Dark Store – A Fresh Mushrooming Concept of Delivery At Door-Step.

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Abstract

The concept of 'Dark Store' in India is still the the one which is finding its foot in the market. It is one of the models which got famous as an effect of long lock-downs during the COVID-19 pandemic. It can be simply explained as a store with a virtual ordering interface that supplies daily necessities including groceries to the doorstep of the customer. Most of the people order from dark store as the deliveries are quicker and people save time to go to the store physically to buy the products. Looking at the current scenario, a lot of big business houses are getting into this sector and setting up dark stores at even faster speed.

This paper tries to find out the habituation of customers while ordering through a dark store, their preferences and reasons behind it. The data was collected by the researcher through structured questionnaire. But psychological and financial factors have not been considered in this study.

Key Words

Dark store, supply-chain, perishables, commodities, supplies, Pune.

Introduction

The concept of 'Dark Store' in India is still one which is finding its foot in the market. It is one of the models which got famous as an effect of long lock-downs during the COVID-19 pandemic. It can be simply explained as a store with a virtual ordering interface that supplies daily necessities including groceries to the doorstep of the customer. This can simply mean a work-from-home scenario for grocery and supply merchants. Dearth (2021) defines it as a brick-and-mortar location that has been shut down for customers and has been turned into a center for fulfillment operations'.

The model of it is based on the same concept of a dark kitchen or cloud kitchen. Customers can not visit a distribution outlet physically. They can see and select the products available with the store virtually, with the help of a mobile app or a website. Then the order is placed and paid for. The store dispatches the ordered supplies and products to the given address. The model has not only helped the merchants to earn during difficult times but has also helped customers to get the supplies at the doorstep even going out of their homes. Many big companies which used to be in the food delivery business like zomato, swiggy, etc. have started these dark stores across India during the pandemic.

The main advantage of a dark store is that the shopping does not need to have any contact between a buyer and a vendor. The placing of orders and payment happens virtually and supplies are often delivered to the doors in a contact-free style. At the same time, it becomes possible for a merchant to reach a larger audience irrespective of the geographic location as anyone downloading the app can have access to the products sold by the merchant. Many of the big companies who have started dark stores also promise to deliver within very less time. This has affected people largely to order through the app than going to an actual grocery store. To have a successful delivery option, a merchant has to keep all the perishables in a flawless warehouse. This requirement helps the customers to get a better-stored product of which the quality has not deteriorated. (Miščević, 2018)

Because of the above-said benefits and due to cost-effectiveness and optimization of the supply chain, it can be said that these dark stores are here to stay for a long time.

Objectives of the study

Following are the objectives of this study –

1. To understand the concept of a dark store in the food and beverage supply chain.
2. To find out the awareness about the concept.
3. To check if mushrooming of dark stores have affected the ordering of customers or not.

Hypothesis

H_1 - There is a significant change in customers' preference to order through the dark store.

H_2 - The frequency of ordering perishables using dark stores is more than non-perishable items.

Literature review

The chapter by Bryson (2021) titled ' COVID-19 and the immediate and longer-term impacts on the retail and hospitality industries: dark stores and turnover-based rental models' focused on the concept of a dark store and how it has evolved through the pandemic. It describes that the main reason to order through a dark store is the availability of variety for one particular product type. The text also sheds the light on how the work-from-home scenario has affected the business of dark stores. The text does not include any specific industry or supply type.

Shapiro (2022) in a paper titled 'Platform urbanism in a pandemic: dark store, ghost kitchen and the logistical urban frontier' focuses on detailing a dark store model. It describes the impact of dark stores on consumers and employees. It states that the dark store and ghost kitchens are highlights of the logistical urban frontier. The paper does not focus on how it affects customers' habits.

The article titled 'ensuring socio-economic efficiency of retail in the conditions of the crisis based on the dark store format' by Shaleva (2020) focuses on the relationship between dark store and socio-economic efficiency during the pandemic time since it has set in. It shades an overview on evolving of the concept. It focuses on a classical dark store model which was adopted by Tesco in 2009. It states that one of the major benefits of a dark store for the operator is of saving cost involved with customer service flow. It also states that maintaining an average receipt is the most faced problem in this model. Though the paper talks about the model and its history it does not have any customer-centric approach.

