

# Design of Butter Spreader- An Application of Generic Product Development Process.



I. A. Dandekar, R. V. Awati, A. K. Joshi, S. S. Kulkarni, A. R. Dandekar

**Abstract:** In the current competitive scenario after globalization, product development process is a very challenging task as it depends on various factors from Customers says to Government policies. Today's customer is technically smart and well aware about the quality of the product. Even just a word about customer dissatisfaction is sufficient to defame the brand image of the product in the market. To avoid such circumstances, it is essential to exercise scientific techniques of product development, so that manufacturers can concentrate on product quality, customer satisfaction, etc. To fulfill the requirements of the manufacturer regarding product development various approach to new product development like Lean product development, Spiral product development, agile product development have been developed by the researchers and the industrial experts. The Generic product development process is a very simple approach in the above-mentioned methodologies. This article discusses the development of butter spreader by using Generic product development process. However, in the initial phase the work is limited up to the overall design of the product.

**Keywords:-**Generic product development, Butter spreader, New product development, product Design of Butter spreader.

## I. INTRODUCTION

Product development is the process that completely covers a series of stages required to bring a product to the market. These stages include idea generation, idea screening, concept development, concept testing, marketing, etc. Eight important stages of the general product development process are mentioned below: [1]

- Idea generation:- In this stage, the organization set up a team to generate multiple solutions for a problem identified by market survey. The thumb rule for this stage is not a single idea that should be criticized. Rigorous sessions of brainstorming are to be conducted to obtain maximum possible ideas.

- Idea screening:- Filtration of the ideas generated in the earlier stage should be carried out carefully in this stage. The simple strategy is to accept the best and eliminate the poor. Proceed with only one or two solutions for the next stage.
- Concept development:- It is the exercise in which the screened idea is translated in the product concept. The product concept is detailed version of the product idea.
- Concept Testing:- Now it is necessary to test the product concept with your customers. The concept should be presented to the target market.
- Business Analysis:- It is the significant stage for every organization. Landmarks and Milestones of the product development process and time required for the completion should be fixed. Also, the impacts of delays and time of product arrival in the market are to be analyzed carefully.
- Product development:- This phase includes the development of a prototype, testing of a prototype, modifications in the prototype and the pilot production.
- Market testing:- In market testing phase product samples are to be presented for consumer groups. You can launch the product in different exhibitions. Also, you can take the trial for the selected customers to obtain their feedback.
- Commercialization:- After obtaining the feedback from market testing do the modifications if necessary. And decide the policies for the promotion of product. Also, start the development distribution channels considering the potential of customers.

The product development process is vital to ensure that the product is viable and can be successfully implemented. The product quality, customer satisfaction, product scope, business value; are some of the parameters for the success of any product to be brought in the market. All these parameters are covered by the product development process. There are different product development processes. Some of them are mentioned below.

- a) The spiral model of product development is based on risk patterns in the given project. Generally, Software products are being developed by using this approach.[2]
- b) lean product development is the approach to counter the challenges of development through innovative solutions. this process mainly aims to reduce production costs and save time.[3]
- c) The Agile product development process considers the iterative and incremental approach. This process is routinely used in the software industry but hardware teams implement this process to save the cost and time which helps in the improvement of the end product.[4]

**Revised Manuscript Received on 30 July 2019.**

\* Correspondence Author

**Miss I.A.Dandekar\***, Student, Department of S. Y. B. Technology, Padmabhushan Vasantdada Patil Institute of Technology, Bavdhan, Pune, (Maharashtra), India.

**Miss R.V.Awati**, Student, Department of S. Y. B. Technology, Padmabhushan Vasantdada Patil Institute of Technology, Bavdhan, Pune, (Maharashtra), India.

**Mr. A.K.Joshi**, Student, Department of S. Y. B. Technology, Padmabhushan Vasantdada Patil Institute of Technology, Bavdhan, Pune, (Maharashtra), India.

**Dr.S.S.Kulkarni**, Professor, Padmabhushan Vasantdada Patil Institute of Technology, Bavdhan, Pune, (Maharashtra,) India.

