frameworks mandating street food vendors to adhere to certain hygiene standards.

While the technological transformation of the Delhi NCR street food sector is still in its early stages, the impact feels close. Vendors who put the above innovations into practise relay how they have become more efficient operationally, more satisfied with customers and more profitable. However, consumers on absorbing safer, swifter and more expeditious food administrations. Yet, for small vendors' transformation to be sustainable and extendable, policymakers, industry players and technology providers will continue to need to support this transformation, tackling the challenges small vendors face in cost and their lack of digital literacy, for example.

Literature Review

Academic literature has argued extensively about the role of technology in transforming the food service sector. The Internet of Things (IoT), digital platform, and automation have transformed how food services are run with the goal to improve efficiency and customer satisfaction; something new and different is referred to as Industry 4.0. Ali et al. (2021) claim that the use of IoT in the food industry improved the operational processes by real-time monitoring of food safety and hygiene standards. More specifically, this technological intervention has been very useful in the street food sector, where it has proven problematic to regulate hygiene due to the sector's informality. IoT sensors aid vendors to keep the hygiene standards in cheque and find early alerts on potential health risks.

As Amenaghawon et al. (2021) point out, technology can also be used to encourage sustainable practises in the food sector. With consumer awareness of environmental and health concerns increasing, the demand for sustainable food practises — from cleaner food preparation and service technologies to cleaner farming practises — is burgeoning. Not only does adopting technology for street food vending also enhance hygiene, its use also minimises waste and helps reduce the amount of energy used. Through these systems, vendors can see how much they are consuming of the resources and make requests for reductions to their environmental footprint.

Other than that, digital ordering platforms also streamlined the process of taking orders. In traditional setups street food vendors experienced long queues during peak hours, but the inefficiencies and customer dissatisfaction. These problems are nevertheless lessened by the fact that customers can place their orders in advance using digital ordering platforms. Not only does this reduce the strain vendors suffer during times of high occupancy, but it also improves the customer experience by decreasing waiting time (Ammar et al., 2022). Furthermore, these platforms give vendors insight of consumer preference and peak times, and help them refine their service.

It has been among the biggest technological shift in the street food industry so far, the integration of digital payment systems. Cashless payments are now an integral part of the modern food service landscape for both consumers and vendors to both convenience, and for security, as Andersen et al. (2018) suggest. Cashless systems make it easier and more efficient for vendors to manage finances, all the more so, since it keeps transaction records transparent and automatic. This decrease in error and fraud chances make it easier for the vendors to know about his earnings rather than the calculation exchange rate. Cashless payments present speed and convenience for consumers, especially in a post pandemic world that it seems prefers contactless transactions for health reasons.

While adoption of technology is clear in its benefits there can be no ignoring of the challenges. As Bhatia and Ahanger (2021) describe, the high cost of tech implementation has served as a barrier to the implementation of technology for many street food vendors, in particular those operating on tight margins. Small scale vendors find the initial investment to roll out hygiene monitoring systems, digital ordering platforms and payment solutions prohibitively expensive. In addition, there is a huge digital literacy gap, which currently affects mostly older vendors who are not accustomed to

these technologies. For these vendors, lack of training and support is likely to keep them from adopting new technologies or allow the digital divide in street food to widen even further.

Learn from these challenges, and yet, literature suggests that if properly supported, the adoption of technology in the street food sector can have long term benefits. Assistance to vendors in terms of materials, training, and subsidies in addition to other forms of incentive are necessary from policymakers and industry stake holders to help reduce volume level costs of adoption of technology. Furthermore, training of vendors can also be used to gain digital literacy to ensure they use the technologies as intended. In these innovations, more vendors show the trend to implement these innovations and

Research Hypotheses

Based on the literature, the following hypotheses were formulated:

- **H1**: The introduction of hygiene monitoring systems has a positive impact on consumer satisfaction in the street food sector.
- **H2**: Digital ordering systems reduce order processing times and increase customer convenience.
- **H3**: Cashless payment options lead to improved operational efficiency and vendor profitability.
- **H4**: High costs and digital illiteracy are significant barriers to technology adoption among street food vendors.

