TOPCART

A design intervention to improve the shopping experience
at supermarkets.

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Introduction

Our focus for this module's design intervention is the service industry. Being active consumers of the service sectors we felt it would be an adequate topic to explore.
Our aim is to improve the shopping experience from the consumers point of view. After discussing and analysing the main sectors of a shopping store we narrowed our focus to supermarkets. Supermarkets are an essential part of our society. It is a self service industry where supermarkets facilitate middle-men between manufacturers and customers. It is a store where customers can explore and choose products which are then handed to the cashier at a designated point to bill. Although supermarkets may vary from place to place, the process and utility of the former remains the same. It is widely used by nearly all demographic sections and is a part of their weekly/monthly routine.

Some exceptions to traditional supermarkets include online services of the same but have not made the latter obsolete.

As consumers ourselves, we narrowed our focus to Aldi in Castletroy, Limerick. Having visited Aldi over the last few months we were able to break down a few key concerns where the shopping experience could be improved.

Image 1.1 Aldi, Castletroy, Limerick.

This design prototype is a reiteration of an existing product, trolleys and baskets.
Trolleys and baskets are an integral part of supermarkets as they are used by customers to place items they wish to purchase while exploring the store.
Our prototype is an additional fixture to the above.

Image 1.2
Trolleys and baskets traditionally used in supermarkets

Areas of concern

We identified four areas of concern that could be improved:

1. Mapping of items in the store
2. Availability of stock
3. Product description
4. Budget constraints.

Solution

Our solution to the above concerns is a model that can be attached to trolleys and baskets, which have a built-in map of the store, a scanner to provide product description, budget totalling and indication of availability.

Design process

The next section of this report is a chronological breakdown of the creative process. It includes a description of each group meeting, the contents discussed, problems we faced and the respective solutions agreed upon by the group.

Brainstorming and mind mapping

This process took place over two consecutive group meetings.
Our initial aim was to find a topic that all group members could relate to and have active participation in.
As international students living in a new city we discussed areas that involve everyday encounters experienced by all members.

Meeting one

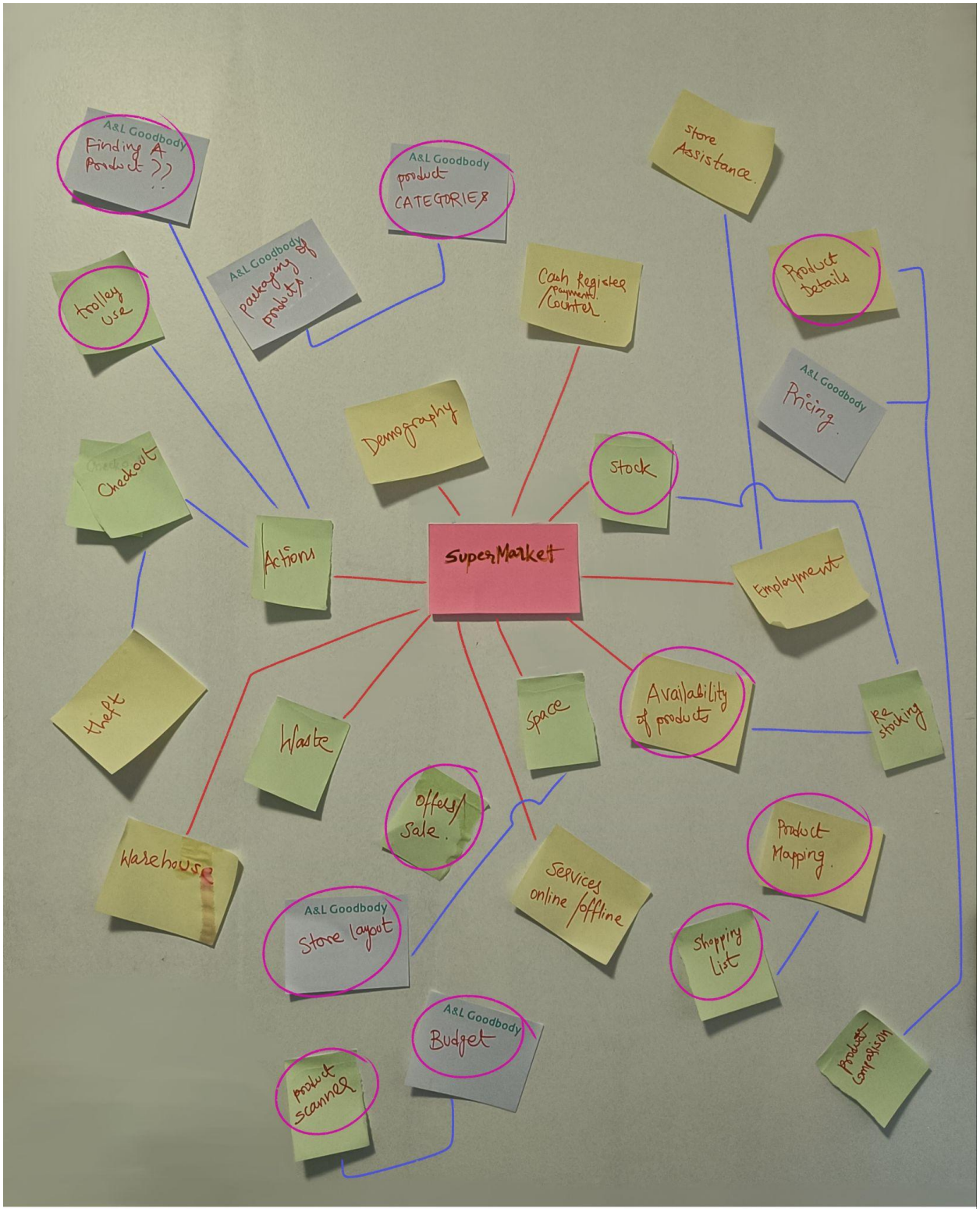
Date: 17th October 2022
Place: Interaction Design Lab
Time: 2 - 4 pm