Research Methodology

This paper is based on primary as well as secondary data. Primary data was gathered through a structured questionnaire. The questionnaire included a few demographic questions and the rest of the questions were about the hypothesis discussed before. Likert's scale was adopted by the research to gather the data. The stratified random sampling technique was used to select the sample size. This method helps in making sure that the population within the stratum is homogeneous. (Kumar, 2014)
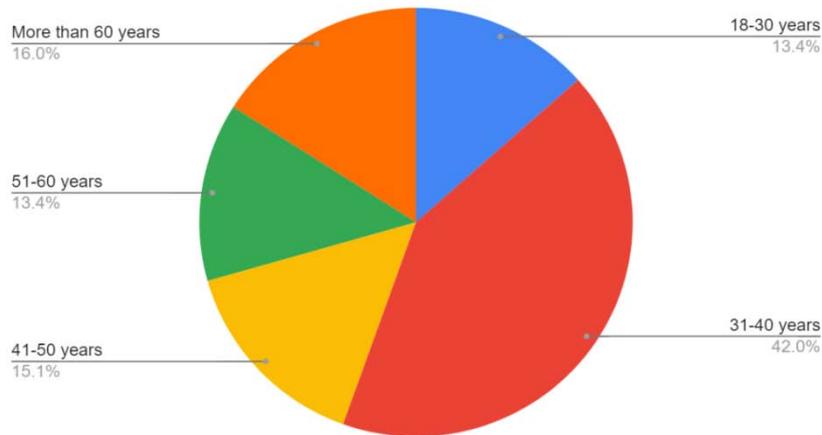
The secondary data was collected through various research papers, journals, textbooks, news articles, and white papers.

Data Analysis & Findings

The data was gathered from 119 respondents. The analysis of the data and findings are as follows –
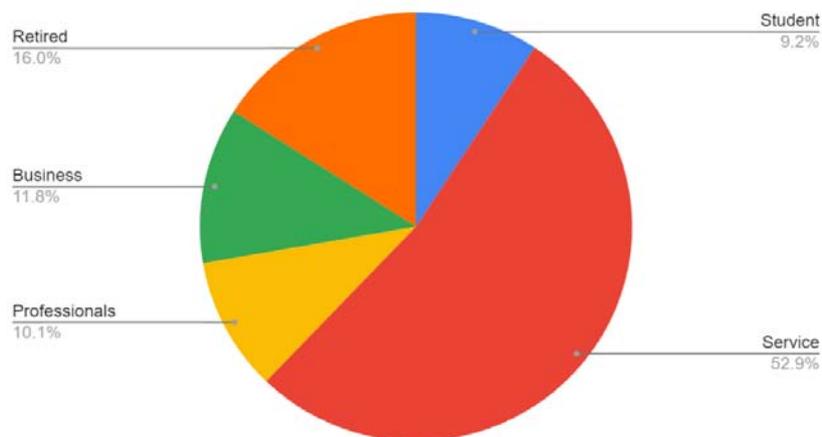
Demographics -

(Figure 1 – Age of the respondents)

Figure 1 shows the age distribution of the respondents. It can be seen that most of the respondents (42%) were between the age of 31-40 years followed by people aged above 60 years (16%) and people between 41-50 years (15.1%). Out of the total sample, 13.4% of the people were from each of the 18-30 years and 51-60 years.
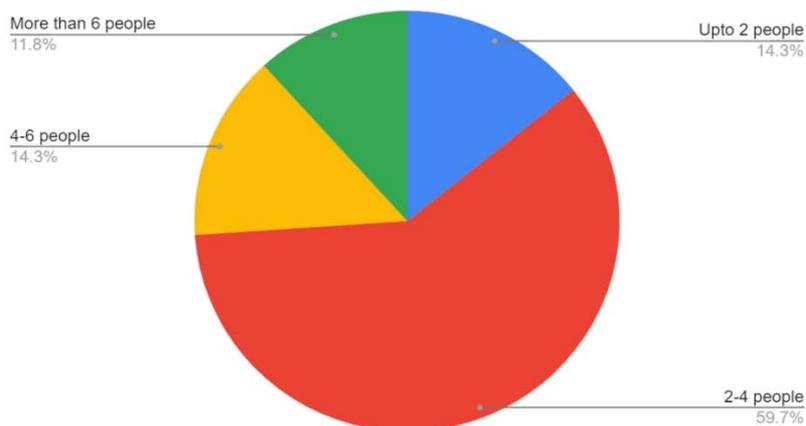

