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New Product Development at PT Asuka Engineering Indonesia

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ABSTRACT
PT Asuka Engineering Indonesia is a company engaged in the construction sector, with electrical and instrumentation as their main services. The purpose of this study is to identify and analyze new products that are needed and desired by PT Asuka Engineering Indonesia's consumers. This research is an applied research with a qualitative approach. The analytical tool that used in this research is the New Product Development Stages. The result of this research is the discovery of an idea of new product that can be developed at the Asuka company, namely by adding services in information technology field. Suggestions from this research are that this can be a reference and input for companies to make decisions in developing new products in information technology field by pay more attention to consumer suggestions for new product requests as a consideration for products that should be developed.

Keywords: *Construction; New Product Development Stages; New Product Development; Information Technology.*

INTRODUCTION

Construction companies are one of the sectors that are experiencing rapid development, along with infrastructure development in Indonesia. Construction does not only focus on civil and architecture, but covers electrical, mechanical, and others. The government hopes that the construction industry players can maximize their potential to be able to survive in industry 4.0 by mastering technology. There are more and more competitors in this sector, thus encouraging each construction company to be able to develop its business. The product life cycle is the most important thing in maintaining the survival of the company's business, because by continuing to develop products towards consumer desires and become customer oriented, it can extend the company's life.

New product development can be done using the product development stages, this technique is used to find ideas about new products that you want to develop. This study uses five stages of product development according to (N Slack et al., 2010) and

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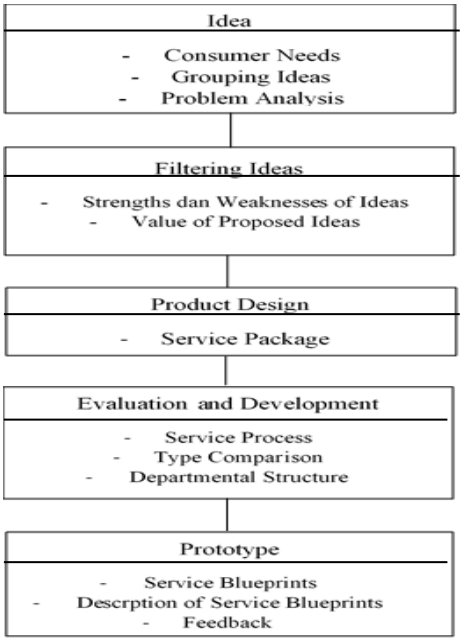
(Stevenson & Choung, 2014) namely finding ideas, idea screening, product design, evaluation and development, and prototypes. Ideas are carried out in steps according to (Nigel Slack & Lewis, 2011) namely analyzing consumer needs, grouping ideas, and analyzing problems. Filtering ideas using step by Ulrich & Eppinger (2012) is to analyze the strengths and weaknesses of each proposed idea to be used as a criteria in assessing each idea. The chosen idea was designed by creating a service package that has been done by Fitzsimmons & Fitzsimmons (2011) which is then evaluated and developed by creating a service process chart and departmental structure using the steps by (Pang, 2009). The last stage is making a prototype with service blueprints based on research that been done by (Heizer & Render, 2016).

The purpose of this study was to identify and analyze new services that needed and desired by PT Asuka Engineering Indonesia's consumers by using the New Product Development Approach stages and also to known the design of new services that will served to the consumer by the company.

LITERATURE REVIEW

Product development according to Assauri (2016) is an activity that carried out to facing the possibility of changes in a product for the better. According to (Handoko, 2012) product development is a strategy for company growth by offering new or modified products. According to Fitzsimmons & Fitzsimmons (2011) service is an activity that can be offered by one party to another that is intangible. According to Lupiyoadi (2014) services are all economic activities whose results are not in the form of physical products and are produced and consumed simultaneously. Service package according to Fitzsimmons & Fitzsimmons (2011) is a series of goods and services as well as information provided by the company to be provided to consumers in an environment. (N Slack et al., 2010) defines the stages of product development consisting of finding ideas, filtering of ideas, product design, evaluation and development, as well as a prototype with the following conceptual framework:



Source: Slack et al. (2010) and Stevenson & Choung (2014). Processed.

Figure 1. Conceptual Framework

RESEARCH METHOD

The research of new product development at PT Asuka Engineering Indonesia use an applied research with product development analysis tool, namely New Product Development Stages. The sources of this research are companies and potential consumers. The operational definition of idea creation is the finding for new product ideas, both existing and non-existent in the market. Idea screening is the stage of determining the ideas to be developed and discarding ideas that are not in accordance with company goals. The design stage is a design or description of the product characteristics that the company want to develop. Evaluation and development is to review and implement concept design into product design, for this research is a service process. The prototype stage is the final step in product development stages by creating a final product design that is ready to be communicated to consumers and company to be considered in developing.