In the first meeting we explored various sectors that directly influenced our lives as international students. We aimed to look at such topics so we would have a better understanding not only from a designers point of view but also from the user.

Each member came up with one pertinent idea which we wrote on sticky notes. Some topics explored include transportation in limerick, food sectors and convenient mapping of The University of Limerick.
We discussed the various concerns with each respective sector and settled on the service industry, namely supermarkets.
From here we broke down the various aspects of the supermarket in the form of a table and mind map to get a more holistic view of the subject.

We broke it down in the following categories:

Image1.3
Mind mapping



1. Space: Cash register, refrigerator, aisles, Deli, Trolley space, Alcohol section, parking, security monitoring space.

2. Stock: Warehouse, trays, bags, trolleys and baskets

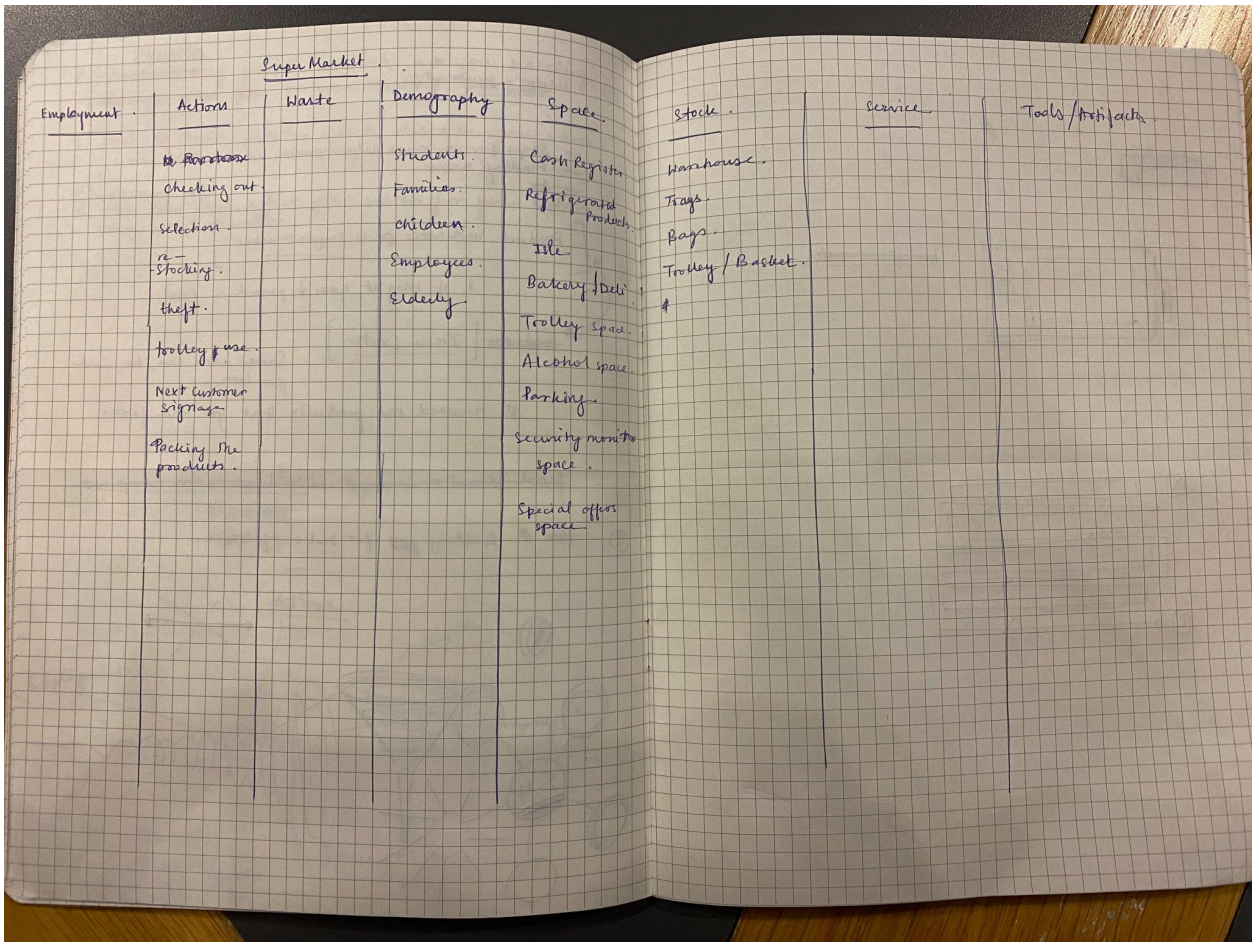
3. Services: Purchase, restock, checkout, parking

4. Demographic: Students, families, children, employees, elderly

5. Actions: Selection, checkout, re stocking, theft, next customer signage, packing products, trolley use

6. Waste: how is produce stored, expiry and disposal of the same

Image 1.4 breakdown of the supermarket



Takeaways from meeting one

An interesting aspect we recognised and moved away from, was focusing on problems and then a respective solution, which in turn limited our view of the subject. We then moved to looking at each sector with a more holistic approach, understanding that a problem isn't necessary for a design intervention.
A map of all the aspects in the sector helped us gain a better understanding of each element involved and its relationship with the customer.

Meeting Two

Date: 22nd October 2022
Place: UL library
Time: 5 - 7 pm

Image 1.5
Group meeting 2

In the second meeting we focused on four main concerns pertaining to the shopping experience.

1. Availability of stock : A way for customers to know if an item is in stock without having to check the aisles or ask an employee.
2. Mapping of the store: We realised a common concern was not knowing where particular items were placed and hence having to circle the supermarket a few times looking for it.
3. Product description: As international students we noticed Irish products vary in name and taste from those of other countries. A way to know the exact product and its similarity to other products around the world.
4. Budget constraints: Many times customers shop with a budget and oftentimes have to remove items during checkout in case it exceeds the same.

Some concerns we faced during this meeting and how we navigated through it.

A primary concern was showcasing mapping of the store. Whether it was too complex to show individual racks and the concern of products not being placed in the same places every time by employees.
We settled on showcasing sections of the supermarket along with approximate placing of each product on their respective racks.