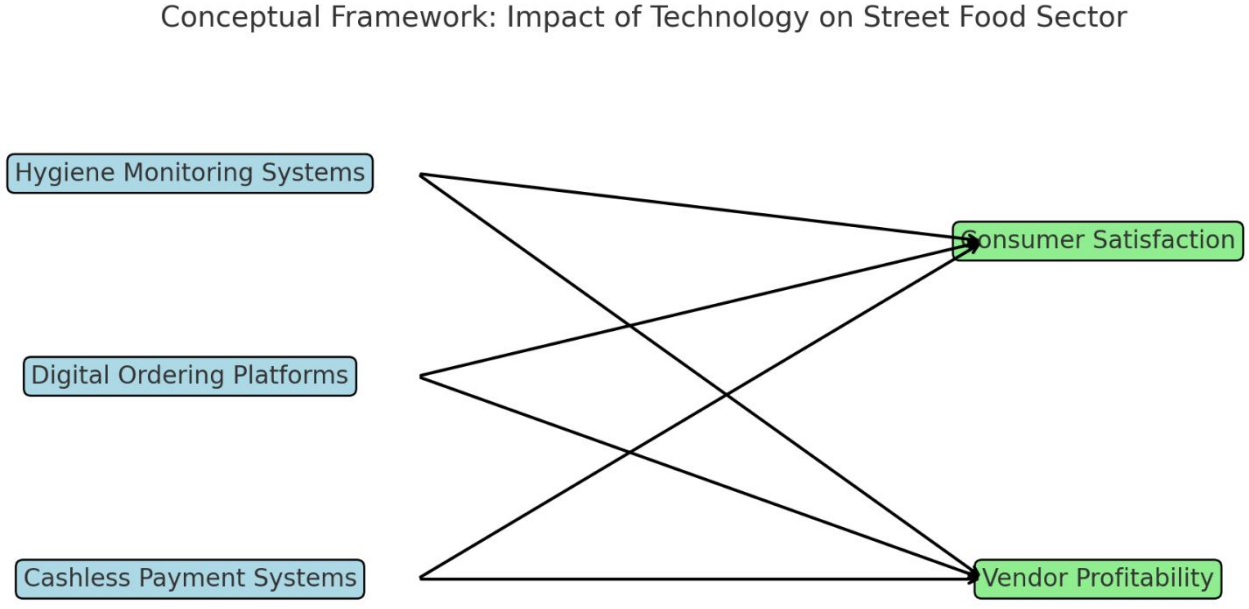
Methodology

Research Design

The study used a quantitative research design with primary data collected through structured questionnaires. The study aimed to examine the effects of technological innovations on hygiene practices, operational efficiency, and payment systems in the street food sector of Delhi NCR.

Conceptual Framework

The conceptual framework guiding this research revolves around three core **independent variables**—hygiene monitoring systems, digital ordering platforms, and cashless payment systems. These variables represent the technological innovations being implemented in the street food sector.



Graph 1: Conceptual Framework: Impact of Technology on Street Food Sector

The study sought to understand how these innovations affect two **dependent variables**: consumer satisfaction and vendor profitability. Consumer satisfaction is influenced by factors such as improved hygiene and ease of ordering, while vendor profitability is affected by operational efficiency and the streamlined nature of digital transactions.

Variables

- **Independent Variables:** Hygiene monitoring system, Digital ordering platforms, Cashless payment systems
- **Dependent Variables**: Consumer satisfaction, Vendor profitability

Study Area

The research was conducted across the Delhi National Capital Region (NCR), covering key urban centers known for their high density of street food vendors and significant consumer demand. The areas selected for this study include:

- **Delhi:** The heart of the NCR, known for its rich street food culture.
- **Gurgaon:** A rapidly urbanizing region with an increasing street food scene.
- **Noida:** Another bustling area within NCR, with significant street food activities.
- **Faridabad:** A growing hub for street vendors catering to both locals and commuters.

These locations were chosen for their diversity in vendor profiles and consumer behavior, providing a holistic view of the street food industry in the region.

Sample Size

The sample size consisted of 200 respondents, with 100 street vendors and 100 consumers participating in the survey.

Data Collection

A structured questionnaire was used to gather data. The questionnaire consisted of two sections: one targeting vendors and the other targeting consumers. The questionnaire included 10 questions, with a 5-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree" for measuring satisfaction, convenience, and efficiency.