The data analysis technique used in this study is the product development stage according to (N Slack et al., 2010) and (Stevenson & Choung, 2014). The first stage is idea (a) Analysis of Consumer Needs, ideas collected by listening to consumer needs and desires, (b) Grouping Ideas are ideas grouped by a category, (c) Problem Analysis by analyzing ideas to look for problems that may arise in these ideas for comparison. The second stage is filtering ideas with (a) Analysis of Strengths and Weaknesses of Ideas, ideas are re-analyzed from the problems that have been found to see and assess their strengths and weaknesses, (b) Value of Proposed Ideas, the ideas are ranked by assessing each idea using criteria made from the strengths and weaknesses that have been analyzed in the previous step. The third stage is product design, which is the idea that is selected in the idea screening, then get described and picturized in product design to see the service that you want to develop. This stage can be said to be the first design which is still a concept. The fourth stage is evaluation and development (a) Service Process, namely the proposed idea of making a simple service process with a flowchart, (b) Type Comparison, which is comparing types of products to see differences when the product is tested, (c) Departmental Structure, which is to create the structure that will be needed as a reference when the product is realized the last stage is the prototype (a) Service Blueprints, namely the service process that has been made in the previous stage and then detailed and (b) Feedback, namely input and suggestions from consumers regarding the products and services that are felt.

RESULT AND DISCUSSION

The results of data analysis are based on the objectives of the research that has been carried out with the new product development stages starting with the first stage, ideas with the first step, namely consumer needs.

Table 1. Results of the Search for Ideas

No.	Suggested Ideas	Source
1	Making Information Systems	Feedback by Consumer Company Innovation
2	Job Training Center	Interviews to consumer
3	*Robotic*	Interviews to consumer

Source: Primary Data. Processed.

Based on table 1, it is known that three proposed ideas obtained from consumer feedback, company innovation on interviews with the company, and also interviews with the consumers. The suggestions that were obtained were the idea of making information system, job training center, and robotic. The second step is Grouping ideas.

Table 2. Categories of Ideas

No.	Suggested Ideas and Ideas	Category
1	Information system creation	Technician
2	Job Training Center	*Coach Trainer*
3	*Robotic*	Technician

Source: PT Asuka Engineering Indonesia (2021)

Table 2 describes the grouping of ideas based on the types of service providers. In the making of information systems and robotics are technicians, while for job training centers are coach trainers. After that the third step is problem analysis.

Table 3. Problems With Ideas and Ideas

No.	Ideas and Ideas	Problem
1	Making information systems	The company does not have employees with special skills and professional programmers
2	Job Training Center	Do not have employees who are certified as training providers
3	*Robotic*	Does not have much budget to develop

Source: Primary Data. Processed.

Based on table 3, it can be seen that every idea has a different problem. Where to make information systems and job training centers have weaknesses in the experts needed. Meanwhile, robotic services have constraints on the costs required to realize the idea.

The second stage is filtering ideas with the first step strengths and weaknesses of ideas which are carried out to find out the best or superior ideas by making a comparison. Table 4 shows that the making information system has more strength than the other proposed ideas.

Table 4. Strengths and Weaknesses of Ideas and Ideas

No.	Ideas and Ideas	Advantages	Deficiency
1	Making Information Systems	1. Already have a worker 2. Currently testing by making a system for internal use 3. Already have a server 4. Can help the company's production process (efficiency and productivity) 5. Reducing operational and management costs	1. Requires training to upgrade employee's skills 2. Requires a good internet connection

2	Job Training Center	1. Develop costs tend to be cheaper	1. Requires the provision of special facilities 2. Do not have professionals who can provide training
3	*Robotic*	1. There are not many competitors	1. Requires skilled employees 2. Need a lot of money 3. Requires special skills to develop

Source: Secondary Data. Processed.

The next step is to assess the proposed ideas which show that the making information systems idea has a total net value of 3 points and is ranked 1, which means that this idea will continue to be developed. Meanwhile, the job training center and robotic ideas get 1 and 0 respectively, which means that the two ideas must be eliminated or discarded at this stage.