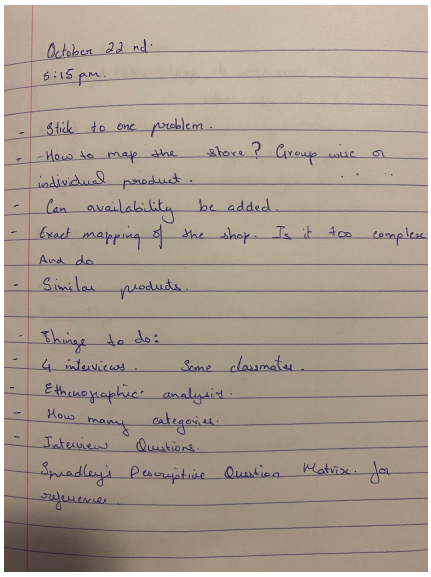
The second concern we faced was whether to solve all of our problem points in one device, and if, so would it make the model itself unnecessarily complicated.

Our third problem area was whether we could implement availability of a product within the design.

We explored similar products that currently exist in the market.
https://www.mappedin.com/industries/grocery/
https://www.pricer.com/products/software-and-cloud/quick-search/

Although these products offer the service of mapping they do not indicate availability, product description or budget constraints. These products use a mobile or kiosk application system to navigate customers through stores.

Image 1.6
Meeting notes



Takeaways from meeting two

We came to the conclusion of conducting ethnographic research and an interview of customers that shop at supermarkets.

Finalised on mapping the store in categories i.e household items, frozen section, fruits and vegetables, etc.

Meeting three
Date: 24th October 2022
Place: Teams meeting
Time: 5 - 7pm

In this meeting we discussed whether mapping in terms of an optimum path was viable. However we concluded that users should have their freedom to explore the store, as they may want items that are not on their initial shopping list and don't feel restricted to following a certain device generated path.

We compiled a list of interview questions inspired by Spradley's Perspective Question Matrix.

List of interview questions:

1. How do you plan your grocery shopping?
2. How much time does it take for you to do grocery shopping
3. What are the steps you take after you enter a supermarket?
4. Do you prefer online or offline shopping?
5. How do you find the products in your supermarket?
6. What do you do if you can't find a product?
7. What all activities are involved in your grocery shopping experience.
8. How well do you remember the map of the supermarket?
9. Do you ask other people for help?
10. What is the checkout process?
11. Are the racks easy to access? Any restrictions?
12. Do you forget items while buying your groceries?
13. Do you improvise on your shopping list while walking through the aisle?
14. Any feedback or thoughts?

Meeting four
Date: 28th October 2022
Place: Thomond Village Hub
Time: 6.30 - 8 pm

In this meeting we focused on sketching the prototypes for the model.

Image 1.7
A design idea we explored but neglected.