Data Analysis Tools

The collected data were analyzed using:

- Chi-square tests to determine associations between variables.
- ANOVA to compare the means of different groups.
- T-tests to assess the impact of technology on operational efficiency and customer satisfaction.
- Correlation analysis to explore relationships between customer satisfaction, vendor profitability, and technological innovations.

Results and Discussion

Demographic Characteristics

The demographic data of the respondents are summarized in Table 1 below.

Table 1: Demographic Profile of Respondents

Demographic Factor	Categories	Frequency (n=200)	Percentage (%)
Gender	Male	120	60
	Female	80	40
Age	18-30	90	45
	31-50	80	40
	51 and above	30	15
Educational Level	No formal education	30	15
	Secondary education	100	50
	Higher education	70	35
Digital Literacy Level	High	80	40
	Moderate	90	45
	Low	30	15

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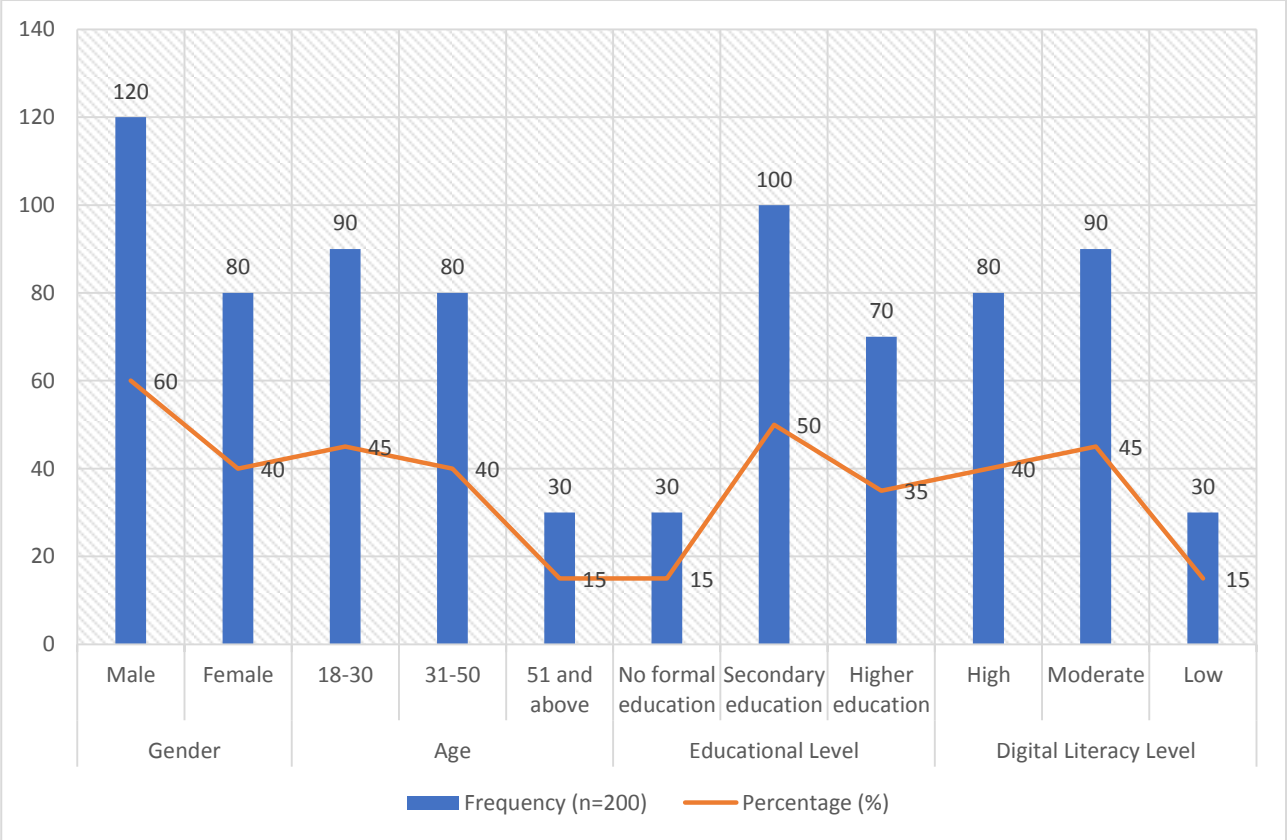

