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USE OF WHATSAPP MESSANGER TO ENHANCE THE SALES OF VEGETABLES BY LOCAL VENDORS IN URBAN AREA - A SOCIAL INNOVATION & SUPPLY CHAIN STRATEGY

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Abstract **- Street hawkers who sell vegetables are commonly called vegetable vendors. The street vendors in urban area face major issues such as uncertainty in sales, physical exertion, lack of financial stability and wastages. We, the authors have developed a model to combat these issues. The model uses Smartphone applications like WhatsApp to build a customer network and ensure some vendor problems are resolved. This paper aims to publish the findings based on pre and post implementation of the model. Research was conducted on the ideology of benefitting the society by proposing socially innovative solutions for societal issues.**

Index Terms **- Vegetable vendors, WhatsApp, Physical exertion, Profit, Sales.**

I. INTRODUCTION

Street hawkers who sell vegetables are commonly called vegetable vendors in India. Huge sector of the perishable goods supply chain depends on daily street vendors to sell the goods, road to road on pushcarts or by foot.

It is estimated that about 2% of population in urban areas are street vendors. In Bengaluru alone around 1, 00,000 vegetable vendors take to the roads to sell their goods daily [1]. They face various hurdles every day, as they try to make a meagre living. We conducted a study, in a locality in Bengaluru South. The study surveyed the households, to gather data on the quantity of vegetables purchased per week, frequency of purchase and locations/vendors from where/whom they are purchased. The study aimed to identify the number of regular street vendors in NR Colony, A locality of Bengaluru south. Interactions with few vendors threw light on the hurdles and challenges faced by them daily.

II. SUPPLY CHAIN NETWORK OF A REGULAR VEGETABLE STREET VENDOR

A Supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request [2] Following is a simple schematic diagram of fresh vegetable supply chain, showing minimum number of intermediaries who are involved in the traditional supply of fresh vegetables and fruits. [3]

Figure 1 Schematic representation of fresh vegetable supply chain

III. CONCERNS

On surveying few vendors, the following concerns were noted:

- Need to walk long distances by foot to sell few kilograms of vegetables.
- Push carts must be maneuverer through rough roads. This causes huge mental and physical stress.
- Long routes travelled causes bone related issues that have long term irreversible effects on the mobility of the person.
- Uncertainty of sales poses a huge risk to the livelihood that depends on daily income.
- Variable sales cause difficulty in forecasting the purchase from the wholesalers, for the following day.
- Large amount of wastage of goods occur at the end of the day since they are unsold at times.
- Often the vendors need to commence sales even in harsh environmental conditions such as rains etc.
- Lack of financial security.

IV. DEVELOPING A NEW MODEL

A Pareto chart performing 80-20 analysis was done on the various issues. The following three issues were identified to be the main cause of concern.

- Long distances travelled to sell goods.
- Lack of constant sales and revenue.
- Difficulty in forecasting the purchase of goods hence leading to wastage.

We have developed a model of sales to address these issues.

To eliminate the issues of sales of the vendors, new technologies such as WhatsApp is used. We identified that the vendors lacked sales due to low publicity and awareness of the goods available for sale. The model implement's text messaging along with multimedia attachment feature of WhatsApp to create awareness among the customers regarding the goods available for sale. Also, the customers can place their requirements the previous day. This will enable proper forecast of purchases by the vendor, for the following day. This will help prevent wastage of goods. Also, several payment gateways were introduced, to ease the payment by customers at their convenience. Payment gateways such as WhatsApp payment, Tez, and Paytm were put to use. The major investment of a vendor will be a mobile phone (costs around 3000 INR) which will support the new technologies such as WhatsApp and Mobile network such as Jio to use internet.

Table 1 Rating of issues faced by the vendors

Causes	Rating out of 10	Cumulative	%age
Distance travelled	8	8	21.05263
Lack of constant sales	7	15	39.47368
Difficulty in forecast of purchase	7	22	57.89474
Wastage of goods	6	28	73.68421
Health issues	5	33	86.84211
Lack of financial security	5	38	100