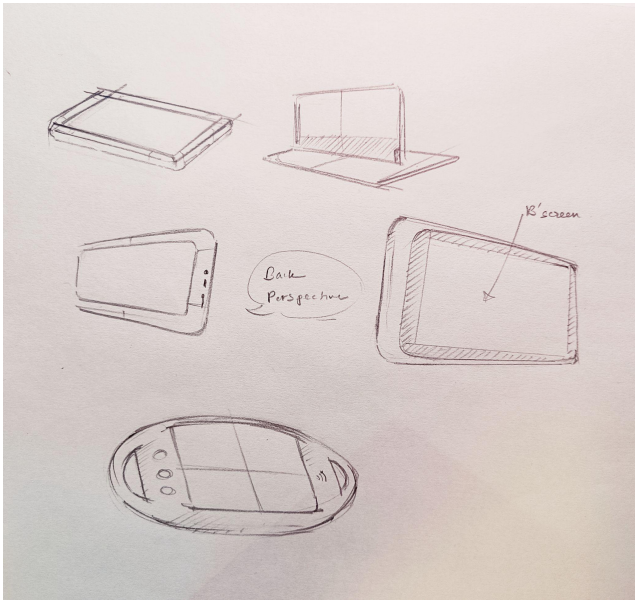
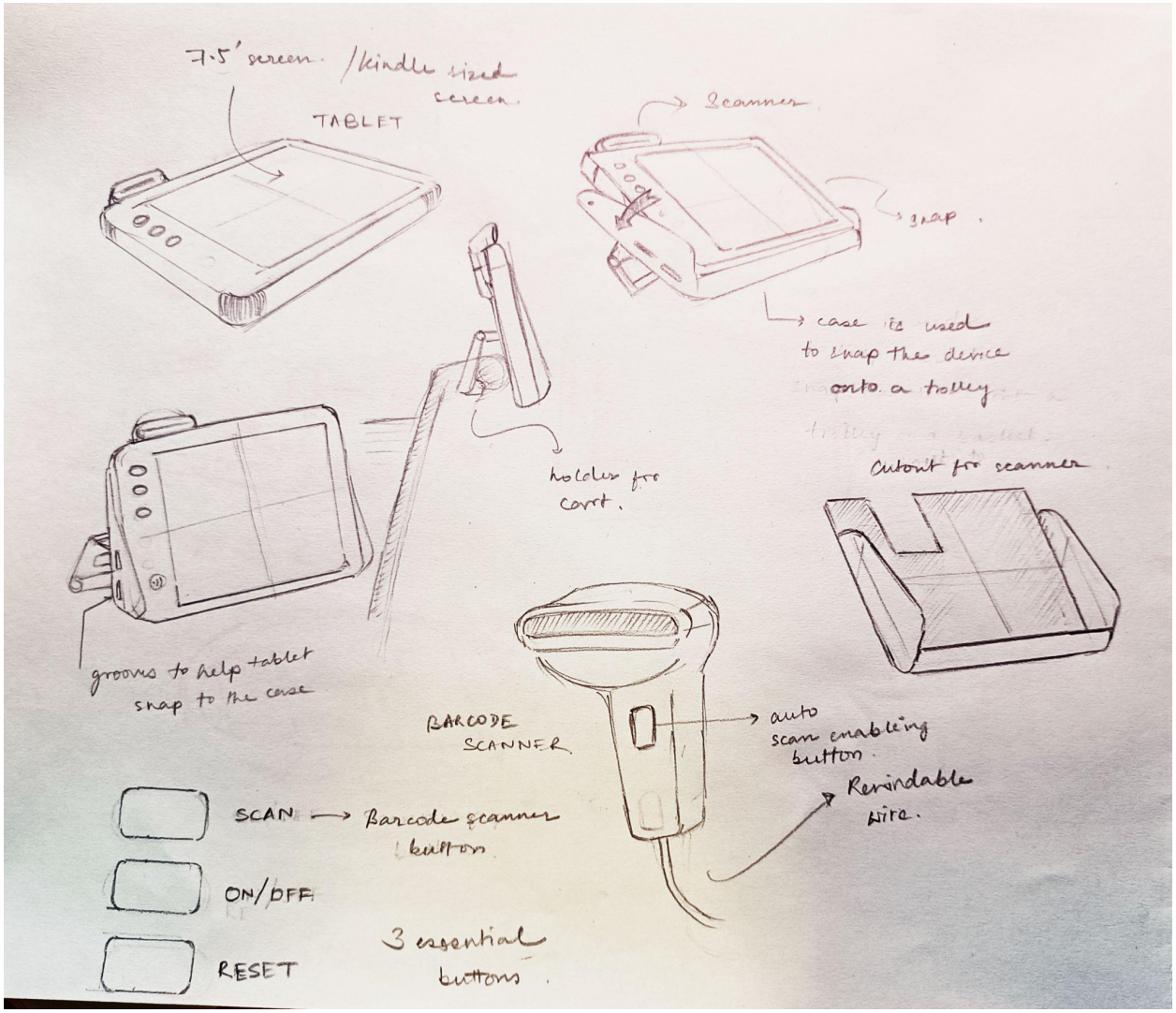


Image 1.8
Final design prototype



Meeting five and six

Date: 31st october - 1st november
Place: Thomond Village
Time: 4 pm - 12 am

The following meetings were utilised to make the physical low fidelity prototype of Topcart.

Interview question Insights:

Exploring and buying the products as a first time user and an experienced user :

“**I usually do not make a list. I go to the store and then start looking at things that I like”**

The user doesn't always make the grocery list , but they have an idea of some essential products they want urgently or on a daily basis.

When the user is aware of the things they need to buy the shopping is done quickly and may take only 10 mins .

“**basic necessity type things** (necessary food items / daily use products) in my life like bread, eggs, milk and yoghourt. **anything else apart from that I I look can I purchase”**

User tries to explore the products when they don’t have the list. This user has a clear idea in mind what they want to buy and the rest of the products they choose to explore during.