(Figure 2 – Profession of the respondents)

It can be seen from figure 2 that 52.9% of the respondents were employed under fixed service. There were 9.2% of the students and other professionals like lawyers, doctors, etc. were 10.1%. Out of 119 respondents, 14 respondents (11.8%) had their businesses and 19 respondents were retired people.

(Figure 3 – The family size of the respondents)

It can be seen from figure 3 that most of the respondents (59.7%) belonged to families of 2-4 people. It can be seen that there were 14.3% of respondents from each 4-6 person families as well as families with up to 2 people only. 11.8% of respondents belonged to larger families of more than 6 people.
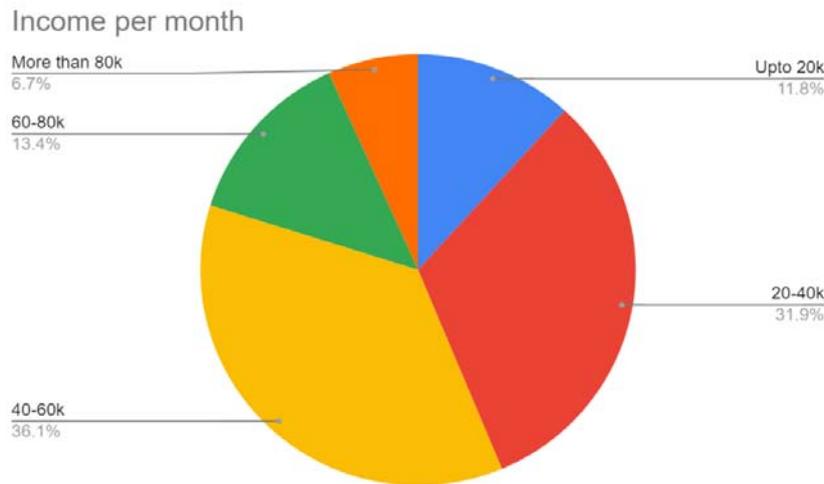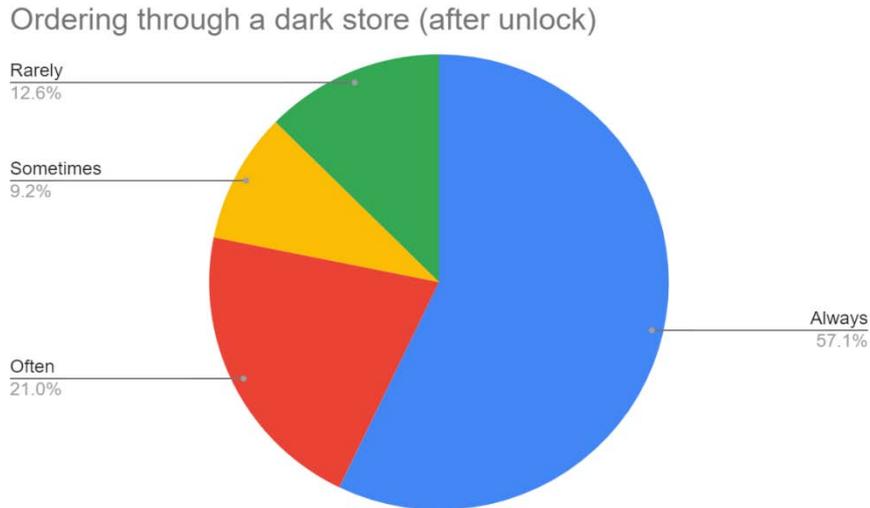

(Figure 4 – income of the respondents)