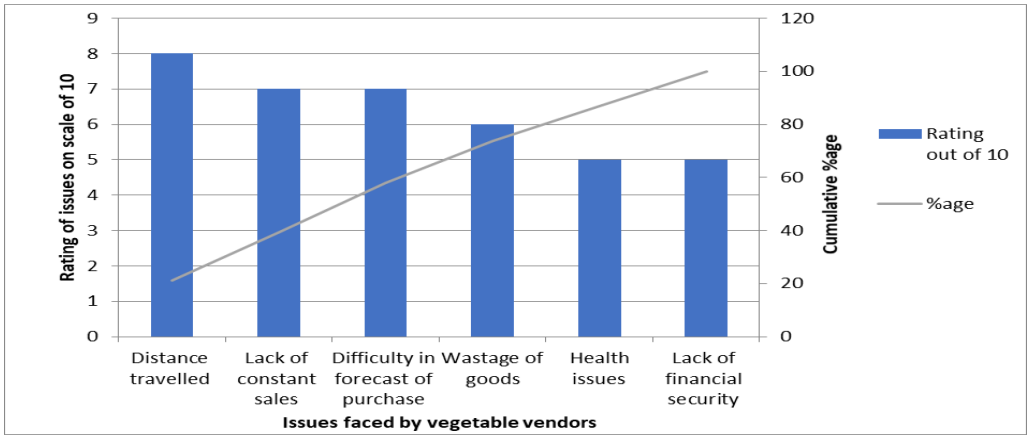

Figure 2 Pareto chart that determines the vital issues faced by vegetable vendors

V. SALIENT FEATURES

The model uses a pre-order sales strategy: The customers will pre-order the required vegetables the previous day. This fixes the quantity of procuring and sales, hence eliminating wastage and ensuring predicted income.
Mode of placing order: A common messenger application called WhatsApp is used. This application is supported by every Android and iOS Smartphone. The customers are required to place an order the previous day or few hours before the market delivery of the product. The order can be placed even by text messages or call.
The vendor will also share images and details of all available vegetables and fruits, to all the registered customers. The customers can update their requirement, and the vendor will purchase the required amount from wholesale markets and sell them to the customers.
The payment for the sales can be made by cash, Paytm, WhatsApp pay, or Tez. This introduces flexibility in payment, and helps the business be at par with digital payment and its benefits. [4]

VI. STEPS TO EXECUTE THE MODEL

At vendors end-

- Gather data such as contact information (of customers and wholesalers).
- Create a message containing the list of goods available for sale and the cost per quantity. Also, attach images if possible.
- Broadcast the message to all the customers using WhatsApp.
- Take pre-orders from customers based on the list sent to them earlier.
- Place order with wholesalers based on data obtained from pre orders.
- Collect the goods from the wholesalers.
- Sort, weigh and pack the goods.
- Deliver the goods to the respective customers.

At Customers end-

- Keep a constant check on any updates regarding price and availability of goods by the vendor.
- Place pre-order regarding requirements with the vendor.
- Pay an advance sum of money if necessary, through digital payment.
- Complete payment process when goods are received.

VII. OUTCOMES

- The uncertainty of sales is combated by ensuring pre-order.
- With this approach, non-value added time is eliminated.
- Wastage of unsold goods is prevented as only ordered quantity of goods are purchased from wholesalers.
- The model helps to build a network of buyers.
- The sales outreach is expanded to digital platforms that are much wider in reach and scope.
- By using technology, we ensure that even street vendors are educated on how to use a smartphone.
- Tedious routes travelled to sell the goods are reduced and the overall health of the vendor is improved.
- Payment is made easy by implementing digital payment methods.

VIII. DATA ANALYSIS

A. Number of customer contacts collected

Table 2 Comparison of number of customer contacts the vendor had per day, before and after the implementation of the mode

Number of customers	Before using WhatsApp messenger	After using WhatsApp messenger	After using WhatsApp messenger
		Week 1	Week 2
Monday	20	25	54
Tuesday	18	29	58
Wednesday	15	34	62
Thursday	16	35	67
Friday	18	39	70
Saturday	20	47	74
Sunday	12	67	79

