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# A sustainable framework for agro-food products by combating raw material storage in e-commerce during covid pandemic

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*Abstract-* **Sustainable supply chain management includes incorporating naturally and monetarily suitable practices into the total supply chain lifespan, from item plan and improvement to material determination, fabricating, bundling, transportation, warehousing, appropriation, utilization, return and removal. In this paper, with respect to the public wellbeing in this COVID-19 pandemic, we made a B2C agro-food conveyance framework utilizing e-commerce business so individuals don't need to escape their home for their everyday necessities. Not only B2C but we also run our model as B2B to see the success ratio and distinguish the difference between B2B and B2C. In our framework, we will convey unpreserved agro-food items legitimately from the farmers/producers to our clients with a conveyance lead time of one day. Doing as such, we will have the option to convey newly harvested sound edibles at our client's doorsteps right away a day after their request, achieving instant demand fulfillment. Our framework will take orders consistently and will have a robotized framework having the exact amount of every items which should have been conveyed every day. Utilizing this information customers can purchase items straightforwardly from the farmers/suppliers with that precise amount consistently, so we won't have the fear of overabundant item sourcing and wastage. We apply machine learning method to upgrade our overall model by utilizing Cross-validation and also designed our server architecture for our e-commerce model. Along these lines and furthermore applying cross-docking technique, this isn't compulsory to have a stockroom and this will dispense with distribution center expense. Subsequently, we will have the option to build up a less expensive, secure and quicker conveyance solution for our purchasers.**

***Keywords- B2B; B2C; agro-food products; warehousing; e-commerce, Cross Validation, supply chain management.***

## I. INTRODUCTION

Developing ecological, social, and moral study and expanded attention with the impacts of food creation and utilization on the regular habitat have prompted expanded weight from purchaser associations, natural support gatherings and strategy creators on agro-food group to manage the feasibility of their supply chains. Enthusiasm for supportability of supply chains has become in the course of the most recent decade. Accomplishing manageability involves arriving at a harmony between financial development, natural insurance and social conditions. Areasonable gracefully anchor alludes to the manners by

which hierarchical advancements and arrangements in supply chain the executives are considered with regards to manageable turn of events [1]. In a reasonable, asset proficient enough food framework, agro-products must be changed over into a scope of important items. To discover the cycle pathways that empower this ideal transformation, a deliberate way to deal with plan is fundamental. Toward the beginning of the twentieth century, the agro-food industry for the most part removed one item from an agro-product, for instance starch from potatoes and sugar from sugar beet. Natural concerns and diminishing edges constrained the business to enhance and decrease squander streams, extricating for example whey proteins from whey and utilizing sugar beet mash for yeast creation. In the most recent many years, the

financial scene in Europe has gone through a makeover [2]. Numerous organizations moved their assembling plants from Europe to ease nations to stay serious [1, 2]. This offshoring prompted lost roughly 3.5 million positions in the assembling business in the European Union since 2008 [3]. Simultaneously, numerous global organizations assembled a circulation place (DC) in Europe. These DCs are commonly answerable for the conveyances of products created outside Europe to European clients, frequently inside the setting of business-to-consumer online business exchanges [4]. Since 2010, European B2C e-commerce business deals have been developing yearly with roughly 17% all things considered. All the more specially, in 2016, the B2C online business deals developed with 15.43% in Europe, bringing about a marketing projection of 530 billion euro in 2016 [5]. The portion of web clients in the EU which made online buys expanded with 16 rate focuses since 2007 up to around 65% [6]. In an internet business setting, clients request all the more every now and again in littler amounts. As an outcome, the quantity of transfers increments [4]. Bangladesh 103TH in online business index,1% Bangladeshis do online shopping, half people have accounts in money related establishments, Range of list esteems in South Asian nations is a lot more extensive, 80% in addition to web clients in six European nations buy on the web [5]. Among the South Asian nations, India beat the list. It hopped seven spots to 73, trailed by Sri Lanka (86), Pakistan (114) and Bhutan (116) [5]. While considering online based supply chains, the warehousing and conveyance activities should be improved. After (e-commerce business) orders are collected in a distribution center, the products should be conveyed to the favored conveyance area of the client. Appropriately, request picking and circulation are interrelated. Disturbances in the request picking activities will affect the conveyances. Broad exploration has just been done on the improvement of distribution center activities [7]. Necessities and limitations of both the order collecting issue and the vehicle directing issue are considered simultaneously. For instance, conveyance time windows are considered when picking records are set up. Warehousing is the demonstration of putting away merchandise that will be sold or dispersed later. While a little, locally situated business may be warehousing items in an extra room, storm cellar, or carport, bigger organizations commonly own or lease space in a structure that is explicitly intended for capacity. Essentially, a stockroom is incredible for putting away overflow products, which consumers don't require right away. Most organizations as a rule produce merchandise fully expecting request. This implies they'll require sufficient capacity for their overflow products until their clients and customers begin placing in orders. Modern distribution centers normally utilize an arrangement of wide walkway bed racking to store merchandise which can be stacked and emptied utilizing forklift trucks. Conventional warehousing has declined since the most recent many years of the twentieth century, with the steady presentation of Just In Time procedures. The JIT framework advances item conveyance legitimately from providers to customer without the utilization of stockrooms. In any case, with the continuous usage of seaward redistributing and offshoring in about a similar time span, the separation between the maker and the retailer developed extensively in numerous spaces, requiring at any rate one stockroom for every nation or per locale in any common gracefully chain for a given scope of items. Ongoing retailing patterns have prompted the improvement of distribution center style retail locations. These high-roof structures show retail products on tall, rock solid modern racks as opposed to customary retail racking. Normally, things prepared available to be purchased are on the lower part of the racks, and crated or palletized stock is in the upper rack. Basically, similar structure fills in as both a distribution center and retail location. Another pattern identifies with merchant oversaw stock (VMI). This gives the seller the control to keep up the degree of stock in the store. This strategy has its own issue that the seller accesses the distribution center. Huge exporters and makers use stockrooms as appropriation focuses for growing retail outlets in a specific locale or nation. This idea lessens end cost to the shopper and improves the creation deal proportion. Cross-docking is a particular sort of dispersion focus (DC) in that almost no stock is put away and item is gotten, handled and dispatched inside a short time period [8]. As in warehousing, there are various sorts of cross-docks. Invert coordination is another sort of warehousing that has gotten famous for natural reasons. The term alludes to things that are going from the end client back to the wholesaler or producer. In this paper, regarding the public safety in this COVID-19 pandemic, we created a B2C agro-food delivery system using e-commerce so that people don't have to get out of their home for their daily necessities. Initially after creating the agro-food delivery model, we applied it through both the B2B and B2C system and took a pre and post survey from our consumers. Upon analyzing those data, we discovered that the B2C system suits better for our model as it was both efficient and responsive than the B2B system at the same time as we could eliminate the middleman, deliver fresh products straight from the producers and minimize our total cost, resulting in delivering at a cheaper price. In our food delivery system, we will deliver fresh agro-food products directly from the farmers/producers to our customers with a delivery lead time of one day. Doing so, we will be able to deliver fresh healthy foods at our customer's doorsteps instantly a day after their order, accomplishing instant demand fulfillment. Our system will take orders on a daily basis and will have an automated system having the accurate quantity of each product needed to be delivered each day. Using this data, we can buy our products directly from the farmers/producers with that exact quantity on a daily basis, so we won't have the risk of excess product sourcing and wastage. Because of this and also applying a cross-docking method, we won't need a warehouse and thus will eliminate warehouse cost. Thus, we will be able to establish a cheaper, safe and faster delivery service for our customers. The rest of this paper is sorted out as follows. In Section 2, an efficient audit of operational examination apparatuses and techniques for the plan of practical supply chains is introduced. From an exhibition point of view, we make a differentiation between papers on a solitary rule and papers that emphasis on various standards. Area 3 presents the technique of the manageable agro-food flexibly chain. A multi-measures dynamic technique is introduced in this stage. Area 4 and 5 presents an investigation of an agro-food supply chain to represent the proposed technique. Administrative ramifications are likewise examined in this part and also utilizing the proposed model with machine learning structure as well as bring the entire system into robotized. At long last,