**Mr.A.R.Dandekar**, Proffessor, Padmabhushan Vasantdada Patil Institute of Technology, Bavdhan, Pune, (Maharashtra,) India.

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an open access article under the CC-BY-NC-ND license <http://creativecommons.org/licenses/by-nc-nd/4.0/>

## Design of Butter Spreader- An Application of Generic Product Development Process.

d) The generic product development process identifies the target market based on which well-executed product planning is carried out. This helps to bring the product that completes customer demands to the market.[5]

### II. PRODUCT DEVELOPMENT PROCESSES

The detail stages of the development processes mentioned are given below:[6]

a) The spiral model of product development: It consists of four phases.

- Planning phase:- In this phase customer requirements are identified. Also, Business requirements are analyzed.
- Phase Risk Analysis:- In this phase a study is conducted to identify the risks and its solutions.
- Engineering phase:-In this phase, actual product is to be developed and tested.
- Evaluation phase:-this phase allows the customer to evaluate the product performance.

b) Lean product development has thirteen principles for product development as per Industry week magazine. They are as follows.[7]

- Always try the value addition from the waste.
- There should be maximum alternatives for a problem.
- Create process flow of the product.
- Try to standardize the process to avoid variation.
- Develop the system to integrate the process.
- Develop cross-functional co-operation policy.
- Develop competence culture.
- Involve the suppliers into product development process.
- Implement continuous environment culture.
- Build a culture to support excellence.
- Adopt new technologies.
- Use simple ways for communication.
- Use advanced tools for standardization.

c) The agile product development process is the process in which the total work is divided into the different stages. Each and every feature of the product is considered separately for the development. The following methodology is to be followed in Agile product development process.[8]

- Divide the total product development work in terms of features.
- Do the requirement analysis of feature 1.
- Detail design of feature 1.
- Implement feature 1 in actual practice.
- Test feature 1.
- Release feature 1 as a working model.

d) The Generic product development process includes the following stages,

- Planning: - In this phase consideration about the current market situation, target market, goals and objectives about a new product are taken into account.
- Concept Development:-After surveying the target market, an overall outline of the product in this phase will be decided.

- System Design: - The assemblies and sub-assemblies of the product would be decided in this phase. Functional requirements of this product must be decided in this stage, which makes it very important.
- Detailed Design: - Detailed drawings with the tolerances should be finalized in this stage. Also, the tooling, manufacturing techniques should be finalized.
- Testing: - A prototype of the product should be developed to carry out various tests and changes are to be made if required.
- Production ramp-up: - This phase includes testing the equipment for the production processes. However, this paper covers the development process up to the third stage i.e. concept system design.

Generic product development is the process of product development that emphasizes customer expectations and demands. In this process customer's say has very high importance and the product is developed accordingly. This helps manufacturer understand what features are to be incorporated and which can be set aside. This eventually results in time and the cost saving as well. Analysis of customer requirements also reduces the possible risk of failure of the product in the market. It also becomes easy to make changes or rectify errors as per the requirement. The other processes are manufacturer oriented. There is space to hear the voice of customer, but it is very compact as compared to Generic Product Development. As per objective of our project and considering the scope of customers in this regard, we have decided to go with Generic Product Development Process.

### III. DEVELOPMENT OF BUTTER-SPREADER USING GENERIC PRODUCT PROCESS

As part of the curriculum, the above S.Y.B.Tech students have decided to develop a new product whose application can reduce the human efforts in practical life. Existing products like, pin holder, school bag, solar cooker, water sprinkler, and finally the butter spreader have been studied. After performing the exercise of reverse engineering, the Butter spreader has been selected for the modification.

#### A) Why Butter Spreader?

Currently, in the market the following equipment are generally used to spread the butter on the bread.

i) Knife. ii) Spoons. Though they are handy and cheaper; following are the limitations of these instruments.

- 1) Butter can be spread only on a single piece at a time.
- 2) Due to which, it is a time-consuming process.
- 3) It can be used for domestic purpose. But for commercial purpose there are limitations.
- 4) Due to the very small size of these instruments, there is often the threat of misplacing.
- 5) In the context of cost they are cheap, but the aesthetics are not so good. This feature is an essential requirement for commercial or professional use.