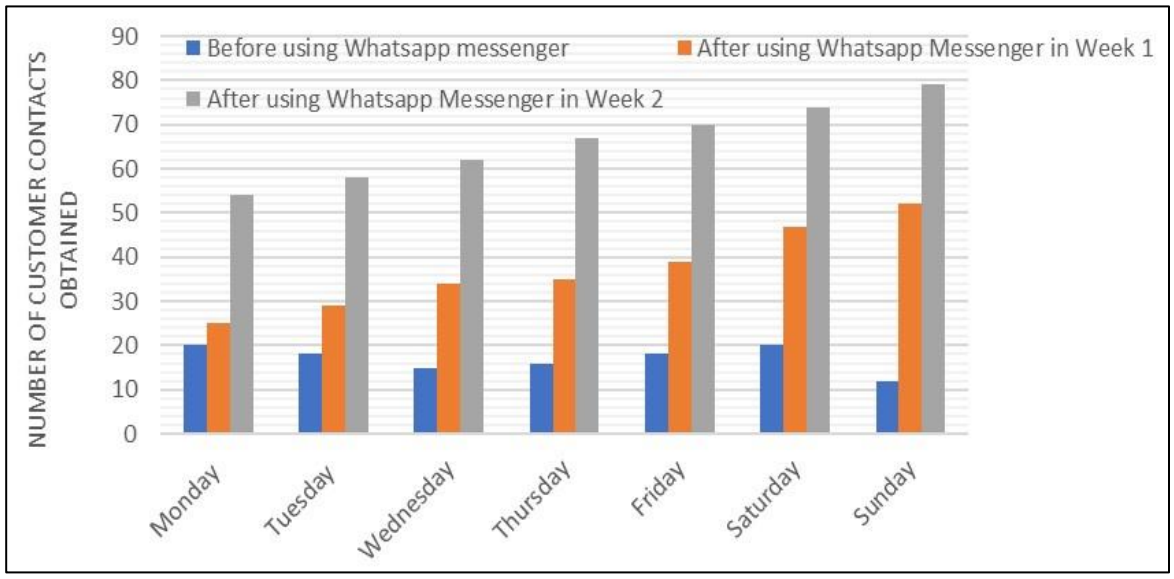

Figure 3 Plot of comparison of number of customer contacts the vendor had per day, before after the implementation of the model.

B. Number of wholesaler contacts collected

Table 3 Number of wholesaler contacts the vendor had before and after implementation of idea

	Number of wholesaler contact gained
Before using WhatsApp messenger	13
After using WhatsApp messenger : Week 1	25
After using WhatsApp messenger : Week 2	36

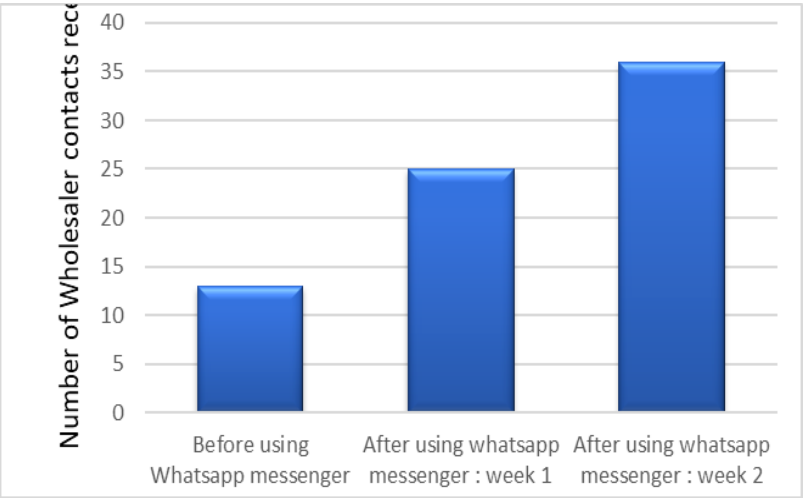

Figure 4 Plot of Number of wholesaler contacts the vendor had before and after implementation of the idea

C. Sales per day

Table 4 Number of kgs of vegetables sold in a day

Sales per day (in kgs.)	Before using WhatsApp messenger	After using WhatsApp Messenger in	After using WhatsApp Messenger in
		Week 1	week 2
Monday	42	40	52
Tuesday	35	42	53
Wednesday	24	45	57
Thursday	27	49	63
Friday	28	50	68
Saturday	29	52	70
Sunday	15	53	70
Total	**200.0**	**331**	**433**

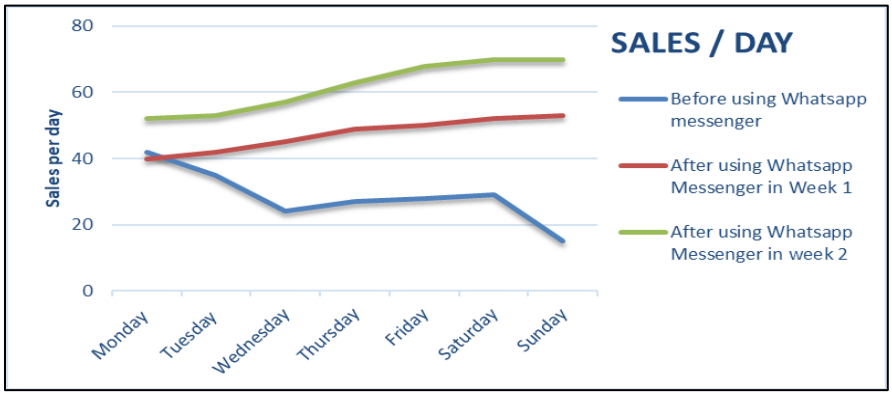

Figure 5 Comparison chart of sales per day

D. Profit gained per day

Table 5 Amount of profit or loss incurred each day to vegetable vendor

	Before model implementation	After model implementation	
Days		Week 1	Week 2
Monday	570	565	780
Tuesday	465	590	780
Wednesday	-130	640	800
Thursday	340	700	840
Friday	380	730	870
Saturday	-70	760	890
Sunday	-280	780	900
	182.14	680.714286	837.1429