It can be seen from the above figure (4) that a major chunk of the respondents that is 36.1% of respondents have monthly earnings between Rs.40,000 to Rs.60,000 followed by respondents' earnings between Rs.20,000 to Rs.40,000 per month (31.9%). 13.4% of respondents earned 60-80K per month and 11.8% of respondents were from the income group of up to 20K per month. Only 6.7% of the respondents earned above Rs.80,000 per month.
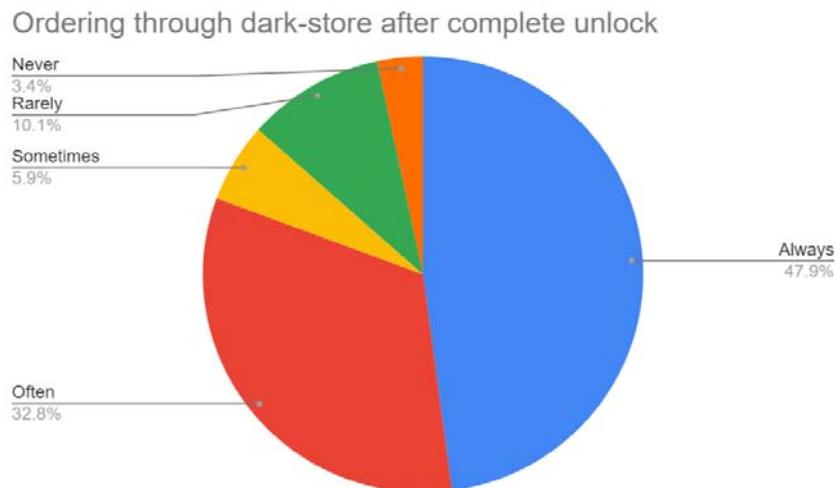
Ordering through dark stores
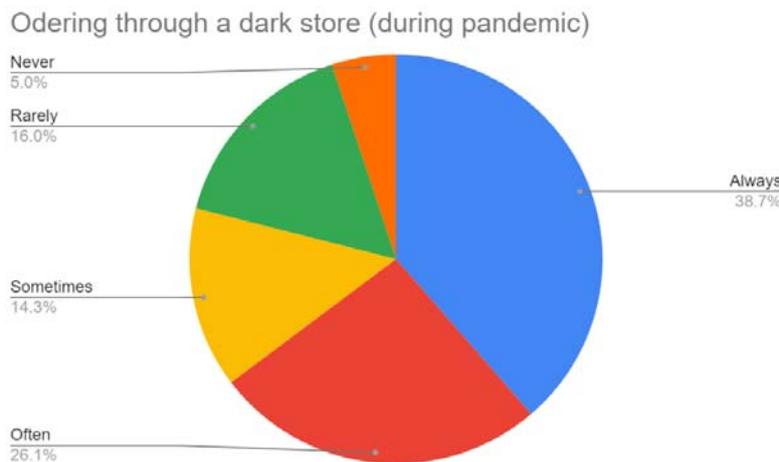
(Figure 5 – Ordering through a dark store during a pandemic)

From the data gathered, 38.7% of respondents always ordered their daily necessities from a dark store while 26.1% of the respondents ordered their supplies often when the pandemic was at the peak and the lockdown was imposed. 14.3% of respondents ordered the supplies sometimes during these times whilst 16% of respondents ordered the supplies rarely using a dark store. It can be seen that 5% of the respondents never ordered the supplies using dark stores even when the lockdown was imposed.

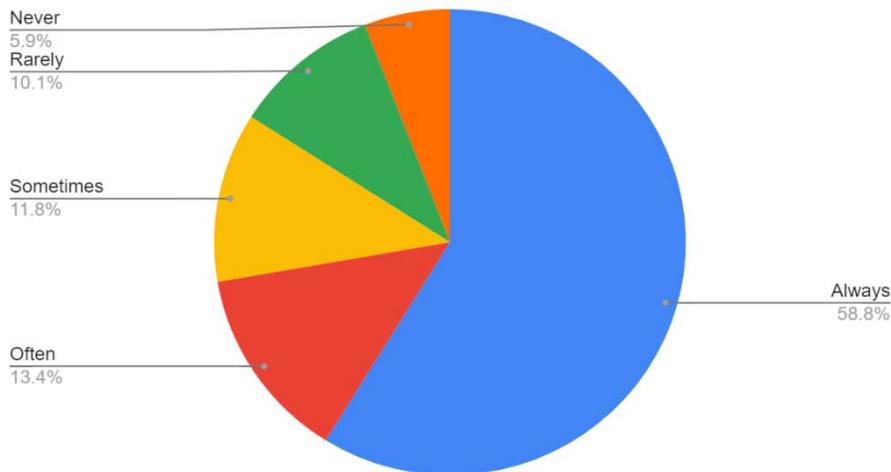(Figure 6 – ordering through a dark store after unlock)

