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Product Development Process Using Tendering and Bidding

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Abstract-**The development process model is very important to integrated product development. In this paper, the integrated product development architecture was established based on the detail analysis of customer relations between product model and its corresponding process model, where the product data management system was viewed as the exchanging interface and operating platform of information. The integrated development mode by the coupling of product model main line and process model main line was presented. In this mode, both product model and process model are modified synchronously, and this modification is dynamic and mutual. The coupling mechanism between product model and its corresponding process model was established, and the algorithm was also given to evaluate the model coupling effect.**

Keywords - **Product development, Development mode, Coupling mechanism, Process evaluation, Tendering, Bidding.**

I. INTRODUCTION

Once the results of the business case of the new product conform to company objectives, the new product team can move on to the development stage, which is made up of activities that range from prototype development to volume ramp up and test marketing. The interaction between the program and project manager is no longer one of selling or buying the concept, but rather one of bringing the product to market on time, within budget, and to the required specifications.

On average, one third of total NPD expenditures are committed during this stage with 40 percent of total NPD time (Cooper, 1999). In the development stage, business case plans are translated into concrete deliverables. What is critical for success at this stage to move through development to launch as quickly as possible and to ensure that the product prototype or final design does indeed meet customer requirements, which requires seeking customer input and feedback throughout the entire development stage. It is important to gain competitive advantage and to enjoy the product's revenues as soon as possible and it also minimizes the impact of a changing environment.

Thus, as the product proceeds from one step of the development stage to the next, the new product team should reassess the market, position, product, and technology in order to increase chances of delivering a successful product (Cooper, 1993; Urban & Hauser, 1993). Marketing and R&D functions in particular should collaborate because, while marketing can express the needs of customers, R&D has the capacity of turning a product concept into an actual physical entity. Therefore they should work together to ensure the product meets customer requirements. Cross-functional teams are widely used in companies to help in identifying and solving problems efficiently by coordination of resources and ideas. Customer input and feedback is a critical activity throughout development, both to ensure that the product is right and also to speed development toward a correctly defined target.

II.PRODUCT MODELING AND PROCESS MODELING

Product modeling and process modelling are the two basic aspects of product development. To establish effective product development model not only avails to manage and control the whole process efficiently, but also avails to organize multifunctional team to develop product concurrently and cooperatively. The proposed product and process models, such as structure-oriented product model, feature-oriented product model, knowledge-based product model, integrated product model, Petri net model, IDEF model, and so on [7,8], describe the product and its development process from different perspectives and promote the development of product design and innovation theory to a great extent.

However, the coupling effect between product model and its corresponding process model were ignored to some extent when these models were developed. It doesn't benefit the process collaboration, optimization and information interaction. This paper is to present the integrated development mode based on models coupling and to establish the integrated architecture about product

development process. The coupling mechanism of models was also established. The logicality of development process and the completeness of product model information were emphasized. Therefore, it can promote the development process evolvement efficiently and make the product development process optimal.

III.THE RELATIONS BETWEEN PRODUCT MODEL AND ITS DEVELOPMENT PROCESS MODEL

Product development process modeling, in its complete sense, consists of two interrelated aspects: product model and process model. Product models are referred to product model

Data base and their associated management and access algorithms [1]. It is the digital and abstract definition of realistic product. Generally, a product model data is determined by its structure and its content. The structure is dependent on the nature of the product and the tools used to model the information as well as to build the necessary schemes for the database. The content is dependent on the particular product. Process model, which are also commonly referred to product development workflow or product modeling processes. It is the abstract description of product development process, and it can be used to analyze, optimize and establish the activity process of product development and to assist the management and monitoring of the whole process. According to different decomposition of process, there exist many different process models, such as concept design process, detail design process and enhancement design process.

The decomposition of process should avail process collaboration, management and optimization. The bigger the process granularity is, the bigger the coupling degree among processes is. However, the smaller the process granularity is, the bigger the discreteness of process is, which can result in more difficulty in process programming. The basic requirement of integrated product and process development is that both the product model and the process model are integrated in one model frame, i.e. coupling [9].The validity of coupling will determine the quality of product development and avail process collaboration, management and optimization [10].

During the development process, product model evolves from abstract model to material model step by step, and this evolvement will result in the hierarchy and dynamic decomposition of product model directly. Because the process model always hinges on product process, the hierarchy of process model can describe the dynamic variation of product development process. The continuous proceeding of process can change the state of product model data continuously, by which the screwy evolvement of product development can be promoted. During the practical development process, there exist close coupling relation between product model and process model. On the one hand, process has data pertinency. That is to say, many processes can deal with the same product model data. Therefore, the logic relation of data can be formed, and this relationship can reflect the development process of product model data life cycle. On the other hand, product model data has process pertinence. The product model data can be handled through the same process, and this can reflect the process relation among different design data. This process relation is the abstract logic relationship in higher hierarchy, and it can offer a new relation definition of different product model data.