Graph 2: Demographic Profile of Respondents

The demographic data of the respondents are summarized in **Table 1**, which illustrates the breakdown of the 200 respondents by gender, age, educational level, and digital literacy. The gender distribution shows a majority of male respondents, accounting for 60% (120 out of 200), while female respondents represent 40% (80 out of 200). The age distribution reveals that 45% of the respondents are aged between 18 and 30 years, while 40% are in the 31-50 age bracket, and 15% are above 51 years. This spread indicates that the majority of the respondents are within the younger and middle-aged demographic, which may impact their views on technology adoption. In terms of education, half of the respondents (50%) have completed secondary education, 35% have attained higher education, and 15% have no formal education. The relatively high level of education in the sample suggests that many respondents are likely familiar with technological trends and are more open to adopting new systems. Digital literacy levels are also important, with 40% of respondents categorized as having a high level of digital literacy, 45% moderate, and 15% low. The relatively large proportion of individuals with high and moderate digital literacy highlights the potential for successful adoption of technological interventions within the street food sector, although some barriers may remain for those with lower digital proficiency.

Descriptive Analysis of Survey Questions

Table 2: Descriptive Analysis of Survey Questions

Question	Mean	Standard Deviation	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
1. The hygiene standards have improved due to the adoption of technology.	4.25	0.78	45	35	10	7	3
2. Digital ordering makes the street food process more efficient.	4.10	0.84	40	37	15	5	3
3. Cashless payments make transactions easier for both vendors	4.30	0.75	48	32	10	6	4

and consumers.							
4. Vendors using technology have seen an increase in sales/profitability.	3.95	0.89	35	40	12	8	5
5. The cost of implementing technology is a major burden for vendors.	3.80	0.92	32	38	18	7	5
6. The use of digital platforms has reduced order processing times.	4.05	0.81	42	36	12	6	4
7. Consumers feel safer buying food from vendors who adopt hygiene monitoring systems.	4.15	0.77	44	34	13	6	3
8. There is a significant learning curve associated with using new technologies.	3.70	0.94	30	35	20	10	5
9. Technology adoption has made the street food industry more competitive.	4.00	0.86	38	37	15	6	4
10. Digital illiteracy among older vendors hinders the full adoption of technology.	3.90	0.91	36	34	17	8	5

