GE 401

PRODUCT REQUIREMENTS DOCUMENT

GROUP 7

November 23, 2011

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1   Introduction

1.1   Purpose

As the need for markets increased, the chain of supermarkets has been opened in the cities. The increasing number of markets caused increasing number of customers. As this system proceed, the problem about excessive use of nylon bags has occurred. The estimated loss caused by this problem is almost 150 thousand TL for a chain of supermarkets that have 60 markets, by the assumption of ten percent of the customers use one extra bag than they need. In addition to this money loss, the damage has been done to the nature by these bags became crucial. InnoBag's purpose is decreasing not only the money loss, but also the damage has been done to nature by decreasing the number of nylon bags used in supermarkets.

1.2   About this Document and its Readers

The Product Requirement Document describes what the project is to do and what constrains are. It has two basic roles:
1) Let the customer to be sure that the developer company truly understood the problem.
2) It is an input for the developer company since it contains the project requirements.

1.3   Project Scope

The scope of InnoBag project involves building a bag dispenser which determines the required number of bags for each shopping. This document is prepared to help the people interested in the project to establish realistic expectations about design and implementation of the product.

2 General System Description

2.1 Product Features

The system consists of two parts. The first part is calculating the required number of bags according to products that the customer buys. Since all the cash registers are connected to the main computer in the supermarkets, calculation part will be done on the main computer.

The second part is rolling down the bag from a dispenser. The bags should be rolled down one by one. After the bags are rolled down, the customer would rip the bag off from the dispenser. The cashier can give extra bags to the customer if needed. The dispenser would be compatible with different size of bags.

2.2 Functional Requirements

There will be 5 different types which products belong to: Hygiene, crushable, breakable, 1-bag-required and others. Those different categories imply that the products which are from different categories needed to packed into different bags with the other products in their own categories.

> Hygiene: Shampoo, Detergent, soap etc.

> Crushable: Tomato, strawberry, grape etc.

> Breakable: Materials made of glass, lamb, some electronic devices etc.

> 1 bag required: Patisserie products

> Others: The products that can be packed together

Each bag has a maximum volume and mass capacity and those maximums should not be exceeded. The supermarkets can change those capacities according to the bags that

they use. Since the main aim of the product is to reduce the number of bags, the bags should be used as efficiently as possible which means that we should force the customers in the supermarkets to fill the bags with the products as much as possible. On the other hand, the bags should not rend and the weight of the bag should not be more than the customer can carry.

The product will start giving the bags when the shopping starts. The first bag will be given when the first product is read by cash register.

2.3   Design and Implementation Constraints

➢ Since one of the goals of the product is to reduce the money loss due to excessive use of nylon bags, which also means help supermarkets to spend less money, the product shouldn't be too expensive. It should return the money back, which is paid on to buy in a short period of time, say at most 1 year. After 1 year, the company should start to earn money as a result of using this product.

➢ In a market, we will put this product near each cash register so there will be at least more then 5 of them. So they should be good looking. And also since we take the freedom of taking as many bags as they want from the customers, they shouldn't feel bad about it. It should be designed in a way that, customers actually feel good, they should actually think they save the nature. It's colors and the words written on it (if any) should be chosen considering those.

➢ The maximum volume and mass capacities for the bags that are used in dispenser should be changeable. The company that would use this product can decide to change the bag type that they use. In such a case, the dispenser should still work fine with small and easy changes.

➢ After the bag is rolled out, the bag will not be cut by dispenser, instead the customer in the market would tear the bag by himself. While the customer taking the bag from the dispenser, the roll shouldn't move. It should stop somehow.

- The time that it takes to roll down one bag from dispenser must be low enough. The customer should not wait more than 2 seconds to get the bag from dispenser.

- Noise level must be low to avoid the disturbance of customer. While rolling down the bag, there is a trade-off between speed and noise level. The optimum should be change: the maximum speed with affordable level of noise.

- The weight constraint is not that strict since machine doesn't have mobility constraint but it shouldn't be more than 5 kg.

3 QFD

Here is our house of quality matrix:

Title: QFD of InnoBag

Author: Team7

Date: November,23,2011

Notes:

Legend		
Θ	Strong Relationship	9
O	Moderate Relationship	3
▲	Weak Relationship	1
╫	Strong Positive Correlation	
┼	Positive Correlation	
▬	Negative Correlation	
▼	Strong Negative Correlation	
▼	Objective Is To Minimize	
▲	Objective Is To Maximize	
X	Objective Is To Hit Target	

Column # — Direction of Improvement: Minimize (▼), Maximize (▲), or Target (x)

Column #	1	2	3	4	5	6	7	8	9
Direction of Improvement	X	▼	▲	▲	▲	▼	▲	▲	

Quality Characteristics (a.k.a. "Functional Requirements" or "Hows")

Column headers: 1 Color, 2 Noise, 3 No. Of Bag Size, 4 Speed, 5 Functionality of dispenser, 6 Cost, 7 Adjustability, 8 Smartness of Algorithm, 9 Weight