**B) Selection of Target market<sup>[9]</sup>**

We have approached various people in the segments like Restaurants, Home-makers, Street Vendors. The Following Questionnaire is provided to them for Market Survey.

**Table No1.Customer survey questionnaire.**

Sr.	Name:- Occupation	Address & Contact
1	What are you currently using to spread butter?	
2	What is your opinion about cost & time?	
3	What is your opinion about looking & form of the product?	
4	What is your opinion about portability?	
5	What is your opinion about weight, durability of the product?	

After collecting the Customer’s say and evaluating it, there is following output.

- 1) The Hotel industry has been preparing Sandwich items on daily basis. Hence reduction in the time is the main requirement for them. Cost doesn’t matter in that case. They can ask for some additional demands like aesthetics.
  - 2) The Vendor in the street has to prepare the Sandwiches in shortest time, when the crowd is gathering around him.
  - 3) In some cases, Domestic users also can think about the Product.
- Hence, in this preliminary stage, we have selected some Restaurant owners and some Vendors in the streets as our target market.

**IV. CONCEPT DEVELOPMENT**

A concept is the detailed description of product idea. All the product ideas are rectified and hardly one or two will be selected for concept development. The concept is to be brought in to the target market. Some selected groups of customers are tested with the concept of the product. It helps the customer to visualize the actual product. Customer can suggest the modifications to incorporate at this stage. Their feedback helps the manufacturer for the improvement. After consulting with some people from target market, we have decided following basic requirements for our product.

- 1)The shape or form of the product should be attractive than the existing products like Knife.
- 2)Though the product should be portable; a proper care should be taken that there is very rare possibility of being misplaced.
- 3)The Dimensions of the product are decided according to maximum possible size of bread and maximum size of butter slice available in local market.

- 4) We have to balance the factors of cost and expectation of target market. To optimize the cost, the material should be selected on the basis of easy availability in local market. Also, it should be light in weight and have good aesthetics.

**V. CUSTOMER’S SURVEY<sup>[9]</sup>**

Different methods are being used to hear the voice of Customer in now days.

- 1) Conventional methods: Conduct the survey of customers with some questionnaire. In this case the risk is that the customer may not respond properly. You have to rectify their responses again and again. These kind of surveys can be also conducted by using the tools like email, telephone, conference calls etc.
- 2) Unconventional Method:- In these methods the behavior of Customer is observed silently without interrupting their activities.

Both conventional and unconventional methods are used to carry out survey to obtain the effective results. Based on preliminary specifications identified through deliberations in the earlier phase of concept development, the survey is carried out. In the product design engineering there are various popular techniques to conduct the customer survey. First one is the Pugh matrix technique; In the Pugh matrix technique, sometimes personal opinions can affect the final results. Another is the KANO-MODEL Technique. The KANO-MODEL technique is more useful for our project. In the KANO-MODEL technique there is a precise analysis of product specifications. The specifications are put for the customer survey. A small group of 16 customers was surveyed for their responses. On analyzing the responses from the survey following trends were identified<sup>[10]</sup>

**A) Survey of Target market**

**Table No 2: Kano-Model Survey**

Sr. No	Customer Need/Specification	A	M	P	R	Q	I	T
1	Easy to handle	9	1	3	1	1	1	16
2	Reduction in time	4	5	1	1	3	2	16
3	Optimum cost	2	2	7	3	1	1	16
4	Portable device	7	5	1	0	2	1	16
5	Even Spreading	4	7	2	1	1	1	16

*R- Reversible need, Q - Questionable need, I - Indifferent needs, A - Attractive needs, P - Performance based needs, M - Must be needs and T –total No of people surveyed.*