This includes the time frame when the unlock was partially lifted. It can be seen that though supply stores were allowed to operate after the first wave, 57.1% of the respondents always ordered their supplies using a dark store, and 21% of respondents ordered their supplies often. Respondents ordering the supplies sometimes using a dark store were 9.2% and only 12.6% respondents ordered their supplies rarely through dark stores.

(Figure 7 – Ordering through dark-store after complete unlock)

This phase includes the time after the second wave of COVID-19 was passed. It can be understood from figure 7 that even after all the stores were allowed to operate to the fullest of their capacities 47.9% of respondents still always ordered their supplies through a dark store and respondents ordering through a dark store often were 32.8%. 5.9% of respondents ordered the supplies sometimes using a dark-store while 10.1% of respondents ordered it rarely. It can be seen that 3.4% of respondents never ordered the supplies after the restrictions were lifted.
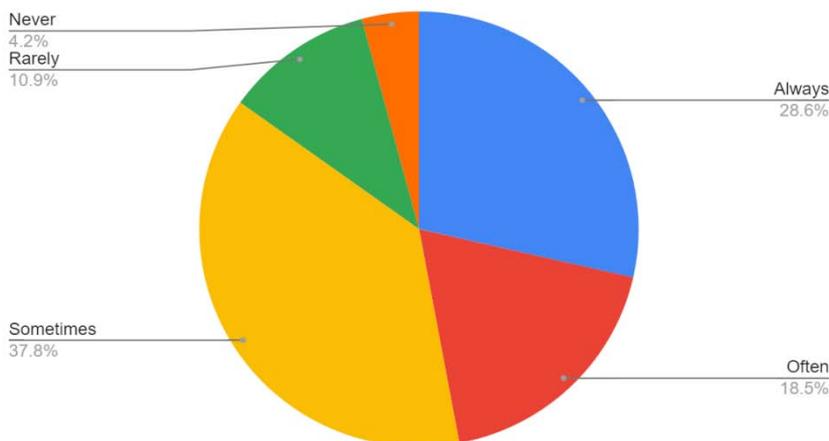
(Figure 8 – ordering perishables through dark stores)

From the entire sample size, 58.8% of respondents tend to order perishable commodities from a dark store all the time, and 13.4% of respondents order these commodities often using a dark-store facility. It can be seen that 11.8% of respondents order perishable products sometimes from dark stores and 10.1% of respondents order perishables rarely through a dark store. 5.9% of respondents never order perishables from dark stores and these respondents still prefer buying perishable commodities from traditional sources. The perishable commodities include any products which need to be consumed within a day or two after procuring them. Products like milk products, fresh vegetables; meat, etc. fall under this category.


(Figure 9 – Ordering non-perishables through dark stores)

Non-perishable products include all the commodities which can be stored for a long time after buying them and often without any special storing requisites. Grains, pulses, cleaning agents, etc. are some of the examples of such products. It can be seen that 28.6% of respondents always ordered non-perishable commodities through a dark store while 18.5% of respondents ordered such commodities often. 37.8% of respondents ordered these non-perishable commodities sometimes while 10.9% of respondents ordered them rarely. 4.2% of respondents never ordered these types of commodities using a dark store.