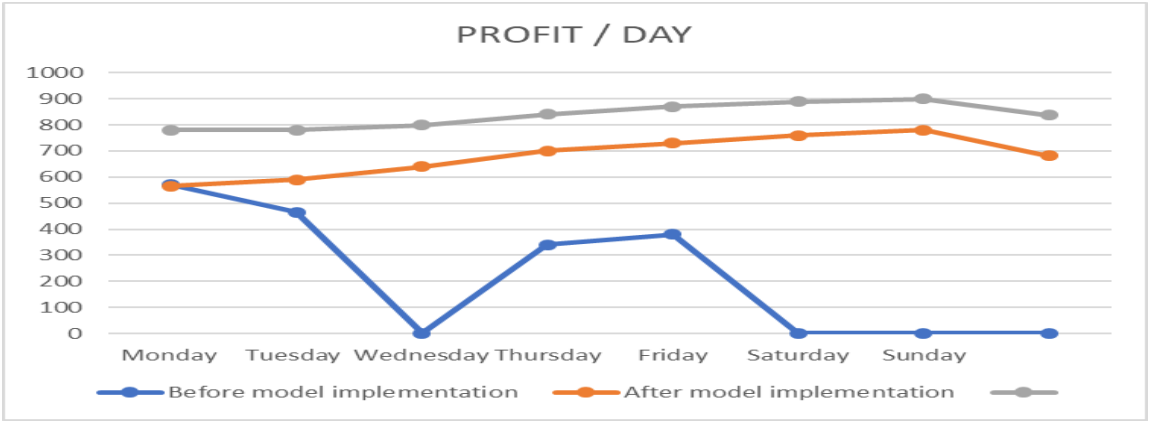

Figure 6 Plot of Comparison of profits incurred each day before and after implementation of the idea

E. Comparison of average sales and average profit earned each week, before and after the implementation of the idea

Table 6 Statistical data of average sales a day (in kgs.) and Average Profit earned per week (in Rupees)

Comparison	Before using WhatsApp	After using WhatsApp: Week 1	After using WhatsApp: Week 2
Average sales a day	28	47.28	61.85
Profit earned	182	680	837.14

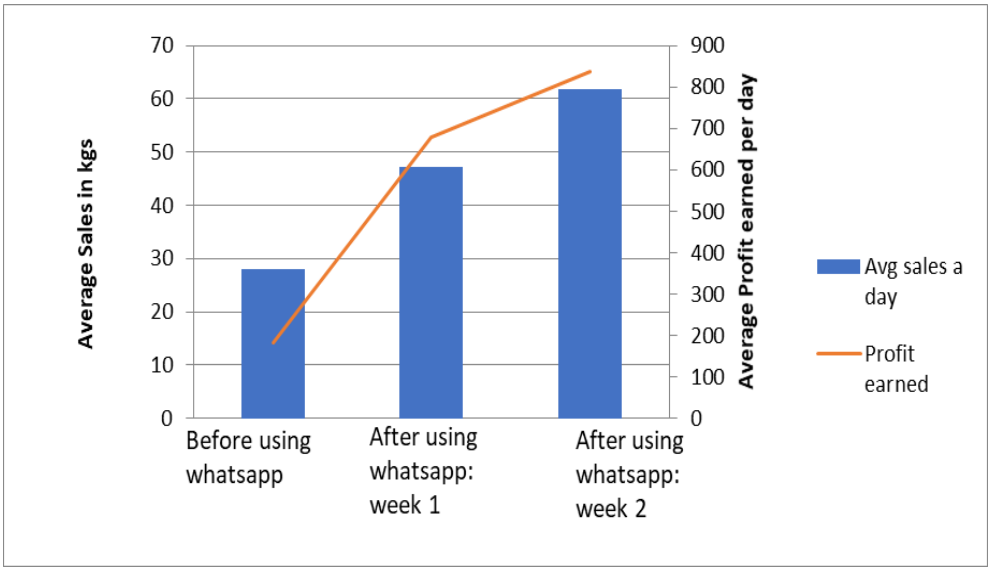

Figure 7 Comparison plot of average sales per day and average profit per week

IX. DISCUSSIONS AND CONCLUSION

The model developed by us was aimed to provide a solution to few issues faced by street vendors selling vegetables on Bengaluru's streets. This model was developed to enhance the sales, of a particular vendor belonging to NR Colony, a locality in the city. The model used WhatsApp to share information on available goods and anticipate sales and pre-orders. By using digital payment methods, ease of sales was established. The profits of pre and post model implementation were analysed and were found to nearly be 6 times more than pre-implementation. This is because losses due to unsold goods were completely eliminated

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