# Design of Butter Spreader- An Application of Generic Product Development Process.

## B) Outcome of KANO-MODEL survey. <sup>[10]</sup>

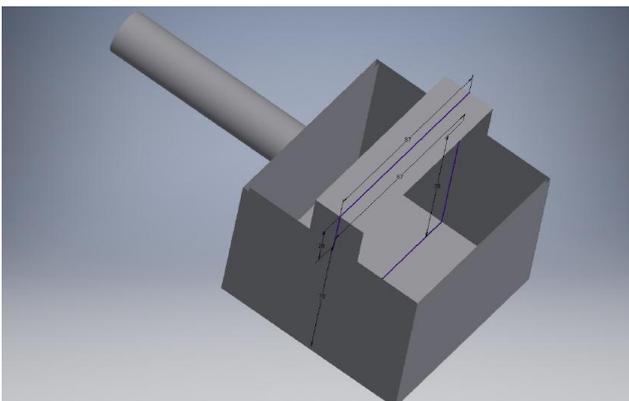
Table No.3 Result of Kano-Model Survey

Sr No	Customer Need/Specification	Maximum Count	Feature Type	Remark
1	Easy to handle	9	Attractive	If we incorporate this feature; it would be attractive for people.
2	Reduction in time	5	Must be	The customers want it strongly.
3	Optimum cost	7	Performance based	It is basic requirement of customer.
4	Portable device	7	Attractive	If we incorporate this feature; it would be attractive for people.
5	Even Spreading	7	Must be	The customer wants it strongly

For handling and portability of the product maximum customers feel that it is an attractive feature. That is they do not expect it from manufacturer but appreciate its inclusion. For time reduction, maximum customers feel that it must be incorporated in the product. For the manufacturer it is compulsory to include this function in the product. For optimum cost people feel it is performance Institute based feature. Without inclusion of this feature, there is the possibility that customer can reject your product. Even spreading again is the feature that customers expect from manufacturer to be incorporated preferentially.

## VI. SYSTEM DESIGN OF THE PRODUCT[11]

System design specifies the idea about the overall concept of the product. However the detailed drawings with tolerances, surface finish etc. will be decided in the next stage i.e. detailed design phase. We have developed conceptual model of Butter spreader using Autodesk-Inventor. Picture below shows the developed model with overall dimensions and some aesthetics like outline and color.



Picture No.1 Conceptual Model of Butter spreader

## A) Some design parameters of butter spreader.

Table No.4. Preliminary design specification .

Sr.	Design parameter	Description
1	Mechanism	Pressure application
2	Overall dimension	90mmx90mmx70mm
3	Color	Silver or Grey
4	Material	Stainless steel (16 or 10gauge)

## VII. CONCLUSION

There are several product development methodologies. Each can be applicable as per the purpose of the product/project. Development of new product using Generic Product Development process has created insight in design specifications in final product based on customer requirements. It can be concluded that generic product development process is the simplest among all the existing techniques. It has distinct advantages over other methods as it includes production of the actual prototype in addition to ideation and concept development. The Preliminary decision about the specification of products should be made on the basis of Customer's say. From the survey carried out it can be concluded that saving time during application and even spreading of butter is utterly important thus these features must be preferentially included in the product. Features like Easy handling and portability are found attractive by the customers, making them more inclined towards the product. The final decision is to be made on the basis of technical and policy constrains. This paper summarizes generic product development process of the butter spreader up to conceptual design stage. These considerations will be taken into account for further development of the product.

## REFERENCES

- Marianna KAZIMIERSKA *et-al*, "NEW PRODUCT DEVELOPMENT (NPD) PROCESS – AN EXAMPLE OF INDUSTRIAL SECTOR", Management Systems in Production Engineering, 2017, Volume 25, Issue 4, pp 246-250
- Barry W. Boehm, A Spiral Model of Software Development and Enhancement
- A.P.Shrotri *et-al* A Comparative Study Of Apqp And Contemporary Product Design And Development Strategies Volume 6, Issue 1, pp. 47 to 55.
- Stare, Aljaž. (2014). Agile Project Management in Product Development Projects. Procedia - Social and Behavioral Sciences. **119**. 295-304. 10.1016/j.sbspro.2014.03.034.
- Iorga Cristian *et-al*, Generic Product Development Process at the detailed design phase, European Scientific Journal January 2013 edition vol.9, No.1 ISSN: 1857 – 7881 (Print) e - ISSN 1857- 7431
- <https://www.geeksforgeeks.org/software-engineering-spiral-model/>
- <https://www.industryweek.com/companies-amp-executives/13-principles-lean-product-development>
- <https://productcoalition.com/product-development-using-agile-methodology-446c01ecd510>