Table 5. Value of Proposed Ideas and Ideas

	Selection Criteria											
Ideas and Ideas	a	B	c	d	e	f	Total (+)	Total (0)	Total (-)	*Net Score*	Ranking	*Continue?*
Making Information Systems	0	+	+	+	0	0	3	3	0	3	1	Yes
Job Training Center	0	0	0	0	+	0	1	5	0	1	2	Not
Robotic	-	0	0	0	0	+	1	4	1	0	3	Not

Source: Elmira Salsabila (2021)

The description of the selection criteria in table 5 (a) is easy to create, (b) worker readiness, (c) facility readiness, (d) trial readiness, (e) development costs, (f) competitors.

The third stage is product design with a service package which is used as an overview of the product design concept to be developed. The service package consists of 5 parts, namely supporting facilities, facilitating goods, information, explicit services, and implicit services.

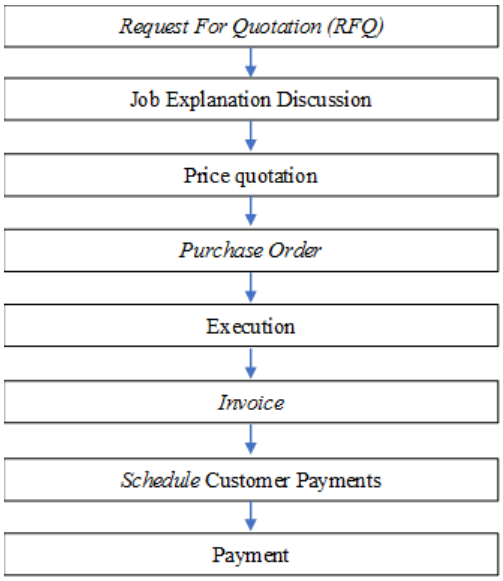
Table 6. Service Package

No.	Service Package	Attribute	Information
1	Supporting Facilities	Location	The new office is located in Gresik
		Workshop	Will use their existing workshop
		Manpower (HR)	Using existing employees, but will recruit new employees if you have a lot of projects to work on
		Tools	a) Server b) Computer c) Laptop d) Switch e) Router f) Firewall
		Machine	Server
		Room	Have room space for consultation

		Internet	Providing a good internet network to carry out product work and testing. If the customer's budget is a lot, they can buy their own server, but if the budget is limited, they can do it with hosting.
2	Facilitating Goods	Material	a) Reference or supporting articles as a reference in making program b) Data of client needs and wants c) Design d) Application installation
		Service Variations	a) ERP system b) Mobile Application c) Network Installation d) Network Consulting e) Purchase of software and hardware f) Network maintenance g) Feature upgrading
		Quality Consistency	a) Engineer training to upgrading their knowledge b) Employee certification (engineer) c) ISO
		Pricing	The price list is adjusted to the system module desired by the client
3	Information	Scope Of Work	a) Estimated project work b) Timeline work on each module c) Final report
		Progress Report	Progress of project work will be given to clients every week in the form of an excel file
		Website	a) Product description b) Feedback from their past client c) Office location d) Operational hour e) Contact
4	Explicit Services	Output	a) Program or system b) Customer Satisfaction
		Reliability	Work on the project according to schedule
		Guarantee	Make sure there will be no system crashes or system trespass by hackers by always performing maintenance of the system or program
		Responsiveness	There will be system recovery with maintenance if there is a failure or error in the system
		Empathy	The company will be active, communicative, and solutive in listening and understanding the client's wants and needs to reach an agreement and also planning accordingly.
		Tangible	The company will provide the best equipment, manpower and facilities for consumers
		Website	There will be a separate website
5	Implicit Services	Attitude of service	a) Employees work professionally, b) Teamwork the good one, c) Applying the 8 Asuka work cultures
		Atmosphere	a) Communicative and pro-active in serving consumers b) Customer oriented c) The convenience of the consulting room
		Waiting	a) Easy to make a booking by submitting an RFQ b) Fast respond to client inquiries and messages
		Consultation	Providing unusual solutions to clients as an added value, by educating consumers about new technologies that can be developed in the system in the future.
		Warranty	a) Provide a repair warranty for 1 year b) Inform consumers if there is a system update

Source: Primary Data. Processed.

The fourth stage is evaluation and development which consists of three steps, namely (a) The Service Process is a simple process as shown in Figure 2, starting with the request for quotation process by consumers to the final process when the consumer and company will make a payment schedule and must be paid by the consumer when it's due.



Source: Secondary Data. Processed.