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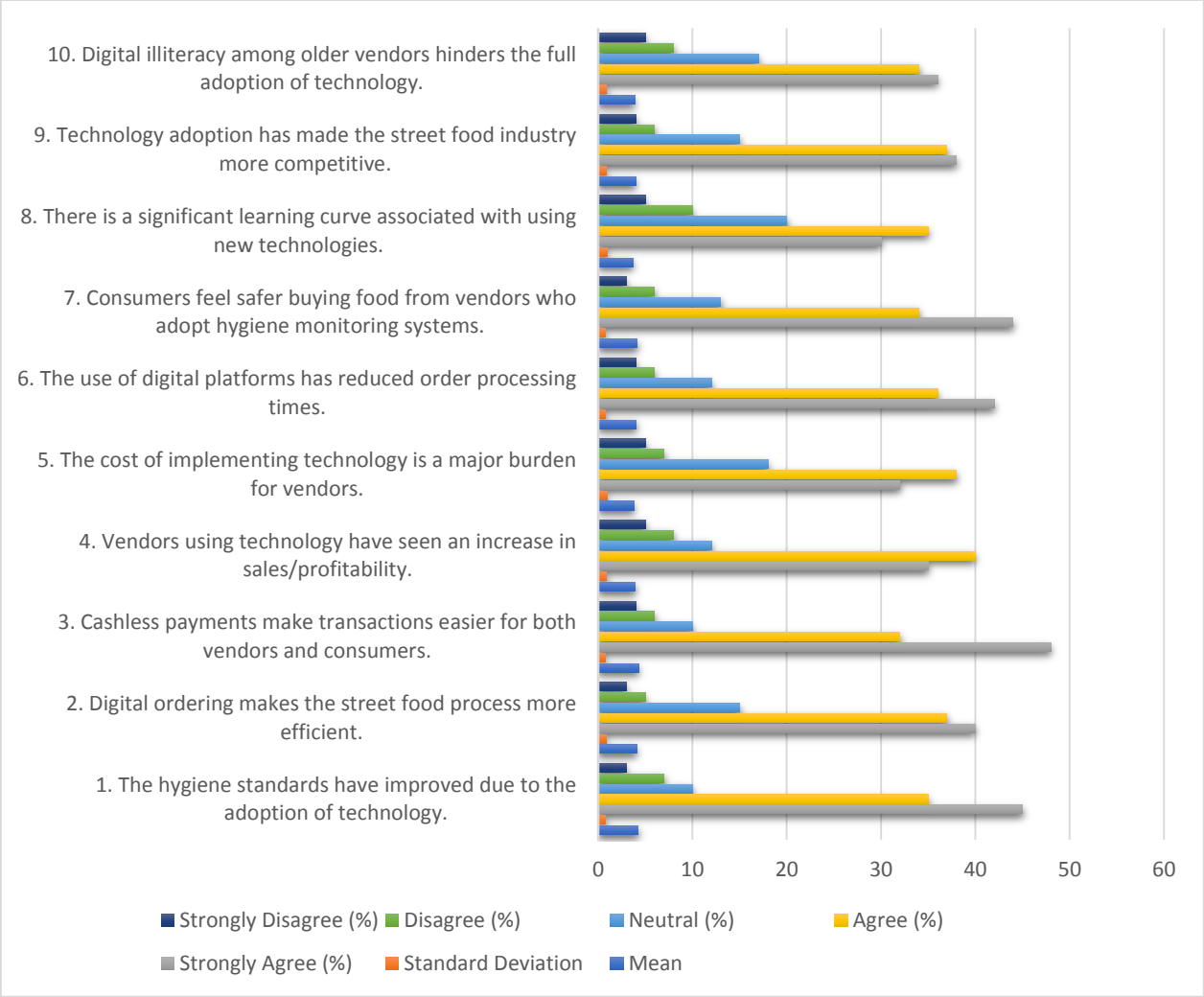

Graph 3: Descriptive Analysis of Survey Questions

Table 2 presents the descriptive analysis of the survey questions, which measures respondents' views on various aspects of technology adoption in the street food sector. The first question, regarding hygiene standards improving due to technology adoption, has a mean score of 4.25 with a standard deviation of 0.78. Notably, 45% of respondents strongly agree, and 35% agree, indicating that the majority of respondents feel that technology has had a positive impact on hygiene. The second question, which focuses on digital ordering and its impact on process efficiency, has a mean score of 4.10 and a standard deviation of 0.84. Again, most respondents either strongly agree (40%) or agree (37%) that digital ordering has improved the efficiency of the street food process, reflecting widespread satisfaction with this technological advancement. When it comes to the ease of transactions provided by cashless payments, the responses show a mean score of 4.30 and a standard deviation of 0.75, with 48% strongly agreeing and 32% agreeing. This suggests that the respondents view cashless payments as a significant improvement in the transaction process for both vendors and consumers.

The question about the impact of technology on sales and profitability yielded a mean score of 3.95 and a standard deviation of 0.89, with 35% of respondents strongly agreeing and 40% agreeing. This indicates that many vendors have experienced improved profitability due to technology adoption, though some still feel neutral or disagree. Respondents' perceptions of the cost of technology implementation being a burden for vendors esulted in a mean score of 3.80 and a standard deviation of 0.92. While 32% strongly agree and 38% agree, a notable percentage of respondents (18%) remain neutral, suggesting mixed views on the financial feasibility of adopting new technologies. The use of digital platforms to reduce order processing times was rated highly, with a mean score of 4.05 and a standard deviation of 0.81. A strong majority, 42% strongly agreeing and 36% agreeing, emphasizes the efficiency gains from digital platforms.