9. *A.k.Joshi et-al*, "Pugh Matrix and Kano Model-The Significant Techniques for Customer's Survey", *International Journal of Emerging Technology and Advanced Engineering*, (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 9, Issue 6, June 2019
10. Tan, K. C.*et-al*. (2001). Integrating SERVQUAL and Kano's model into QFD for service excellence development. *Managing Service Quality*, Vol. 11, No. 6, 418-430
11. Charnley, Fiona & Lemon, Mark & Evans, Steve. (2011). Exploring the process of whole system design. *Design Studies*. 32. 156-179. 10.1016/j.destud.2010.08.002.

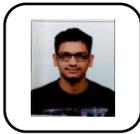
### AUTHORS PROFILE



**Name: Miss. Dandekar Indraja** Amarendra  
Qualification: Third year mechanical student.  
Organization: Padmabhooshan Vasantrodada Patil of technology, Budhgaon. 416304 Email: [dandekarindraja5@gmail.com](mailto:dandekarindraja5@gmail.com) Miss. Indraja Dandekar is pursuing bachelors of technology in mechanical engineering in premier institute affiliated to Dr. Babasaheb Ambedkar Technological University, Lonere. She is the member of SAE India.



**Name: Miss. Await Ritika Vikram.** Qualification: Third year mechanical student Organization: Padmabhooshan Vasantrodada Patil Institute of technology, Budhgaon. 416304 Email: [ritikaawati99@gmail.com](mailto:ritikaawati99@gmail.com) Miss. Ritika Awati is pursuing bachelors of technology in mechanical engineering in premier institute affiliated to Dr. Babasaheb Ambedkar Technological University, Lonere. She is the member of SAE India.



**Name: Mr. Joshi Akhilesh Kedar** Qualification: Third year mechanical student. Organization: Padmabhooshan Vasantrodada Patil Institute of technology, Budhgaon. 416304 Email: [akjmaster@gmail.com](mailto:akjmaster@gmail.com) Mr. Akhilesh Joshi is pursuing bachelors of technology in mechanical engineering in premier institute affiliated to Dr. Babasaheb Ambedkar Technological University, Lonere. He is the member of SAE India.



**Name: Dr. Kulkarni Satish Shankarro** Qualification: M.E. (Design Engg.), Ph.D. Designation: Professor Mechanical Engineering email: [kulsat@gmail.com](mailto:kulsat@gmail.com) Organization: Padmabhooshan Vasantrodada Patil Institute of technology, Budhgaon. 416304 Dr. Satish Kulkarni is working as a Professor in mechanical engineering department of mechanical engineering in premier institute in engineering education affiliated to Dr. Babasaheb Ambedkar Technological University, Lonere. He completed his Ph.D. in vibration design from Shivaji University, Kolhapur in November 2012. He has experience of 25 Plus year in academics and research and industrial experience of 3 years. He has published more than 25 papers in various national and international journals and conferences. His thrust areas include vibration design and analysis, Product design and rapid prototyping.



**Name: Mr. Dandekar Ashutosh Ramchandra** Qualification: M.E (Product Design and Development) Designation: Assistant professor (Mechanical Engineering) email: [ardandekar@pvpitsangli.edu.in](mailto:ardandekar@pvpitsangli.edu.in) Organization: Padmabhooshan Vasantrodada Patil Institute of technology, Budhgaon. 416304 Mr .Ashutosh Dandekar is working as an Assistant Professor in department of mechanical engineering in premier institute in engineering education affiliated to Dr. Babasaheb Ambedkar Technological University, Lonere. He has published 12 Research articles in international journals. His thrust areas include Product design & Quality Management.