“I**n the beginning it was difficult to choose where to purchase the groceries”**

The user mentions that as a first-time user, it's difficult for them to know what to buy and where the products are in the supermarket.

“I didn't know where to carry, you **know where to hold that list on me because I'm already carrying a hand basket in my hand,** not have not taken a trolley.”

Here the user tries to mention that it's difficult to look at the list and shop at the same time.

“**I don't have a list in my mind but I still know the things that I bought last time and a rough idea** I might like. So **sometimes I do miss out on things”**

Once the user is used to going to the same supermarket it's easier for them to know about the product location , but still sometimes they do miss out on stuff.

“If I have time to explore then I you know stop by each each each section”

if I'm in a hurry then I'll just go to those particular spots/aisle, I know you know where the things are and I'll purchase it then I'll go to the billing counter “

When a user becomes accustomed to the supermarket map as a result of many visits, they may contemplate exploring the aisles and different departments, but this is primarily determined by time constraints. If they are pressed for time, they may hurry to the sections and purchase things as soon as possible.

Products on sale information :

“I don't have any ideas too. You know like this is a section where the sale is going on currently or these are the products that have an offer on but when I'm when I'm like roaming around freely and if I come across a section where I obviously stop and look what the product is and everything”

The user has no knowledge about the sale products; he claims that it is only after exploring that he comes across the things on sale; so, they must walk through each section to check the sale for a product.

Products out of stock/ not able to find a product :

“I had **to wait there for some time before I saw some official the user duo tend to take the help from the store assistants if they don’t find a product.”**

“he(store assistant) told me that you know the like **they're out of stock and like they'll be refilled like in a few hours** because that that's the day when they restock”

By talking with store employees, they can learn whether a product is available in the market that day or when it will be restocked.

Pricing and product packaging (details of the Product) :

“**issue in trying to identify the prices** of the item because I am used to looking for the prices on the boxes which is not the case in the supermarket over here. **sometimes I get confused as to is this label for the product on top of the shelf? Or is this label for the product below?”**

“but **I was actually looking at the wrong price tag, the entire thing. you improvised your shopping list while you were walking through**.”

It's more of a cultural constraint, where the user shares their mental model , more of a comparison of the pricing details they had back in their home country . The pricing details are confusing for the user as they are not sure where to look for the product pricing on the rack.

“**I got completely confused from because of the due to the packaging and due to the choice of,**

I'd rather pay attention to the price of the item that I'm purchasing because I'm trying to keep myself under a budget.

The user was asked to select if they would consider the product branding or the pricing of the product , before buying. The user mentions it depends more on the budget and also the quality of the product. Sometimes the Product packaging is misleading and users tend to buy a different brand product.

Ethnographic Research

The first observation was done at the trolley section of the supermarket, where an old couple, approximately 60 years and above, found **the coin system of locking and unlocking the trolley a bit challenging**. Then they asked help from a passer-by who unlocked the trolley for them. A few people came in front of the trolley to check if any of the trolleys were already open to use. There was a person who **found a trolley that was open and used it.** There were others who knew exactly how the trolley system worked and went through the whole process of taking the trolley and entering the supermarket without any hesitation. The **deep trolleys were used when purchasing bulky items.** There was one family who **got their personal shopping trolley** which was smaller in size and **utilized the in-store baskets**. In a study, it was also found that **the trolleys also served as a walking aid,** and this was highlighted by Meneely et al.

(2009) in their article, ‘Age associated changes in older consumers retail behaviour’. On questioning a few people, several respondents also felt that they would **like to have an attachment on the trolleys to secure their shopping list.** While looking into the availability of baskets and trolleys, none was reported during this study but there was way **lesser number of baskets compared to trolleys** available at the supermarket.

Now coming to the layout of the supermarket, I noticed that all the people **followed a certain pattern in the path,** at least in the beginning, to pick up items. Aisle 1 which is in front of the entrance is always the common path most people follow until and unless they are looking for a specific thing and they **head directly towards a different aisle.** On asking around 8 random people, I also found out that **3 customers found the passageways to be narrow.** Quite a few of them also mentioned that **the signage mentioning the different categories of products was also not very clear because they were high up and not at an eye level.** The old couple I mentioned earlier also found it **hard to read the signage as they both had relatively curved backs compared to the young adults,** so reading a sign that is high up was difficult for them.