Figure 2. Service Process

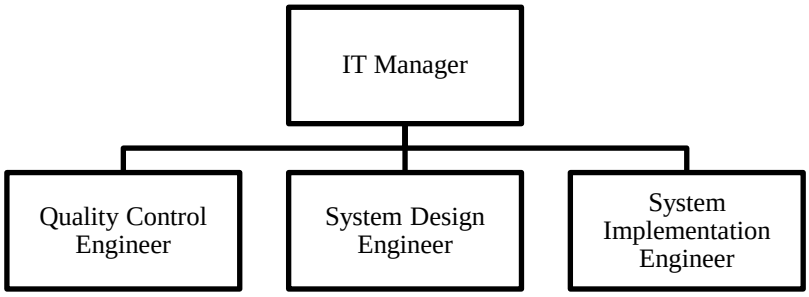
The second step is (b) Comparison of Product Types, namely the researcher takes a comparison of the estimated time by comparing each project category according to the level of difficulty in working on the design and implementation of the system, because making a system requires time which is conditional in nature.

Table 7. Comparison of Estimated Time Based on Project Category

No.	Project category	Estimates		
		Small Project	**Moderate Project**	**Complex Project**
1	*Request For Quotation* (RFQ)	1 day	1 day	1 day
2	Job Explanation Discussion	1-2 days	1-2 days	1-2 days
3	Price quotation	-	-	-
4	*Purchase Order*	1 day	1 day	1 day
5	Execution	5-14 days	14-31 days	1-12 months
6	*Invoice*	1 day	1 day	1 day
7	Payment Schedule	1 day	1 day	1 day
8	Payment	-	-	-
	Total	**10-20 days**	**20-37 days**	**37-371 days**

Source: Secondary Data. Processed.

The final step in the evaluation and development stage is (c) Departmental Structure namely designing the structure that will be needed when developing information technology services consists of four positions. Manager, Quality Control, System Design, and System Implementation.