Reasons for ordering through dark stores
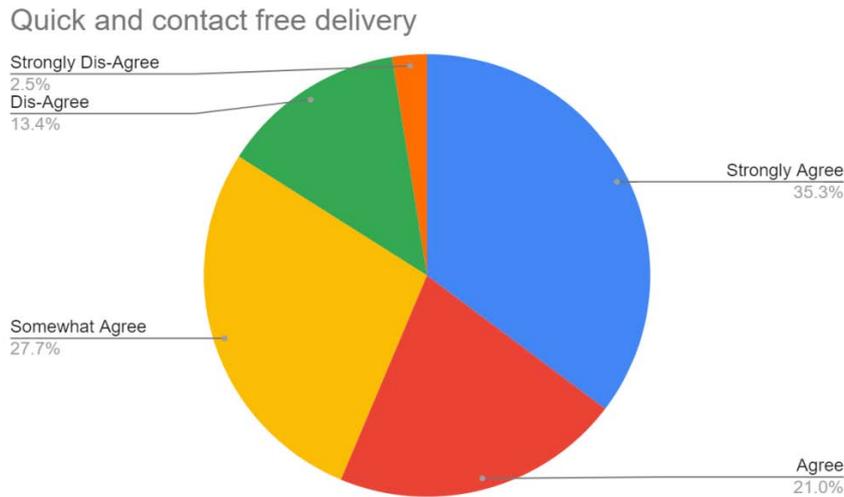
(Figure 10 – Quick and contact-free delivery)

It can be read from figure 10, that 35.3% of respondents strongly agree with the fact that they ordered their supplies from dark stores for quicker delivery and contact-free deliveries. This reduced the interaction between buyer-seller making it a safer way in times of pandemic. 21% of respondents agreed to this reason while 27.7% of respondents somewhat agreed to it. 13.4% disagreed with the statement that they ordered through the dark store because it was quick and contact-free while 2.5% of respondents strongly disagreed with this reason.
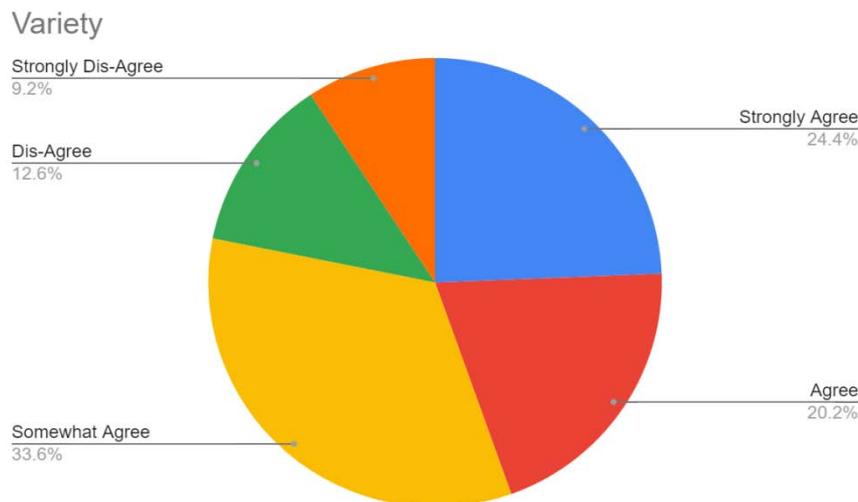
(Figure 11 – Variety)

With the business houses like Ola, Amazon entering into this business, they tend to offer a variety of brands and types in one single item. It can be seen that 24.4% of the total respondents found this reason the most apt reason for ordering through a dark store while 20.2% of the sample size agreed with this reason. Respondents somewhat agreeing with this reason were 33.6%. Rests of the respondents were on negative spectrum with this reason as their motivation to order from a dark store.
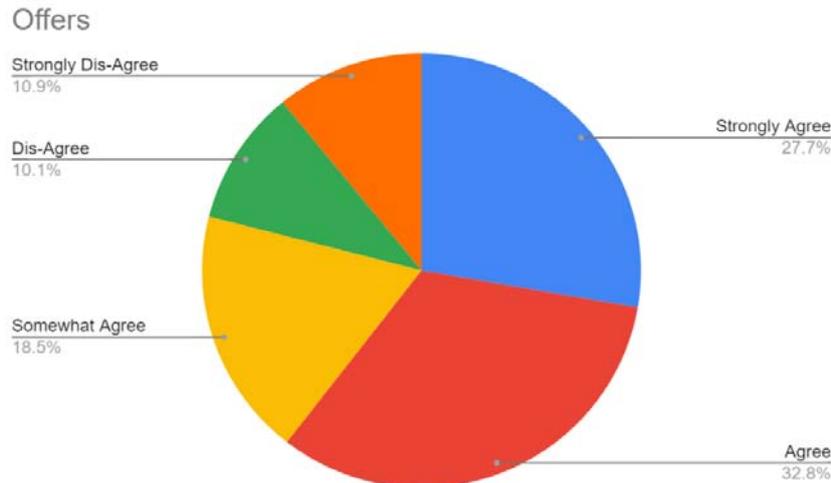
(Figure 12 – Offer)