the paper concludes with a limitation and future research in Section 5.

## II. LITERTURE REVIEW

Nowadays, SCM has a fundamental impact of an association's prosperity. Productively running gracefully fastens permit firms to rapidly convey items to the end-client for a minimal effort. The move towards online shopping in shopper conduct affects individual travel just as cargo transport. Ying Yu et al. concluded that is a synchronization estimation model for the dissemination place activity synchronization (DCOS) issue, which expects to guarantee the E-trade request's promptness and synchronization simultaneously [8]. They embrace information from a genuine practice case and apply CPLEX to get the ideal arrangement. Their outcomes exhibit that considering the nonconcurrent cost in the all-out cost target capacity will incredibly improve the activity synchronization in the dispersion community, by sparing the extra room, the hardware, and the work assets. What's more, if the capacity cost is in a sensible range, the synchronized activity can be acknowledged while the dependability is additionally advanced. It is seen from their case that the most productive approach to improve conveyance focus activity is growing inbound activity limit. As indicated by the affectability examination results, growing an appropriation place's inbound activity limit is the most productive approach to acknowledge better activity synchronization and control the complete expense. Stanley Frederick W.T. Lim et al. revealed the motivation behind this paper is to rethink the surviving exploration on LML models and consider LML's differing establishes in city coordination, home conveyance and business-to-customer dispersion, and later advancements inside the online business computerized gracefully chain setting [9]. The survey offers an organized way to deal with what is as of now a dissimilar and broke field in coordination. The deliberate writing audit analyzes the interface between e-commerce business and LML. Following a convention driven approach, joined with a "snowballing" method, an aggregate of 47 articles structure the premise of the survey. The writing examination conceptualizes the connection between an expansive arrangement of possibility factors and operational qualities of LML setup (push-driven, pull-driven, and crossover framework) by means of a lot of basic factors, which are caught as a plan system. The creators propose four future exploration territories reflecting likely computerized flexibly chain advancements. To go around emotional choice of articles for incorporation, all papers were surveyed autonomously by two analysts and counterchecked with two free coordination specialists. Coming about groupings illuminate the improvement regarding future LML models. The plan system of this investigation gives professionals bits of knowledge on key possibility and auxiliary factors and their interrelationships, just as practical setup choices inside given limit conditions. The reformulated information permits these prescriptive models to illuminate professionals in their plan regarding last-mile conveyance. Vladimir Todorovic et al. evaluated that the biggest piece of food deals is overseen by huge food SC [10]. Notwithstanding, an elective arrangement of food dissemination centers around privately delivered and sold food that has gotten extraordinary consideration over the most recent twenty years. The difficulties of those new frameworks, called SFSC, speak to intense market rivalries, high conveyance and coordination's costs, little shipment estimates, etc. Subsequently, the SFSC requires relating arrangements in food circulation that are lined up with the contemporary coordination's patterns, maintainability and parts of the new computerized time. Utilizing exceptionally created strategy, in light of two diverse applied models, we indicated how the SFSC could be planned from the parts of inventive coordination's modes and contemporary data and correspondence advancements, with the last expect to diagram and assess distinctive food dissemination situations towards more noteworthy maintainability. The principal theoretical model was focused on the production of imaginative types of SFSC, in which business measure displaying was utilized so as to plan and investigate the given circumstance all the more altogether. For the reasons for leading a relative appraisal of the dissemination models created in the past part, the second calculated model is created. By utilizing a subjective methodology, this is the means by which the significant focal points and difficulties of functional executions in making reasonable dispersion arrangements are expressed for every situation. Katrien Ramaekers et al. said about their paper that it reveals insight into the cost increment e-commerce business organizations cause when offering clients adaptability in choosing conveyance time windows [11]. An incorporated order collecting – vehicle directing issue is utilized to determine this cost increment while in past exploration just the vehicle steering issue is utilized. This incorporated methodology prompts productivity gains and a higher help can be offered to clients without an expansion in costs. In light of the aftereffects of the ANOVA it tends to be reasoned that the researched factors impact the extra expense of permitting clients to choose a conveyance time window. This examination reveals insight into the cost increment online business organizations cause when offering clients adaptability in choosing conveyance time windows. An incorporated request collecting vehicle directing issue is utilized to determine this cost increment while in past examination just the vehicle steering issue is utilized. This incorporated methodology prompts proficiency gains and a higher help can be offered to clients without an expansion in costs. In view of the aftereffects of the ANOVA it tends to be presumed that the researched factors affect the extra expense of permitting clients to choose a conveyance time window. Jochem Jonkman et al. proposed a methodology that utilizes Multi-Objective Optimization techniques, to give choice help to PS to leaders in the agro-food production [12]. This prompts new bits of knowledge in ideal pathways for preparing agro-materials for the agro-food production. To arrive at a feasible, asset effective food framework, the ideal cycle pathways changing over the agro-material into these items must be recognized. To distinguish these pathways, a methodical Process Synthesis (PS) strategy is required for the agro-food production. This maintainability driven PS strategy should empower the amalgamation of the ideal cycle pathways, changing over an agromaterial into a scope of significant items, delivering insignificant waste or low-esteem results. In this paper, the components called for such a technique are suggested. Lokesh Vijayvargy et al. proposed the green supply chain management (GSCM) rehearses for the Indian business [13]. It likewise assesses the effect of GSCM rehearses on authoritative execution. This examination