In terms of shelves at the supermarket, **the topmost shelf was not easily accessible** to quite a few people. Most of the customers **lifted the products on the top shelf to read** what it is even though the product label mentions it. It is possible that the reason for the customers to pick the product is to **check the expiry date and direction of use of the product**. The old couple also mentioned that “If the **shelves are too low, she will have a problem because she has a knee problem when she bends down and when the shelves are higher or deeper in the shelves it gets difficult for us because of kyphosis”.** Another point of focus was the **over-stacking of canned food, which made it difficult to take the cans** from the shelves. Previous study has identified the issue of poor product accessibility as a major obstacle to a positive shopping experience among older shoppers. The **list of ingredients on product labels is relevant to people on a particular diet.** A mother of 2, who had come with her children commented, "I look at the ingredients to see what's within. I have to watch out for wheat because my husband can only consume gluten-free food." She was also having difficulty in picking up a heavy lamp as she was already carrying a heavy backpack with her. She looked around to search for **a store assistant to help her, but she couldn’t find anyone,** which led me to go ask her if she required any assistance.

In terms of customer support, a few people after searching for a product was looking around for store assistants but did not find any so they **ended up asking other customers.** After a while a person from the warehouse came by with a trolley of products for restocking and two people went to him to ask for help. The warehouse personnel **knew one of the products but couldn’t help the second person. However, he suggested him to look for the product in Aisle 3**. Upon asking a

customer, he felt that the information counter could not be easily seen and there was a need to have more staff available for help. He also believed that **customers would like the customer care representatives to direct them to the goods**. I also noticed a student **coming back to aisle 1 to pick up coleslaw while standing in line for checkout**.

At the checkouts, there were long queues, which was a problem. Most people patiently waited for their turn patiently except for a man wearing gloves. He asked the person in front of him if he could go first as he was in a rush. The customer walks up to the checkout counter after placing the items on a rubber belt. Usually, the **customer places a divider which has the text 'Next Customer' to separate his products from the next person. A few people forget to do that, so the following customer does it instead.** The employee greets the customer saying, 'How are you' and scans the items. He/she tells the customer the amount and then asks whether the payment is going to be in cash or card. A few people would start filling their bags with the items before payment to save time whereas a few other people would wait till the payment was done and then start filling their bags with the items. The **old couple I had spoken to earlier told me that they would not prefer the deep trolleys they see in other stores as it gets difficult to unload the items during checkout.** Upon asking the student regarding his thoughts on the checkout process, he told me that maybe they could **add a self-checkout booth like the one at Dunnes Stores, which would save time for people who are just buying a few products.** This is consistent with the findings of Goodwin and McElwee (1999), who discovered that waiting time at checkouts was related to consumer satisfaction, and that long lines contributed to customer dissatisfaction.

Customers who would come in their **own personal vehicles would prefer loading the items back in the trolley at checkout and then take the trolley till the car to unload it at the parking.** The parking lot has two sections, one is for in-store customers and the other is for click and collect customers. The click and collect option allow you to select the products from their app and **having someone sort them out for the customer by the time he/she arrives at the store with a vehicle.** The prices of click and collect are same as in-store prices. However, it **does not include a few in-store discounts and offers.** There are **additional charges for the use of large compostable tray liners,** which are used to deliver groceries directly to the vehicle.

Ethnographic Research Insights:

- Preference of a free trolley instead of the coin system
- Trolleys are preferred for purchasing several items.
- Use of baskets for fewer items.
- Shopping List attachment.
- Lesser number of baskets compared to trolleys.
- Most people followed a certain route.
- Passageways were narrow.
- The category's signage is too high and hard to read.
- All products aren’t easily accessible.
- List of ingredients are important for customers.
- Store Assistance is not available.
- The Store Assistant does not have knowledge about all the products.
- People forget to pick up items, so they go back to collect things.
- Long queues at checkout.
- People forget to put ‘Next Customer’ divider at checkout
- Deep trolleys are not preferred for old people.
- Self-Checkout booths preferred for people with less items.
- No additional charge.
- Auto-sorting.