Row #	Max Rel. Value in Row	Relative Weight	Weight / Importance	Demanded Quality	1 Color	2 Noise	3 No. Of Bag Size	4 Speed	5 Func. of dispenser	6 Cost	7 Adjustability	8 Smartness of Algorithm	9 Weight	Our Company	Competitor 1	Competitor 2
1	9	10.0	4.0	Easy to take a bag					Θ					3	5	5
2	9	12.5	5.0	Adjustable to any markets						▲	Θ			4	5	5
3	9	10.0	4.0	Adjustable to different bag sizes			Θ		O	▲	Θ			4	5	5
4	9	12.5	5.0	Enough bag to avoid damaging products								Θ		3	5	5
5	9	12.5	5.0	Reduce number of bags								Θ		4	4	4
6	3	12.5	5.0	Fast working software				O				▲		5	3	3
7	9	10.0	4.0	Short duration for bag giving process				Θ		O		O		4	3	2
8	9	7.5	3.0	Low noise level		Θ		▲		O				4	3	3
9	9	7.5	3.0	Low cost		▲		O		Θ	▲		▲	5	0	1
10	9	5.0	2.0	Attractive	Θ									4	1	1

	1 Color	2 Noise	3 No. Of Bag Size	4 Speed	5 Func. of dispenser	6 Cost	7 Adjustability	8 Smartness of Algorithm	9 Weight
Target or Limit Value	Green	Below 70 dB	3	Below 1.3sec		500 TL			max 5kg
Difficulty (0=Easy to Accomplish, 10=Extremely Difficult)	10	7	6	6	7	9	8	7	9
Max Relationship Value in Column	9	9	9	9	9	9	9	9	1
Weight / Importance	45.0	75.0	90.0	157.5	120.0	142.5	210.0	267.5	7.5
Relative Weight	4.0	6.7	8.1	14.1	10.8	12.8	18.8	24.0	0.7

Competitive Analysis (0=Worst, 5=Best)

Legend: Our Company, Competitor 1, Competitor 2, Competitor 3, Competitor 4, Competitor 5

1) Easy to take a bag:

The customer could be able to tear the bag easily from the dispenser. The height of the product should not be too short to avoid the customer from bending. It also should not be too long to avoid the customer from reaching the bag, so height should be optimal.

2) Adjustable to any markets:

The product should easily be modified so that it can be used at every different environment. The design should be so smart, such that, without need of different production, same machine should work for every single customer. There may be a tradeoff between flexibility and functionality. The "smart-design" should handle this problem. Without losing any functionality, a flexible design must be implemented.

3) Adjustable to different bag sizes:

In packaging process of the products, there can be different size of bags to cover different amounts of products' packaging. User can desire to use "Small", "Medium" or "Large" sized bags according to the his or her shopping. Therefore, our product should satisfy the size demand after making simple adjustments.

4) Enough bag to avoid damaging products:

InnoBag should be able to give enough number of bags so that user won't damage products by packing them in one bag, even though the assumption of there would be any customer that is packing in a way that the products would damage is not so realistic.

5) Reduce number of bags:

Supermarket's main expectation is that at the end of the shops', number of nylon bag usage will be reduced. Since a machine which has no ability to reduce bag usage is not different than a free bag automat, InnoBag would be pointless without this constraint. Therefore, customer's this demand should be the main consideration.

6) Fast working software:

The computer which the software of the InnoBag will be installed to, controls all the operations of the supermarket. Customer will demand that the software should not slow down

the computer's working process in order to easy access to programs must run simultaneously in the same computer.

7) Short duration for bag giving process:

During the shop as soon as one bag filled by user, other bag should be rolled down from dispenser in a tolerable amount of time. Otherwise user will not be satisfied with InnoBag due to waiting a lot and he or she will be unwilling to go to the markets which have it.

8) Low noise level:

Since InnoBag's dispenser is near the cash register, user and cashier will be near it considerably long amount of time. If it produces disturbing noise while it is rolling down the bags, the user will be uncomfortable. Since cashier's efficient working will be reduced due to this disturbing noise, supermarket will not be happy about it too. From the customer in a market point of view, a machine working loudly is also not good. Therefore, this condition will lower the quality of InnoBag if it is not considered.

9) Low cost:

Reducing bag usage will be beneficial due to two consequences of the process; first one is helping nature by reducing the waste of nylon, second one is decreasing the loss of customer due to extra used bags. Since money is one of our objective functions, InnoBag's cost should be low enough to attract customer to buy it to reduce its loss.

10) Attractive:

Supermarkets desire that the customers of markets should willingly use InnoBag without feeling angry towards market. They should feel nature-friendly so that supermarkets' "money profit" aim should not be that obvious.

In this QFD Competitor 1 is assumed to be a market who hire people whose only job is packaging the products which has been bought by customers, and Competitor 2 is a market who extends cashier's duties in order to cover packaging the products for customers. Competitor 1 gives extra salary for this process and Competitor 2 has to increase salary of cashiers in order to provide equal conditions with other markets. Even though these two

competitors have advantages in terms of some criteria in the house of quality chart, it can be seen that their high cost eliminates whole their advantages. Also the method of competitor 2 is not time efficient since cashier has to do the entire job by her/himself.

4   Conclusion

As a conclusion, the aim of this document was to consider the users' requirements and expectations from our product InnoBag. Since InnoBag can easily be misunderstood by thinking it as a product of a very ungenerous company which tries to only save their money and not considering the needs of its customers, the design of it should be done in a way that its image on users should be positive. In order to obtain that image, users' demands should be the top priority concern and the next steps of the designing procedure should be based on these demands. After making the products features according to users' needs, our product will be not also "qualified" but also "desired". Finally, a company which has not taken the users' requirements into consideration has destined to make unqualified and unused products.

5   References:

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3. IEEE. "IEEE Guide for Developing System Requirement Specification". IEEE Std 1223,1998 Edition.