expects to experimentally test the GSCM model to research the current direction of the Indian business toward GSCM works on utilizing a pre-tried organized survey. The measurable surmising was drawn utilizing the information gave by 161 Indian firms. This has thought about the GSCM practice executions among little estimated, medium-sized and huge measured associations. The investigation uncovers that Indian associations have indicated an acceptable execution of dominant part of the natural practices, aside from provider ISO:14001 confirmation and Tier-II provider assessment. Out of 21 practices, medium-sized associations have received GSCM rehearses at a comparative level contrasted and enormous associations, with three exemptions: existing natural administration frameworks, uphold from mid-level and top administration and provider assessment for ecological practice. It was discovered that GSCM appropriation can prompt equivalent upgrades in operational execution for both huge size and medium-size associations. This paper makes two significant commitments in the space of green gracefully chain rehearses in India. To begin with, it explores the reception of GSCM rehearses in associations of various sizes (little, medium and enormous) and the effect of GSCM rehearses on the exhibition of associations of various sizes. Second, it recognizes the key territories for development and suggests a lot of measures for improving the usage of GSCM rehearses in Indian associations.

## III. THEORETICAL FRAMEWORK

Notwithstanding the agro-food area's significance for the improvement of any economy, the investigation of agro-food SC has gotten little consideration in the writing. One of the primary purposes behind this disregard might be qualities of agro-food items and cycles. Agro-food SC are mind boggling frameworks including various firms generally cooperating inside explicit industry segments to fulfill an undeniably globalized market interest for food items. As of late, customers have gotten more curious and there is developing worry over food ascribes, for example, quality, honesty, wellbeing, variety and supportability. This section delineates the general strategy of our model. The exploration depends on system whose schematization structure is depicted in figure 1, With the point of seeing how conveyance cycles could be set up and composed and of evaluating their supportability includes, the accompanying methodology is utilized.

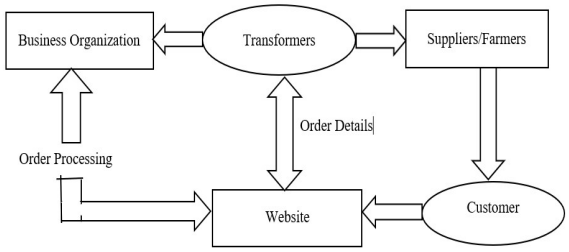


Figure 1: Structure of Proposed B2C Model

Here we spoke to as a business association and we have a few transformers who can convey our agro-food items from ranchers to purchasers. Consumers can order by means of site or application or through calls. By gathering orders, we can examine their time slot and attempt to convey their agro-food items timely at their doorstep. This is the essential structure we followed in this paper.

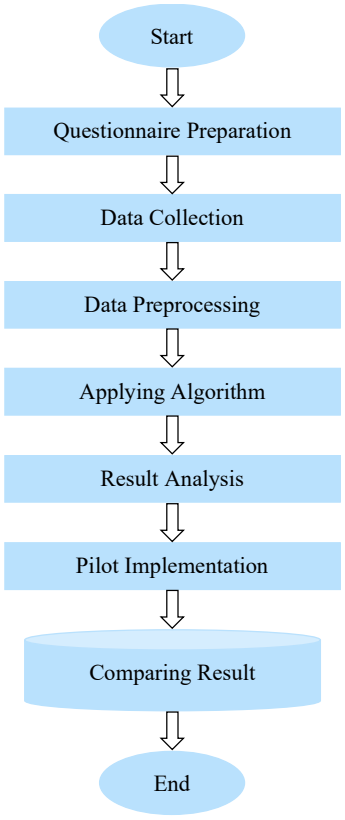


Figure 2: System Architecture

*Questioner preparation:* 11 unique questions are utilized to make our questioner. We have taken 1 integer and 10 categorical attributes for setting up our survey. All the inquiries were close ended. Close-ended questions are principally valuable in studies since they are the well on the way to guarantee that information gathered is handily looked at between respondents, factually huge, and delegate of the bigger populace that a scientist is attempting to quantify.