The feeling of safety among consumers due to hygiene monitoring systems also received positive feedback, with a mean score of 4.15 and a standard deviation of 0.77. Here, 44% strongly agree and 34% agree, indicating a strong correlation between technology use and enhanced consumer safety perceptions. Regarding the learning curve associated with new technologies, the responses indicate a mean score of 3.70 and a standard deviation of 0.94, with 30% strongly

agreeing and 35% agreeing. However, 20% of respondents remained neutral, highlighting the challenges some vendors face in adopting new technologies. The question on whether technology adoption has made the street food industry more competitive received a mean score of 4.00 and a standard deviation of 0.86. A combined 75% of respondents either strongly agree or agree, suggesting that technological innovations are viewed as a key factor in increasing competition within the industry. The question addressing digital illiteracy as a barrier to full technology adoption scored a mean of 3.90 with a standard deviation of 0.91. With 36% strongly agreeing and 34% agreeing, it is evident that digital illiteracy, especially among older vendors, remains a significant challenge to full adoption.

4.3 Analysis of Hypotheses

H1: Impact of Hygiene Monitoring Systems on Consumer Satisfaction

Table 3: Descriptive Analysis of Consumer Satisfaction Levels Based on Adoption of Hygiene Monitoring Systems by Vendors

Response Category	Frequency	Percentage (%)
Highly Satisfied (Adopted Hygiene Systems)	65	65%
Satisfied (Adopted Hygiene Systems)	25	25%
Neutral	5	5%
Dissatisfied (Not Adopted Hygiene Systems)	3	3%
Highly Dissatisfied (Not Adopted Hygiene Systems)	2	2%

Descriptive analysis of consumer satisfaction with street food vendors, which have adopted hygiene monitoring systems is presented in Table 3. On vendors adopting these hygiene systems, 65 percent of respondents had low adoption but 25 percent were satisfied. That implies that customers find the added hygiene of this new tech implementation awesome. Very little change (5%) was shown in respondents for not being indifferent to the existence of hygiene systems. At the other end of the spectrum, 3 percent of consumers responded dissatisfied to changes in hygiene standards, 2 percent highly dissatisfied, and these represent a small number whose changes may not be perceived as significant. By highlighting the positive impact hygiene monitoring systems have on increasing consumers' perception of hygiene and safety in the system, this distribution, to some extent, emphasises how increase in these perceptions lead to increase in consumers' overall satisfaction with the system.

Table 4: Results of Chi-Square Test Examining the Relationship Between Hygiene Monitoring Systems and Consumer Satisfaction

Variable	χ^2 Value	df	p-value	Conclusion
Hygiene Monitoring & Consumer Satisfaction	18.72	1	< 0.05	Statistically Significant

Using the chi-square test, the relationship between consumer satisfaction and hygiene monitoring systems was assessed and the results are shown in Table 4. The chi-square value ($\chi^2 = 18.72$) and for a p value under 0.05 it is a statistically significant relationship. As a result, there is a high correlation between the degree of satisfaction received by consumers of street food and the extent street food vendors adopt hygiene monitoring systems. Because of the significance of this result, we conclude that hygiene monitoring systems are critical in enhancing consumer trust and satisfaction, validating H1. These results reject null hypothesis (no relationship exists) and offer the evidence that hygiene technology could positively affect consumer attitudes.

H2: Impact of Digital Ordering on Order Processing Efficiency

Table 5: Descriptive Analysis of Order Processing Times for Vendors Using Digital Ordering Platforms Versus Those Not Using Them

Vendor Type	Mean Order Time (minutes)	Standard Deviation
Vendors using Digital Ordering	5.2	1.1
Vendors not using Digital Ordering	7.8	1.3

The descriptive statistics for order processing times for vendors who use digital ordering platforms vs. those that do not are presented in Table 5. A mean order processing time of 5.2 minutes with a standard departure of 1.1 minutes suggests that those vendors who adopt the digital ordering process have a more consistent processing time. Vendors that had not implemented digital platforms, on average, underwent 7.8 minutes of processing, with standard deviation of 1.3 minutes, which in comparison to the other vendors is a higher variability and longer waiting times. The results imply that the adoption of digital ordering platforms greatly contributes to operational efficiency to make it faster for customers. Also speaking to the benefits of technology, the fact that it reduces time variability and allows for quick transactions between vendors using digital systems, also suggests that we should have some consistency in order processing between vendors.