Insights we are acknowledging through our prototype:

- Trolleys are preferred for purchasing several items.
- Use of baskets for a few items.
- Shopping List attachment.

- The category's signage is too high and hard to read.
- All products aren’t easily accessible.
- List of ingredients are important for customers.
- Store Assistance is not available.
- The Store Assistant does not have knowledge about all the products.
- People forget to pick up items, so they go back to collect things.
- No additional charge.
- Auto-sorting.

About Topcart

Topcart is a device that ensures a more convenient experience for customers at the supermarket. This product will help customers find the products in the supermarket easily, explore products, manage their budget, if any, etc.

The device can be easily mounted on a trolley or a basket at the supermarket. Then the customer can start the device, which shows the main screen, where a split screen comes into the picture. The left one is smaller and shows a search bar and basic categories of products, and the right one shows the layout of the supermarket. Customers can directly search for a product at the search bar or scan it using the scanner to explore product details. There will then be an option to find that product in the supermarket. The other option for the customer is to load the list from their phone by NFC or type directly into the system and add it to the list. Then, on the right side of the screen, you can see the supermarket layout showing a categorised view of all the products. For example, categories like Frozen food, vegetables, stationary, etc., will light up if the products are in those categories and the customer can choose any of them. Once a user selects the category from the list a dropdown appears where the user can see the products from the list under that category. The list includes a + symbol to add a product that the consumer requests and displays products that are out of stock in a greyed-out style (disabled). An assistance button is also on the product which when pressed, alerts store personnel that a customer needs assistance in that category. The linked scanner can read barcodes on products and retrieve information about them, including pricing data. A real-time virtual cart that is updated with the current price can be updated by the customer when they add new products to the list. A future

prospective can be a self checkout system, which can be helpful for the user to have a quick and hassle free checkout using the virtual cart.

Supermarkets generally have a variety of products that are sorted by categories and sections. There is a limitation to the supermarket giving directions to the customer for a particular product. While we were figuring and filtering out the problems we faced at the supermarket; we narrowed it down to a few that would enhance the experience at the supermarket. From our ethnographic research, user interviews, observations, and experiences, mind mapping we gathered a lot of information that solidifies the assumptions and information. Many customers have difficulty finding a specific product in the supermarket and may end up circling the store.Then others had a long list of items to buy and had to walk around the store multiple times to get all the things. Some couldn’t find the product details, and others had a budget constraint. We also found some customers who can identify where the products are clearly and some others who like to explore the products in the supermarket. So, the product now has a clear pool of customers with specific concerns. We researched products like these and others that tried to give customers a smoother experience and found products like self-checking out carts, apps to simplify shopping lists, etc. a few useful apps for convenience. Some users think the existing supermarket apps are difficult to use. We now have an assumption that we will not go for mobile applications. This is for a particular set of customers, so it must be a supermarket device. We thought of a kiosk, but that’s not at all a suitable solution because it won't be that dynamic to help the user at a particular section of the supermarket and a kiosk might lead to long queues which would add-up to dissatisfaction for the customer. A device that should work like an app but shouldn’t be another load for the customer to carry around at the supermarket. It should be easy to handle, easily understandable, include most of the features addressing the user issues, we found in the research, and be convenient for the supermarket.

Topcart is simply installed on the trolley or basket for a customer to use. It's so light and convenient that most people can handle it. It can be put on the trolley bar or basket side, depending on the unused space. The trolley bar's central section or the basket's front. The screen size is adequate for viewing the map, searching in the search box, and listing the products. Once the list has been loaded, anyone can view the map and walk around; modifications can also be made to make it more user-friendly.

Conclusion

Over the last two weeks, we learned the importance of trusting the process and working as a team, navigating through group dynamics and the value of acknowledging all ideas without personal biases.

Our aim for this design intervention was to improve the shopping experience at supermarkets. Based on our insights from the ethnographic research and interview analysis we were able to successfully identify key problem areas and possible solutions for the same.

Our goal was to integrate all of the above features within one portable prototype. Through trial and error we were able to narrow down the design prototype, to one wherein all design choices were conscious, justified and unanimously agreed upon by the group.