*Data Collection:* We made a survey form to initialize our client's demand as well as our potential clients. For this reason, we collected data from online survey. Online dataset which is consisted of 350 instances with 11 different questions. Two questions were personal and the rest questions are regarding to our research purpose. Information pre-processing incorporates the change of crude information to machine-intelligible structure, stream of information through the CPU and memory to yield gadgets, and organizing or change of yield. Any utilization of PCs to perform characterized procedure on information can be incorporated under information preparing. Information preprocessing implies changing over crude information into clear configuration. More often than not certifiable information isn't finished. Before going out in an excursion it is truly critical to be readied. By handling the information issue can be fathomed and better outcome can be found. The term business-to-consumer (B2C) alludes to the way toward selling items and administrations straightforwardly between a business and shoppers who are the end-clients of its items or

administrations. B2B online business is an online plan of action that encourages online deals exchanges between two organizations, while B2C eCommerce alludes to the way toward offering to singular clients legitimately. A case of a B2C exchange would be somebody purchasing a couple of shoes on the web or booking a pet lodging for a canine. In this post, we will discuss some significant advantages of having a bound together B2C and B2B e-commerce business website.

A custom e-commerce website/app can make the things simpler for consumers. It will kill the confusions that come about because of dealing with a few indexes at a time. Having a solitary site will bring about lessening the operational expenses to a critical level as one will require less physical foundation and staffing [14]. Besides, it will give most extreme quantifiable profit by offering items to the two customers. There is a great deal of specialized aptitude expected to construct a site that can control both B2B and B2C tasks. An organization building up a profoundly gifted custom online based business site can accomplish this work without any problem. When that finished, the things become simpler as you need to incorporate frameworks like CRM, ERP, and related frameworks in a solitary spot. We needn't bother with discrete mix for different locales for this situation. These days, the organizations want to purchase an item rapidly at a moderate cost. Time has gotten one of the vital things for them and that is the reason they would prefer not to squander their valuable energy on purchasing things. In this way, giving them an encounter of custom online business site by using B2C model will get enormous appreciation. As indicated by the current circumstance, the low effectiveness, low advancement and low productivity are that enormous information of B2C online business and coordination's are autonomous and isolated in the current modern improvement measure [15]. In this manner, so as to quicken the division of work, coordination, mix, correspondence and the interrelationship between the two ventures and create agreeable impact, there is important to execute the advancement of huge information innovation. At present, the business chain all in all has fast reaction to changes in market requests and operational productivity.

The statistical charts were given below according to our pre-survey report:

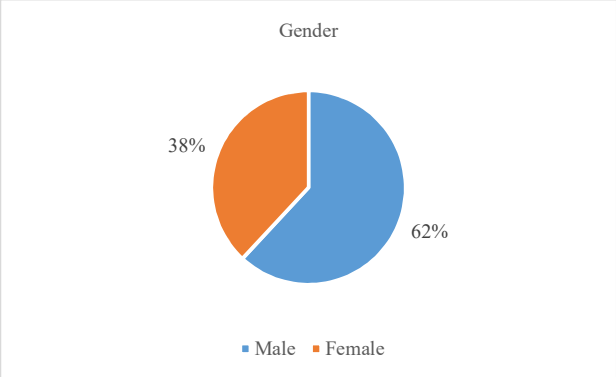


Figure 3: Pre-Survey Evaluation – Gender Ratio

From our pre-survey report, we found that 62% Male are supported our B2C model and rest 38% were women.

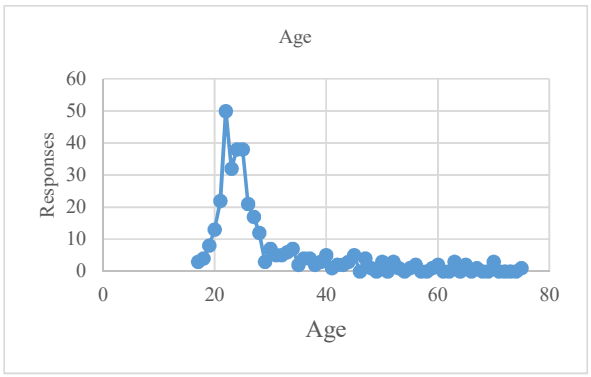


Figure 4: Pre-Survey Evaluation - Age

Most of the 350 responses to our survey (approximately 71%) came from people having their age ranging from 19-28 years, who are the young generation. This indicates the future demand of our service and also ensures that our research has great future sustainability.

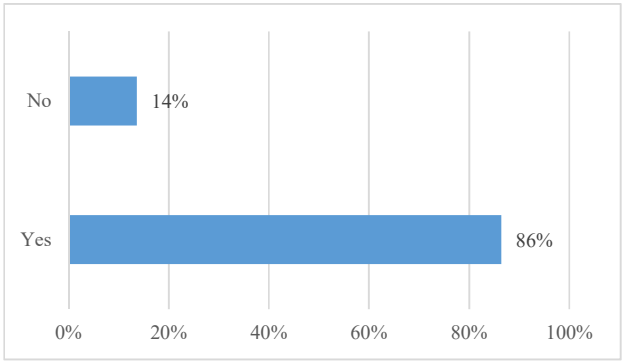


Figure 5: Pre-Survey Evaluation

Here we asked 350 people if they felt the need of an e-commerce system to deliver them daily necessary agro-foods at their doorsteps and 86% of them told us they did.

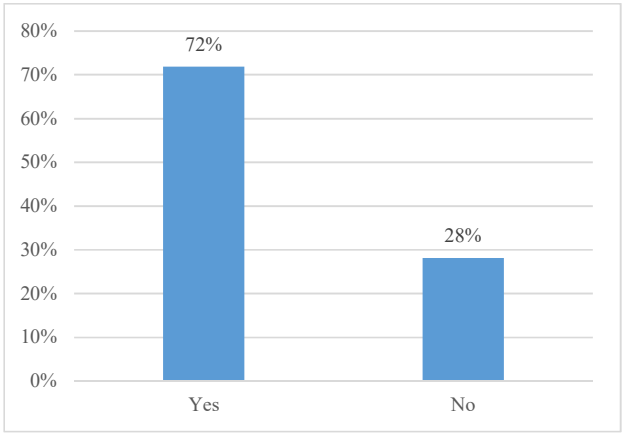


Figure 6: Pre-Survey Evaluation

Out of the 350 responses we got from our survey, 72% of them told us that the faced late delivery of their products ordered through e-commerce due to COVID-19 pandemic.