The dark stores run various offers to attract more customers to gain the business. This can be termed as one of the motivations to order from a dark store. It can be seen that 27.7% of respondents strongly agreed with this reason while respondents agreeing with this reason were 32.8%. There were 18.5% of respondents who were almost neutral with this reason and 10.1% disagreed with this reason.
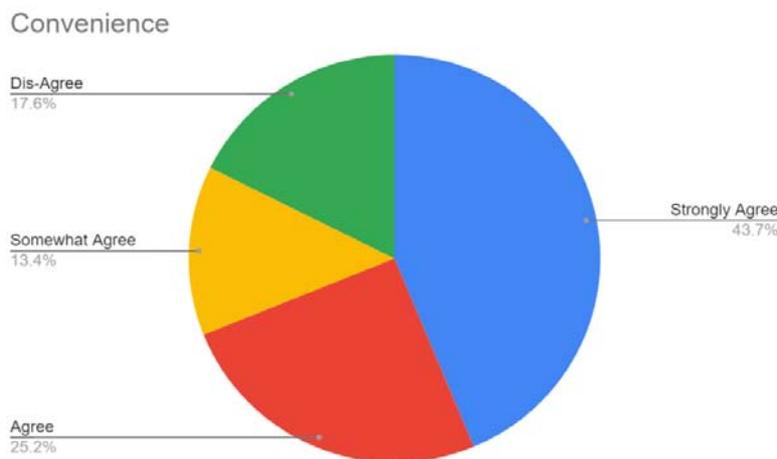
(Figure 13 – Convenience)

It has come from the published materials that one of the major reasons due to which the dark stores mushroom were convenience of the people whilst they were under a lock down. It also reflects in the responses of the respondents. 68.9% of people (43.7% strongly agreed & 25.2% agreed) positively answered to this question while 13.4% respondents were neutral with it. There were 17.6% of respondents for whom convenience was not the prime reason to order the supplies from a dark store.
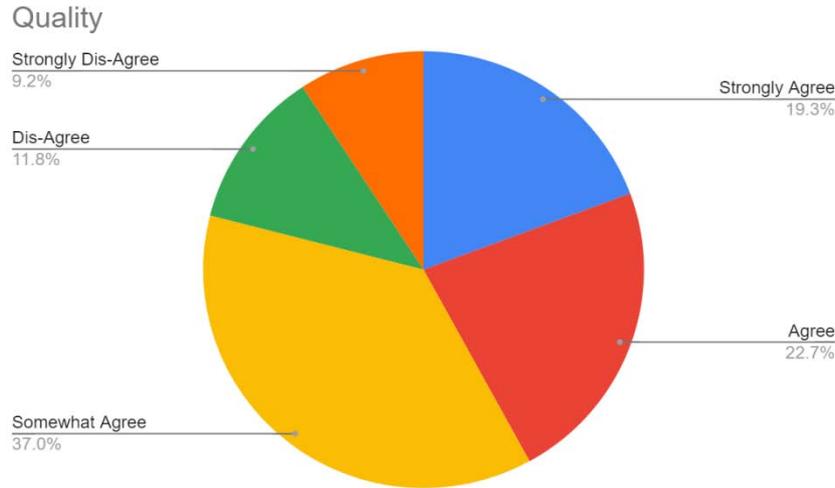
(Figure 14 – Quality)

It can be seen from figure 14 that people agreeing strongly with the quality reason were only 19.3% while only 22.7% just agreed with this reason. There 37% of respondents who somewhat agreed with this reason and 11.8% of the respondents disagreed with it. It can also be seen that 9.2% of the respondent did not consider 'quality' as a reason to order from a dark store at all.