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Table 6: T-Test Results Comparing the Impact of Digital Ordering Platforms on Order Processing Efficiency Among Vendors

Group	t-value	p-value	Conclusion
Vendors using Digital Ordering	3.45	< 0.01	Statistically Significant
Vendors not using Digital Ordering			

The results of a t test to evaluate the impact of digital ordering platforms on order processing efficiency are shown in table 6. A t-value of 3.45 and a p-value less than 0.01 indicate statistical significance between vendors using digital ordering and those that do not use it. It also supports the hypothesis (H2) that digital ordering platforms have a large impact on order processing times. Our results support the idea that vendors with digital platforms find it easier to process customer orders faster, providing a more efficient service than traditional vendors. This means that digital ordering systems have got a lot of operational advantages and not only shorten the process but also increase the customer experience with shorter wait times.

H3: Impact of Cashless Payments on Vendor Profitability

Table 7: Descriptive Analysis of Monthly Profits for Vendors Using Cashless Payment Systems Compared to Cash-Only Vendors

Vendor Type	Mean Monthly Profit ($)	Standard Deviation
Cashless Payment	2500	350
Cash-Only Payment	1800	400

According to Table 7, the descriptive analysis of vendor profitability with respect to the payment methods vendors use is presented. They showed that the mean monthly profit of those who adopted a cashless payment system, the same as $2,500 and standard deviation equal to $350, indicating that these vendors generally do have higher profitability. Less than the cash only vendors, with the average monthly profit of $1,800 and standard deviation of $400, respectively. They imply that cashless payment could improve the financial performance of street food vendors since transactions become faster, sales can be tracked easier and customers become more comfortable. The significant difference between mean profits of the two groups shows the potential impact of technological improvements in payment systems for business growth.

Table 8: ANOVA Test Results Highlighting the Effect of Cashless Payment Systems on Vendor Profitability in the Street Food Sector

Payment Method	F-value	p-value	Conclusion
Cashless Payment	4.89	< 0.01	Statistically Significant
Cash-Only Payment			

Results from an ANOVA test examining the impact of cashless payment systems on vendor profitability are presented in Table 8. A statistically significant difference is indicated by this F value of 4.89 and p value of less than 0.01 when vendors use the cashless payment system as compared to those using only cash. These results are consistent with H3, that profit is higher under cashless payment systems. Adopting digital payment allows the vendors to have faster and more efficient transactions that, in turn, will attract more customer and satisfaction. Furthermore, digitally tracking sales and managing finances is likely to be much easier for the firms that are shown to be more profitable with this digital trend. It's this evidence that backs up the idea that cashless payments are a good technological advancement from a street food vendor point of view, as they can help optimise their earnings.

H4: Barriers to Technology Adoption

Table 9: Descriptive Analysis of High Costs and Digital Literacy Gaps as Barriers to Technology Adoption Among Vendors

Barrier Type	Frequency	Percentage (%)
High Cost	85	42.5%
Lack of Digital Literacy	70	35%
Both High Cost & Literacy Gap	45	22.5%

The descriptive analysis of barriers to technology adoption of street food vendors is summarised in table 9. One of the key things that we found was that 42.5% of the vendors mention high costs as the main barrier to adopting new tech, and 35% said that lack of digital literacy was the main obstacle they faced. 22.5 per cent of respondents said high costs and a digital literacy gap were barriers to introducing technological innovations, while a smaller group of 22.5 per cent said that high costs and a lack of a digital literacy were barriers. Taken together, these findings highlight the two biggest hurdles in the way of modernising street food vendors. Small scale vendors are often not able to implement the technology due to high implementation costs, and older or less educated vendors don't have the digital literacy to understand, let alone use the technology effectively.