IV. INTEGRATED DEVELOPMENT MODEL

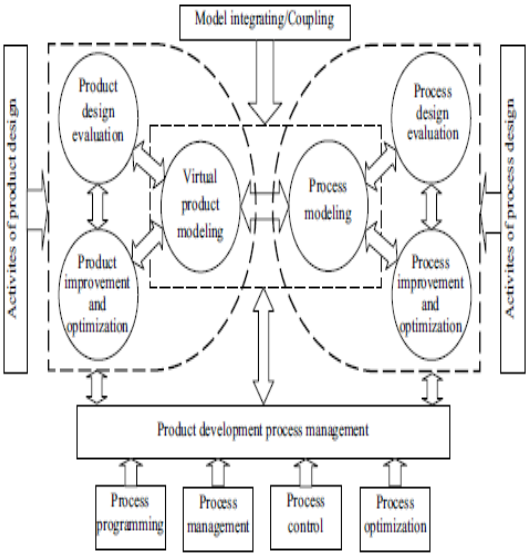

Fig. 1 Integrated product development architecture

Integrated product development breaks through the limitation of time and space. Its main work mode is computer supported collaborative work Therefore, it requires effective process management to carry out system collaboration, real-time monitor, synthetic optimization, requires effective process programming to analyze and forecast the essential reasons that could result in conflict such that the conflict can be avoided or reduced, requires process control mechanism to schedule the development activities and monitor the proceeding of product development, and requires effective process optimization to limit the potential design conflict to a controlled range.

The optimization and solving models can be established through using optimization algorithm, intelligent tools

and programming languages to ensure that the process proceeding is optimal in time and space. Integrated development model emphasizes the coupling effect between product model and process model, and will make the screwy evolvement of product be completed in the mutual adaptation between product model and process model. In integrated development mode, the design activities can use all the design resources effectively, and can make fast response to the variation of development environment. PDMS is of avail to realize the uniform management, redundant control and synchronous maintenance of model information.

V. TENDERING PROCESS AND E-TENDERING

For several years, tendering has been undertaken as part of the traditional contractual procurement process, which operated on the separation of the design and construction phases. However, this has started to change with increased technological complexity, design and build procurement, and client expectancies [2].E-tendering has been assumed to be more cost effectivethan the current, traditional method, in addition to time savings offered by the process. In simplistic terms, this will have implications for reduced printing, copying and courier costs and also reduce the chances of miscommunication [3].There also appears to be a general opinion within the industry that e-tendering should be made more mainstream
and accessible to all members of the supply chain. Booty[4] has indicated that web-based tendering is the way forward in order to reduce bid costs and bureaucracy while at the same time offering the opportunity for greater clarification of information. However, some literature highlights the cost implications of retendering, which for most organizations will be the initial capital investment for set-up costs of the system and training, which will particularly affect smaller firms [5]. Contractors may also suffer cost consequences in printing costs and employing specialist staff to use plotters and CAD. However, Marsh and Flanagan [6].dispute that there are many other hindrances preventingconstruction companies from implementing advanced IT systems. Being able to quantify and measure the actual cost of creating and distributing informational tectonically is seen as a barrier by some organizations.

For companies wanting to put e-tendering into practice, there must be sufficient cost assessments in place in order to gauge whether using the process is financially viable [7].A government report by the National e-Procurement Project highlights that approximate savings of £8 million per annum that can be made within their local authorities by using e-tendering [1]. Another illustration of cost and time savings has been highlighted by Clark [3], on the use of online tendering by a company which saved over £200 000 in tender costs representing a
73% reduction. Additionally, Booty [4] highlights the saving of an organization at £1500 per tender in paper and administration costs, a reduction in time of 1.5days to administer each tender where the overall spend against the budget was reduced by 20%.If e-tendering is to be fully implemented across the whole spectrum of the supply chain, all of the relev ant parties must be aware of the practices, procedures and potential pitfalls of using it. Additionally, there needs to be an increased awareness among subordinates and suitable training provisions established, in order to facilitate tendering successfully.

There is still sufficient apprehension within the UK construction towards e-tendering, which suggests that it will be some time before it is fully incorporated and accepted by the industry as a whole [5]. The creation of a guide specifically for e-tendering highlights the acceptance by the industry that the process is destined to feature predominantly in the future of construction Moreover, opinions are still mixed and the industry is still undecided on the full implementation of retendering, which “offers advantages over paper-based methods. It can be quicker but there is still the opportunity. for human error.

If the technology fails at a crucial moment, it can also mean unfairness to one ormore of the tenderers”.The dearth of substantial fact-based study can be related to the uncertainty and formative stage that retendering is currently undergoing. Indeed, Breetkze etal .[7] highlighted that opinion is clearly divided over the benefits of using e-tendering, and that further research should enable this opinion to be more clearly identified.

VI. LITERATURE REVIEW

Neema Athumani et al. [4] discusses the effectiveness of Tender process in public sector, this paper suggest the solution when the complaint arises furthermore the researcher identified some weakness such as in competency among bidders to fill tender documents, difficulty in understanding language used and during the study the researcher intends to deeply explore whether there is a value of money if the tendering is effectively managed. Area of study of this paper was being conducted at the ministry of health and social welfare in Dar es Salaam region. The paper results in finding a proper tender process cycle.