Hypothesis testing

H_0 – There is no significant change in customers' preference to order through a dark store.

H_1 - There is a significant change in customers' preference to order through the dark store.

The statistical tool used to test this hypothesis is ANOVA (Analysis of Variance). Means of different treatments are compared using this method. (Kothari &Garg, 2019) The results are as follow -

Summary of Data				
Treatments				
	1	2	3	Total
N	119	119	119	357
$\sum X$	449	503	490	1442
Mean	3.7731	4.2269	4.1176	4.039
$\sum X^2$	1881	2259	2164	6304
Std.Dev.	1.2584	1.0612	1.1137	1.1605

Result Details

Source	SS	df	MS	
Between-treatments	13.3501	2	6.6751	$F = 5.06966$
Within-treatments	466.1008	354	1.3167	
Total	479.451	356		

Null hypothesis is rejected if the significant value is less than 0.05. It can be seen that the f-ratio value is 5.06966. The p-value is .006749. The result is significant as p-value (0.006749) is than 0.05. The null hypothesis is rejected and the alternate hypothesis is accepted. Hence it can further be concluded that there is a significant change in customers' preference to order through the dark store.

H_0 – The frequency of ordering perishables using dark stores is less than non-perishable items.
H_2 - The frequency of ordering perishables using dark stores is more than non-perishable items.

This hypothesis has been tested using t-test statistics. It tries to find out whether frequency of ordering perishables using a dark stores is more than ordering non-perishables or not. The results are as follows -
Difference Scores Calculations

Treatment 1
N1: 119
df1 = N - 1 = 119 - 1 = 118
M1: 4.09
SS1: 193.98
s21 = SS1/(N - 1) = 193.98/(119-1) = 1.64

Treatment 2
N2: 119
df2 = N - 1 = 119 - 1 = 118
M2: 3.56
SS2: 153.28
s22 = SS2/(N - 1) = 153.28/(119-1) = 1.3
T-value Calculation
s2p = ((df1/(df1 + df2)) * s21) + ((df2/(df2 + df2)) * s22) = ((118/236) * 1.64) + ((118/236) * 1.3) = 1.47
s2M1 = s2p/N1 = 1.47/119 = 0.01
s2M2 = s2p/N2 = 1.47/119 = 0.01
t = (M1 - M2)/√(s2M1 + s2M2) = 0.53/√0.02 = 3.36651

If the calculated significant value is less than 0.05 then the null hypothesis is rejected. The t-value is 3.36651. It can be seen from the above calculation that the p-value has been calculated to 0.000889. So it can be concluded that the null hypothesis is rejected and alternate hypothesis has been accepted.

So it can be further concluded that the frequency of ordering perishables using dark stores is more than non-perishable items.

Findings

Though the concept of dark store is relatively new, it has grabbed a considerable market share, thanks to the COVID-19 restrictions. The lockdown imposed made people order through these stores. As customers have already experienced the delivery system, a lot of customers still prefer ordering from dark stores. The percentage of people ordering from the dark store even after the unlock phases has not dropped. It was also found that when it comes to ordering commodities from dark stores, customers tend to order highly perishable products such as meat products, dairy products, etc. more than ordering semi-perishables or non-perishable commodities.

While ranking the motivators for ordering supplies from dark stores, quick and contact free delivery was the topped ranked reason followed by convenience. Availability of quality products and offers promoted by companies were the next popular reasons. Getting variety of product at a single click was the least favorable reason to order supplies from dark stores.

Limitations

Following are the limitations of this study –

1. The study has been conducted within the geographical boundaries of Pune city.
2. Financial and psychological factors have not been considered for this study.
3. The study considers all dark stores irrespective of size, products availability or organization.

Conclusion

Ordering supplies using a dark store helped a lot of customers during the time of lockdown due to the restrictions. This duration was used by many to understand the pros and cons of the dark stores. The benefits of dark stores have made customers order supplies even after the complete unlock. Most of the people order from dark store as the deliveries are quicker and people save time to go to the store physically to buy the products. Looking at the current scenario, a lot of big business houses are getting into this sector and setting up dark stores at even faster speed. It can be said that though dark store is a newer concept in supply chain, it is here to stay for long.

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