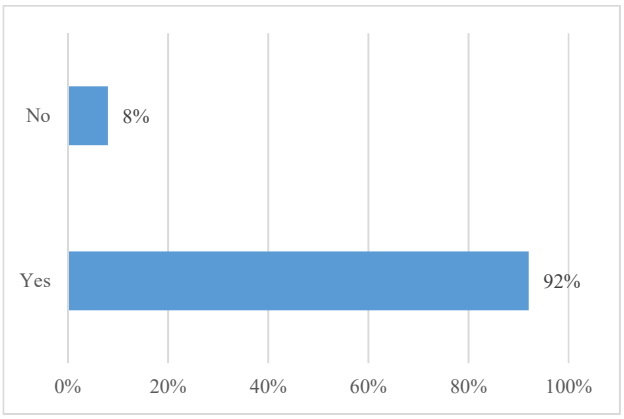


Figure 7: Pre-Survey Evaluation

Surprisingly, 92% of the 350 people we talked to told us that they would definitely love having their daily necessary agro-food products delivered at their doorsteps just 1 day after ordering.

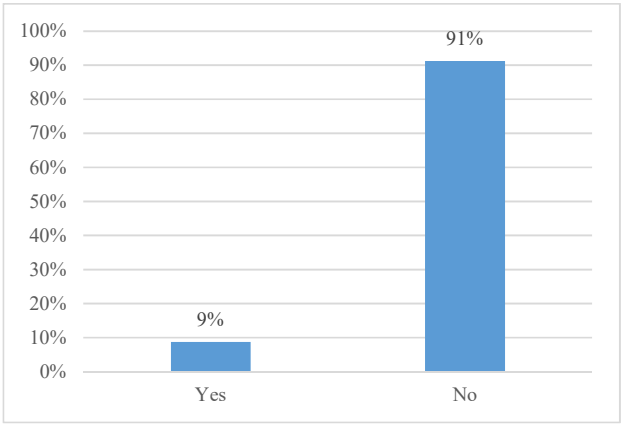


Figure 8: Pre-Survey Evaluation

Among the 350 people we talked to, an alarming 91% of them are afraid to go out by themselves and buy agro-food products as they don't feel safe at public places in this COVID-19 pandemic.

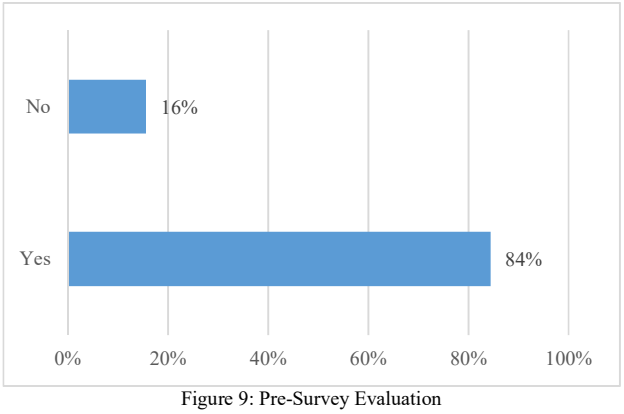


Figure 9: Pre-Survey Evaluation

84% of the 350 people told us that they are really worried if the agro-food products they buy from the markets in this Covid-19 pandemic are hygienic, fresh and healthy as there is always a risk of carrying the corona virus.

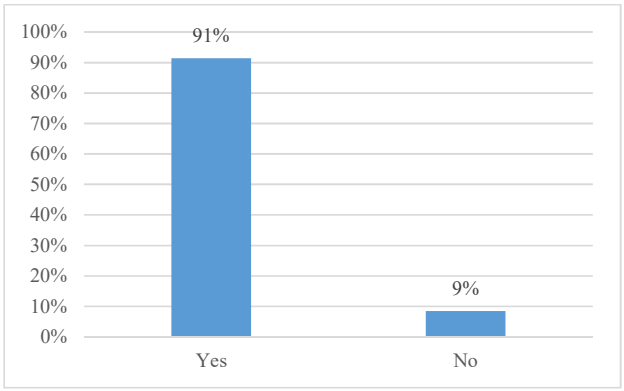


Figure 10: Pre-Survey Evaluation

We asked 350 people if they would like to have their ordered agro-food products delivered to them straight from the farmers/producers and 91% of them told us they would love that as they believe doing so, they will be getting fresher and healthier agro-food products.

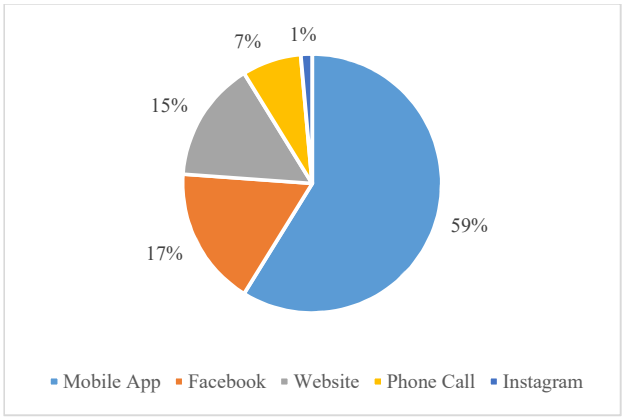


Figure 11: Pre-Survey Evaluation

When asking 350 people through which online platform they feel comfortable to place their orders, a surprising 59% opted for using a mobile app to do the work. Not only that, 17% of them preferred the social media site 'Facebook' which is mostly used by the young generation, and 15% of them thinks ordering products through an official website is better. But there are a little 7% group of people who finds their comfort in ordering straight through a phone call.