Avinash Shukla et al. [5] review the implications of applying the E-procurement practices by construction industries. In this paper advent of information technology has provided more competitiveness in

business operation. Construction industry is also gearing up towards the more usage of information technology driving platform. Cost is the main factor for construction industry. Construction industry development council of India (CIDC) has estimated that approx 40-50% cost belongs to material in total building project. Therefore, it is imperative to optimize the material purchasing in construction activities. E-procurement has emerged as panacea to address the most of the problems- cost saving, time saving and best quality, minimization of malpractices associates with purchasing.

Kristina Lauche et al [6]. This case present decision making during tendering procedure in Europe, in the case of the built environment representatives of authorities make decisions about future buildings that can substantially impact the wellbeing of building users and general public. These decisions deal with design quality within a frame of time and money and could cause conflicts with regulations. Most of the conflicts in design decision making have to do with the psychological and managerial aspects of decision making, Although theoretically tangible and intangible costs and benefits could have equal weight in decision making, in practice tangible factors are more often regarded as valid basis for decision making than intangibles. Based on findings a framework is proposed that aims to improve the decisions made by public clients incorporating perception of architectural quality without violating European tendering procedures. This case shows for finding proper contractor a good framework of decision in tendering is required.

VII.THE CURRENT RESEARCH OF TENDERING AND BIDDING SYSTEM

1. The Disunity of Data Interface Of the nowadays building market

It is very prevalent to tender and bid from one place to another place. So to realize the total management of the tendering and bidding, we should use the unity data interface which can create the unity tendering and bidding word document. But in the practice of current tendering and bidding process, the cost calculates software was appointed by the building enterprises. This way can maintain some cost calculate software monopolize place. The disadvantage of this way is add the cost and is unfair

2. The Profession and the High Price of Commercial Software

First, some commercial software developed by the software company is very professional. It has the function which can account the project cost. The people who used the software should be familiar with the budget knowledge and should be trained specially. This way adds the difficulty to work the software. Second, some software of this kind is commercial, so the encryption techniques go against with the need to extend. In a word, design a tendering and bidding system which is low cost, high efficiency and has the unity data interface based on the computer is very necessary.

VIII. CONCLUSION

New product success still remains the critical challenge for companies. Many companies are aware of the major role new products must play in their future and quest for prosperity: companies are constantly searching for ways to revitalize, restructure and redesign their NPD practices and processes for better results. This framework proposes that to achieve success, NPD firms should have a clear and well communicated new product strategy. These firms should have well defined new product arenas along with long term trust, with clear goals. Successful businesses and teams of NPD have a dedication towards the voice of the customer. It is critical that firm should gather as many ideas as possible and a large number of these should come from customers so that the firm can be in a position to design and develop winning new products. Up-front homework prior to the initiation of product design and development is found to be a key factor in a firm's success. The quality of execution of the predevelopment steps - initial screening, preliminary market and technical studies and business analysis - is closely tied to the product's financial performance. Firms should try to shorten the development time so as to minimize the chances that the development and customer needs have changed when the product comes into the market. It is important to verify and validate product performance requirements and design specifications along with customer's acceptance before launching the product into the market via validation and user field testing.

REFERENCES

[1]. Roberts N E. Tendering and the PQS [Dissertation]. Nottingham Trent University, 2004.
[2]. Kwakye A A. Understanding Tendering & Estimating. Hampshire: Gower, 1994.
[3]. Clark P. By switching to online tenders, Laing Homes saved a cool £200,000...so why are most firms stuck in apaper jam. London: Quantity Surveyor News, 2005.
[4]. Booty F. Does e-tendering represent the future market place? London: The Royal Institution of Chartered Surveyors,2004.
[5]. Mayer P, Westcott T. Electronic tendering: Is it delivering? A U.K. and European perspective. Bristol: University of West of England, 2002.
[6]. Marsh L, Flanagan R. Measuring the benefits of information technology in construction. Journal of

Engineering Construction and Architectural Management, 2000, 7(4):423-443.

[7]. F. L. Krause, F. Kimura and T. Kjellberg, "Product Modeling". Annals ofthe CIRP, vol. 42, no. 2, pp. 695-706, 1993.

[8]. Z. B. Wu and C. Wu, "Integration Methodology for Product andDevelopment Process Based on Product Data Management". Journal ofTsinghua University, vol. 40, no. 4, pp. 88-91, 95, 2000.

[9]. B. Wesfechtel, "Integrated Product and Process Management forEngineering Design Applications". Integrated Computer-AidedEngineering, vol. 3, no. 1, pp. 20-35, 1996.

[10]. B. P. Munch, R. Conradi, J. Q. Larsen, et al, "Integrated Product andProcess Management in EPOS". Integrated Computer-Aided Engineering,vol. 3, no. 1, pp. 5-19, 1996.