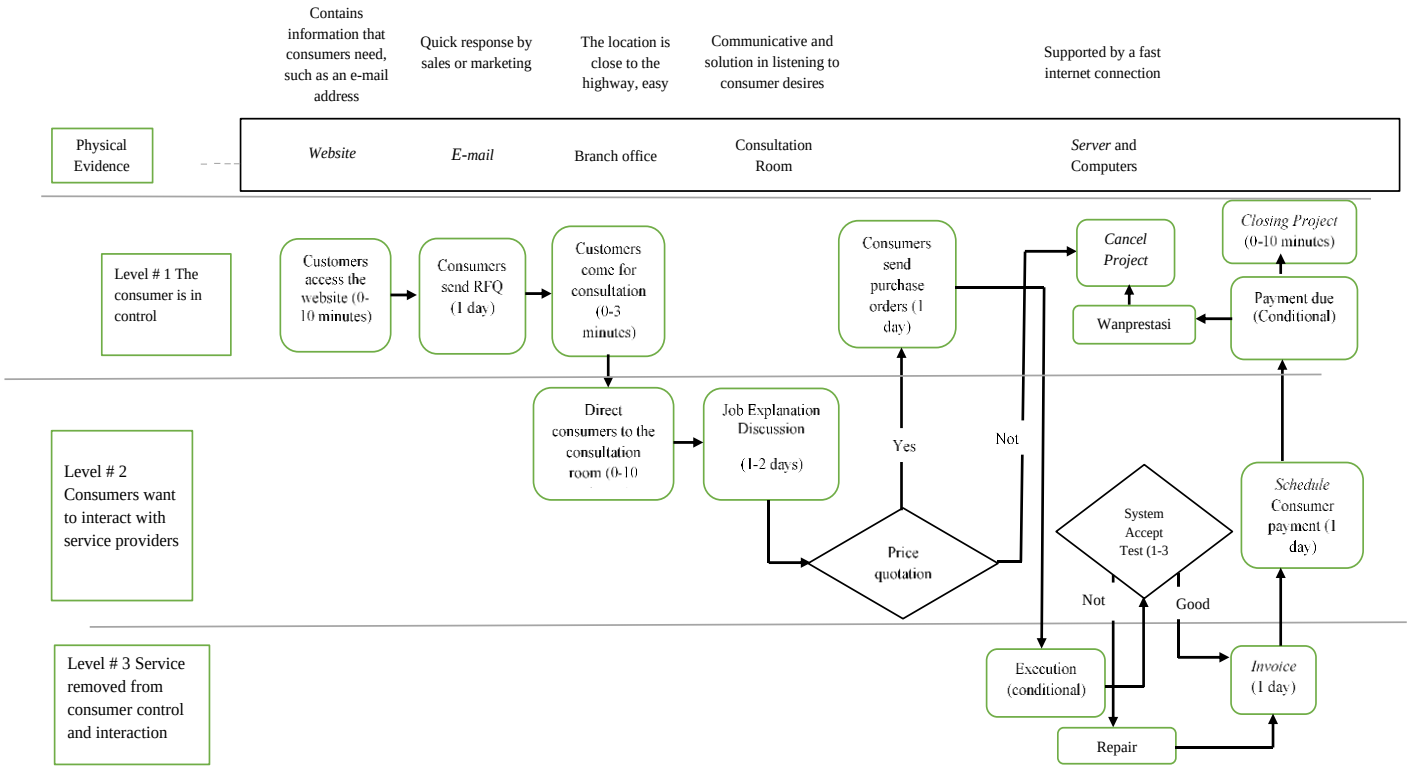


Source: Elmira Salsabila (2021). Processed.

Figure 3. Structure of the Information Technology Department

The last stage of product development carried out by the researcher is the prototype stage with the first step (a) Service Blueprints, namely this prototype is made from the service process at the evaluation and development stage which is then made in detail with the flowchart in Figure 3.The second step (b) Description of Service Blueprints consists of (1) Website access, namely consumers visiting their website to explore information related to services and products to be used, (2) Request For Quotation (RFQ), namely consumers sending requests, (3) Job Explanation Discussion, namely consultation between service providers and consumers , (4) Purchase Order, namely consumers sending purchase orders as a sign of project commencement, (5) Execution, namely service providers working on projects with stages of consumer needs, system design, implementation, testing, and maintenance, and (6) Invoice, which is a sign of the end of the project by submitting a bill of fees.

This research is based on the formulation of problems and research objectives regarding new products that are desired and needed by PT Asuka Engineering Indonesia's consumers by using the new product development stage method submitted by (N Slack et al., 2010) and Stevenson & Choung (2014) with five stages, namely ideas and ideas, idea screening, product design, evaluation and development, and prototypes. New product development starts with the creation of ideas at the idea stage and the idea uses (Nigel Slack & Lewis, 2011) steps by analyzing consumer needs, grouping ideas, and analyzing problems. There are three ideas found at this stage, namely making information system, a job training center, and robotic. The idea was obtained after conducting interviews and gathering feedback from consumers.



Source: Elmira Salsabila (2021). Processed.

Figure 4. Service Blueprints

The ideas are then selected with the idea filtering stage using an assessment of the idea suggestions put forward by Ulrich & Eppinger (2012). The criteria used to judge are derived from the strengths and weaknesses of each idea. The results of the assessment show that the idea of making an information system gets the highest score, with three score, and it can be concluded that this idea can be continued to be developed.

Making information system that has been selected is then communicated to the company for interviews and discussions about service packages to find out the service experience that you want to provide to consumers. This design consists of attributes or component specifications of the product that you want to create. The results of the service package in table 6 show an overview of the service process that will be developed.

The fourth stage of product development is the evaluation and development of the designs that have been formed. The steps performed by (Pang, 2009) is to make a service process from the start of the request to the completion of the process and also a comparison of the estimated time to work on the project based on the level difficulty of making the system, namely light or small projects with a total time of 10-20 days, medium projects with a total time of 20 – 37 days, and complex projects with a total time of 37 – 371 days. In addition, the researchers made the arrangement of the departmental structure attached to Figure 3 with the roles and responsibilities of each section with the aim of assisting the company in considering the new structure for this new service.

Prototype is useful as the final design of product development which is described by service blueprints with reference from (Heizer & Render, 2016), as well as a description to explain each process. These service blueprints are based on the service process at the evaluation and development stage which is made in more detail. Descriptions of service blueprints are obtained from interviews with the company and

also based on journals(Prihantara et al., 2018), with the product process stages, namely needs analysis, design, implementation, testing and maintenance. The results of this prototype are finally communicated to the company and consumers to find out their feedback, suggestions and input on this product. Then the company can continue to develop making information system services and offer its products to consumers to expand the market.

CONCLUSION

Based on research that has been done with the formulation of problems regarding what services are needed and desired by consumers, PT Asuka Engineering Indonesia produces service packages and service processes in information technology services as new products at PT Asuka Engineering Indonesia. The process of forming a product design is carried out using a service package that is based on the service experience that the company wants to serve to consumers. And the process of flow of making information systems services is done by making service blueprints and discussions with the company to find out an overview of the process and the feasibility of the product to be created.

This research is limited to the use of five stages of product development so that it is hoped that future researchers can use more detailed and structured stages. So it is hoped that companies can pay more attention to consumer suggestions for product demand as a consideration for products that should be developed.

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