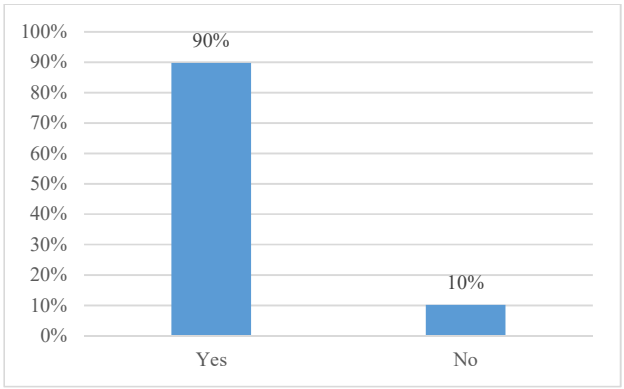


Figure 12: Pre-Survey Evaluation

90% of the 350 responders told us that they would love to have their ordered agro-food products delivered on a specific suitable time of a specific day chosen by themselves so that they can always be prepared at home to receive their products regardless of the tension due to the uncertainty of the arrival time of the product.

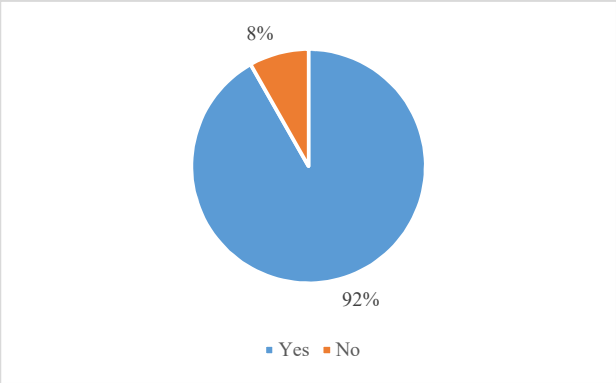


Figure 13: Pre-Survey Evaluation

We proposed 350 people an e-commerce service which will collect the daily necessary agro-food products straight from the farmers/producers and deliver those products at their doorsteps just after 1 day of ordering in this COVID-19 pandemic situation and asked if they would take this service. 92% of them responded that they would definitely take such service from us and after taking the post-service survey, we found all of them are satisfied.

*Pilot Implementation:* Usage includes executing the cycle enhancements that have been created for the duration of the life of the task. An intensive execution plan generally covers in any event five components: The task plan, assets and spending plan, partners, hazard appraisal, and control of product quality. The execution stage follows a few stages. Right off the bat, we needed to characterize pilot tactics. Furthermore, we chose our partners. Thirdly, we created a plan of our pilot usage. After that making correspondence is obligatory. At that point we needed to direct our arrangement and lastly evaluate our go-ahead arrangement [16]. These are cyclic. The stated figure indicates our means unmistakably:

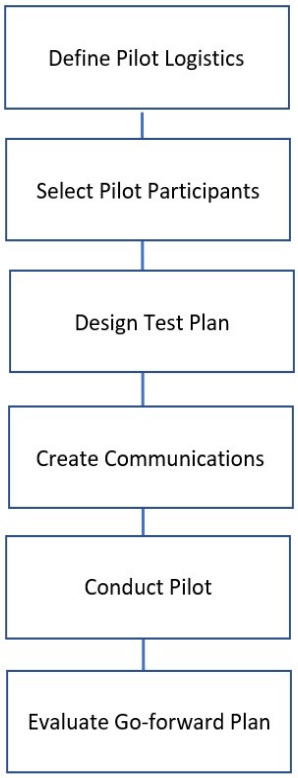


Figure 14: Steps of Pilot Implementation

The reason for the undertaking usage plan is to give partners the certainty that achievement of the present venture has been all around reviewed, and to list the assignments, exercises and cycles associated with creating expectations. Successful execution is tied in with guaranteeing network Triple P professionals, associations, and accomplices are locked in and all around upheld to make worthwhile nurturing occur with each other. Triple P is an effective program having familiar advantages for families and networks. What's more, we can say that our experimental execution was fruitful. We served roughly 45 families as our experimental execution. Subsequent to giving them administration we carried out our post-overview structure and dissected it appropriately. It shows plainly that they are practically glad and prepared to accept our administration as our perpetual clients. Furthermore, we have a concern about warehouse. Basically, we wanted to create a cost-effective business model without warehouse any kind of extra cost. So, that is why our model is the most cost-effective successful model.

## IV. METHODOLOGY

*Cross Validation:* We utilized k-overlay cross validation to prepare and test our model. 10-fold was utilized. In table shows the exactness and approval precision result while preparing the model [17].

Fold 01: In fold one the preparation precision began from 55% and finished at 84% while approval exactness began from 64% finished at 82%.

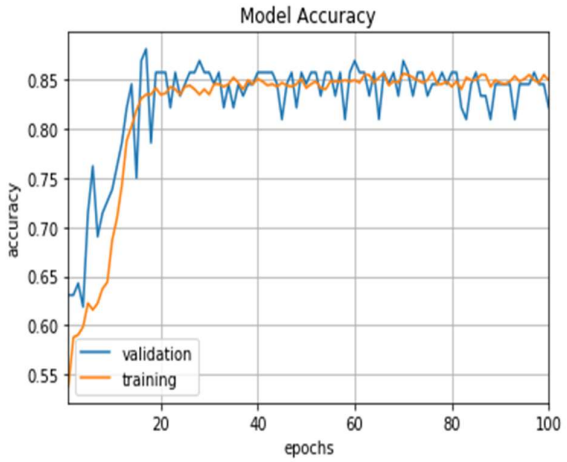

Figure 15: Fold-1 validation Graph

Fold 05: In fold five the preparation exactness began from 59% and finished at 85% while approval precision began from 54% finished at 87%.