Table 10: Correlation Analysis Between Digital Literacy Levels and Perception of Cost Barriers to Technology Adoption

Variables	Correlation Coefficient (r)	p-value	Conclusion
Digital Literacy & Cost	-0.65	< 0.05	Statistically Significant

A correlation analysis of the relationship between digital literacy and cost related barriers to the technology adoption is presented in Table 10. From a statistical point of view, the correlation coefficient (r = -0.65) and p value of less than 0.05 indicate that digital literacy has a very strong negative correlation with cost related barriers feelings. This also supports the hypothesis (H4) that both lack of digital literacy and high costs are big barriers to the use of technology. Digital systems are more likely to be rejected by vendors who are less familiar with digital systems because they perceive the costs of technological upgrade as too high and thus are less likely to adopt innovations like digital ordering or cashless payment systems. The results emphasise that targeted interventions like education and financial support are necessary to overcome these barriers and help wider adoption of technology in the street food sector.
However, the sector has undergone a major transformation on the streets of Delhi NCR through technology, increasing operational efficiency, enhancing consumer satisfaction and vendor profitability, but it leaves the small vendors facing a number of challenges. Hygiene monitoring systems, digital ordering platforms and cashless payment systems have been driving technological advancements that have considerably helped addressed some perennial problems of hygiene, delays in service and payment inefficiencies. In this regard, the studies by Ahani et al. (2019), Ali et al. (2021), and many others have proved that these innovations are critical for the enhancement of real time monitoring and improving the operability as well as transparency in financial transaction. These findings are consistent with this study, where statistically significant correlation of adoption of hygiene systems to consumer satisfaction was shown ($\chi^2 = 18.72$, $p < 0.05$), suggesting that the hygiene monitoring increases the consumer trust in the KFC product. Digital ordering also leads to a reduction in order processing time ($t = 3.45$, $p < 0.01$) like Ammar el al. (2022) found that these plateforms increase operations and improve customer experience. Also, technology has played a big role in financial growth in terms of improving vendor profitability ($F = 4.89$, $p < 0.01$) as shown by Andersen et al. (2018) and Ali et al. (2021). Barriers however include high costs and older vendors who are not digitally literate, remain significant. This study corroborates ($r = - 0.65$, $p < 0.05$) and builds (Bhatia, Ahanger 2021) on previous findings (Bhatia & Ahanger 2021) that for smaller scale vendors, costs of adoption of these systems can be prohibitive. Amenaghawon et al. (2021) suggest these barriers underscore a need for targeted interventions, including financial subsidies for vendors and digital literacy programmes, to make sure that the benefits of technology are available to all vendors. While adoption of technology is making a positive impact on the street food sector, the challenges to overcome, and wider technological integration for all vendors still remain, all of which ultimately require continued support from policymakers, industry stakeholders and technology providers.

Conclusion

The street food sector in Delhi NCR is going through a healthy transformation using technological innovations such as, hygiene monitoring systems, digital ordering platforms and cashless payment solutions. The results of this study indicate that these technological advances have large impacts on vendors and consumers as operational efficiency improves, customer satisfaction improves, vendor profitability rises. Addressing increasing consumer concerns about cleanliness and if health risk includes improving on the adoption hygiene monitoring system. The fact the citizens among them said that they were highly satisfied with the vendors who had made use of these systems also confirm these findings. Just like digital order platforms exploded, order processing time was drastically reduced, and operations were simplified and the buyer's experience improved. Meanwhile, the new introduction of cashless payment systems is that they make things simple for both vendors and vendors in terms of managing their finances and so grow the bottom line. Although the study also identifies a number of main problems that must be resolved in order for these technologies to come into widespread use, yet. However, there is still some way to go, as serious remaining barriers include high implementation costs, and gaps in digital literacy among traditional and older vendors. Number of vendors know the value of technology created, however, most of the operators tend to spend a lot of investment in initial and it is especially true for small scale operators with low margin. Also, there is another challenge: Since within vendors there is the digital divide, which is especially less known to modern technology. The digital literacy and the cost related

perception of barriers relationship is strong and facilitates further targeted interventions initiatives such as training programme and financial support to help vendors solve those barriers.
This technological transition is dependent upon a convergence of policymakers, industry stakeholders and technology providers. This helps vendors to share the cost burden by means of subsidies and grants, as well as opens up training programmes to teach those vendors who may already be older or less educated how to use these technologies effectively. Additionally, the government can play a promoting role in digital payment system and hygiene quality standard, which can further encourage the street food on the adoption of this innovation in order that the street food sector can be competitive and sustainable in the long run. The end results of this study show that, while moving to a tech-powered street food industry can be seen as a challenge, the advantages of higher efficiency, customer happiness and profitability are great, which can be attained if Delhi NCR gets the proper help to transform into a tech powered street food industry.

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