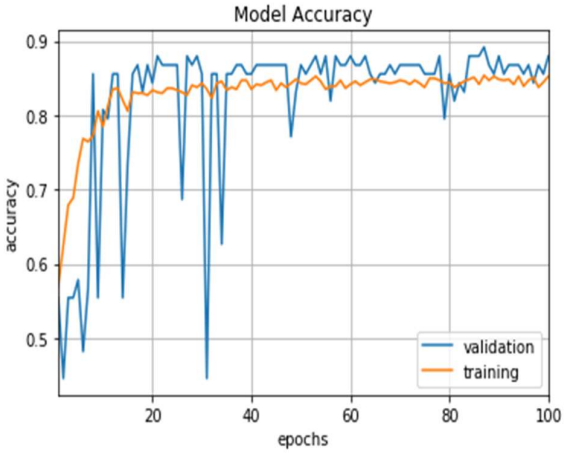

Figure 16: Fold-5 validation Graph

Fold 10: In fold 10 the training accuracy started from 60% and ended at 85% while validation accuracy started from 50% ended at 75%.

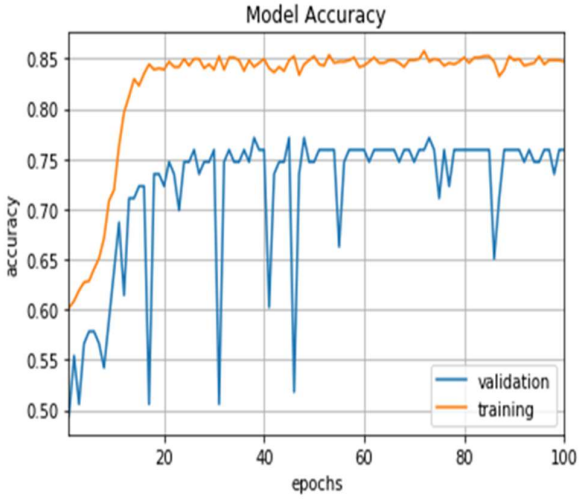

Figure 17: Fold-10 validation Graph

Here is the Table 1 that shows all the 1-fold cross validation.

| Fold no | Accuracy | Validation Accuracy |
|---|---|---|
| 01 | 0.84933392007447 | 0.82142857426688 |
| 02 | 0.85066620572408 | 0.80952381236212 |
| 03 | 0.85333377702332 | 0.84523808956146 |
| 04 | 0.86266661498921 | 0.76190476474307 |
| 05 | 0.85219670804203 | 0.87951807372541 |
| 06 | 0.84553790539128 | 0.86746988095432 |
| 07 | 0.85386213523062 | 0.81927710986999 |
| 08 | 0.84020445056212 | 0.91566265706556 |
| 09 | 0.83754280251454 | 0.87951807731605 |
| 10 | 0.84687083209262 | 0.75903615104146 |

Table 1: 10-fold Cross Validation

Confusion matrix if a fitting device for examining how well a model has been fabricated. In table shows the confusion matrix for our cross validation [18].

| **Statistical Matrix** | **Result** |
|---|---|
| Accuracy | 0.91566265060240 |
| Misclassification rate | 0.084337349397590 |
| Sensitivity/Recall | 0.8125 |
| Specificity | 0.98039215686274 |
| Precision | 0.96296296296296 |
| prevalence | 0.38554216867468 |
| Positive Predicted Value | 0.96296296296229 |
| Negative Predicted Value | 0.89285714285719 |
| F Score | 0.88135593220898 |

Table 2: Model Performance

In this paper, regarding the public safety in this COVID-19 pandemic, we created a B2C agro-food delivery system using e-commerce so that people don't have to get out of their home for their daily necessities. Initially after creating the agro-food delivery model, we applied it through both the B2B and B2C system and took pre and post survey from our consumers. Upon analyzing those data, we discovered that the B2C system suits better for our model as it was both efficient and responsive than the B2B system at the same time as we could eliminate the middle man, deliver fresh products straight from the producers and minimize our total cost, resulting in delivering at a cheaper price. In our food delivery system, we will deliver fresh agro-food products directly from the farmers/producers to our customers with a delivery lead time of one day. Doing so, we will be able to deliver fresh healthy foods at our customer's doorsteps instantly a day after their order, accomplishing instant demand fulfillment. Our system will take orders on a daily basis and will have an automated system having the accurate quantity of each products needed to be delivered each day. Using this data we can buy our products directly from the farmers/producers with that exact quantity on a daily basis, so we won't have the risk of excess product sourcing and wastage. Because of this and also applying cross-docking method, we won't need a warehouse and thus will eliminate warehouse cost. Thus, we will be able to establish a cheaper, safe and faster delivery service for our

customers. We would like to make a system for our model and this is the basic Server Architecture.

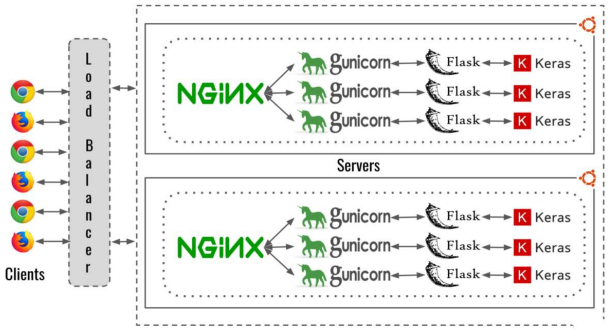


Figure 18: Server Architecture

Python: We used Python as our programming language and the version was 3.6 [19].
Keras: Keras is an open-source neural-network API written in Python. Keras was made to be easy to use, measured, simple to broaden, and to work with Python. Keras is capable of running on head of Tensorflow, CNTK or Theano backend [20].
Flask: Flask is a micro frame work. We used it as our web application backend development and the version is 1.0.2 [21].
MySQL: MySQL is world's most popular open-source relational database management system. We used it to store data to our server. Our server version is 5.7 [22].
NGINX: NGINX open source programming for web serving, turn around proxying, reserving, load adjusting, media streaming, and that's only the tip of the iceberg [23].

## V. RESULTS

B2B organizations sell items and administrations straightforwardly to different organizations. Or on the other hand, more explicitly, they offer to the chiefs in a specific business. This can incorporate everything from table administration programming for eateries to promoting administrations to office seats. B2C organizations offer items and administrations to clients for individual use. This can incorporate travels, dress, vehicles, finishing administrations and a lot more. B2B and B2C advertising efforts will have similar specialized accepted procedures, such as utilizing retargeting to diminish surrendered trucks or negative watchwords to improve promotion situations. While these practices remain the equivalent, notwithstanding, there are a few essential contrasts that different the two [24]. Understanding these distinctions will improve missions essentially, so we should investigate them. B2B and B2C promoting both needs to by hyper-focused to get results, however this can be a major test specifically for B2B brands. B2C missions can arrive at any potential client who might be keen on their item, regardless of whether that individual hypothetically wouldn't be the purchaser. A lady who sees adornments that she prefers may send the connection to her life partner, which could bring about deals despite the fact that the advertisement engaged somebody other than the essential purchasers. B2C organizations can profit by arriving at the leader in the family, especially for first-class things like new vehicles, yet they don't need to only speak to a solitary part in the unit so as to get results. They can show advertisements to any individual who may buy and have a reasonable possibility of a transformation. In B2B promoting, notwithstanding, we have to interest a particular individual or little gathering of people inside the business. These are the leaders. It doesn't make a difference, for instance, if a business' twenty representatives need new seats just the workplace supervisor or other upper level worker would be able to settle on that choice and they should be the ones to see the promotion straightforwardly [25]. We have to get our advertisement before these discourses is a basic contrast yet it's a major one. B2C clients are considerably more liable to buy rapidly subsequent to seeing a promotion, while B2B clients are slanted to take any longer. This is straightforwardly attached to the exploration cycle and its carefulness. urban individuals [26]. Focusing by work title in Facebook Ads can help with that. We run our model by using two process which are B2B and B2C to see the success ratio. The given chart can conclude the summary.

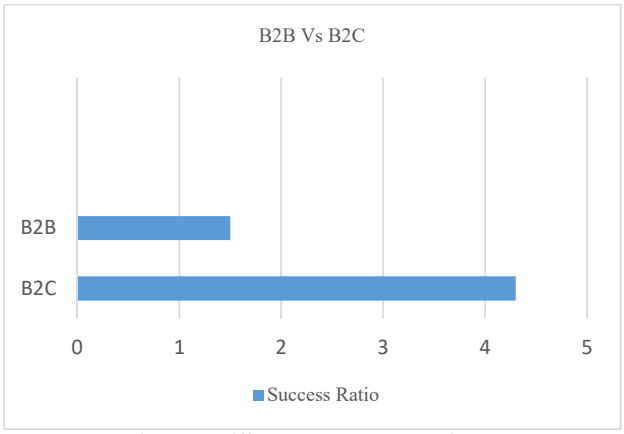


Figure 19: Difference Between B2B and B2C

It is clear for us that B2C is the demand of future generation. B2C can ensure consumers' instant demand as well as the agro-food products were fresh because we don't need to use any chemical for preservation. Agro products were directly shifted from farmers/suppliers to consumers whenever they want it at their door-step. We are also careful about their preferred time. We can divide our time slot and make these available for delivery. Consumer can choose their preferred time by using mobile application, website, Facebook, Instagram and through phone calls. Before our service, consumer worried about their the freshness of their agro-food products. If we use B2B model we need to use various types of preservation process because this model is slower than B2C that is why product will be delivered in delay. But if we use B2C model specially for agro-food products it's quite easier to ensure the products quality and hygiene as well as freshness.

## VI. LIMITATIONS

Truly one of the significant requirements for this is the B2C coordination identified with the plan of action we need. Such organizations can possibly endure on the off chance that they have a decent handle of the desires, needs, and not least, the administration that clients request (regularly identified with coordination) is continually evolving. This is on the grounds

that shoppers have broad scope of data on elective items and stores, just as information on costs, with only one straightforward snap, so the intensity of choice is, progressively, the customer side. In equal, buyers look at the exhibitions of various business frameworks and, while not realizing they relegate names, puts the related coordination frameworks being referred to. The way that the provider doesn't claim stock in one of the arranged items thought about fundamental by the customer, we can likewise raise doubt about the presentation of the provider. In this circumstance the customer may decide to move to a conventional market for the item itself must produce a sentiment of dismissal of this sort of business and placing into question the organization which had mentioned administration.

## VII. Future Research

This exploration reveals insight into the cost increment online business organizations acquire when offering clients adaptability in choosing conveyance time windows. choosing a limited time allotment will be more costly than picking a more extensive schedule opening. Valuing time allotments can be either done statically or progressively. On the off chance that schedule openings are evaluated powerfully, this would imply that for each client, a particular cost would be determined considering the genuine extra expense of adding this client. A different line of future exploration is the fuse of the natural effect of internet business conveyances in the examination of shifting time window strategies. At long last, we will make this general framework dynamic that implies we will make application, site, web-based media and call to make our framework more helpful and error free. At long last, later on a bi-objective displaying approach can expressly join the compromise among expenses and client support

## VIII. Conclusion

It has been presumed from mathematical analysis that separated from key plans, supply chain's strategic plans assume a noteworthy part in utilization design development in the manageability heading. As indicated by the mathematical analysis, utilization and creation designs are corresponded somewhat. At first subsequent to making the agro-product conveyance model, we put it on application along the B2B as well as the B2C framework and took pre and post review from our shoppers. After investigating that information, we discovered that the B2C framework suits better for our model as it was both efficient and responsive than the B2B framework simultaneously as we could take out the center man, convey newly harvested items directly from the makers and limit our absolute expense, bringing about conveying at a less expensive cost. Here we planned a B2C agro based plan of action where we needn't bother with any distribution center and no should be stressed over items misfortune and furthermore purchasers will get the new compound free agro-items from direct providers/ranchers. Clients got their item willingly. We have a choice to pick their favored time allotment just as date when they will be accessible to get their item or at whatever point they need their items. We additionally executed it as a pilot implantation to comprehend individuals' interest just as before gazing we did a study about their need. We attempted a ton to make the framework online based. Consequently, it is chosen to open an online based stage and proceed with our business.

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