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De-coupling of front-back stages in service industries: developments from traditional operation to mass customization

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The traditional model of service operations separates the process into front and back stages. This concept has been re-examined and given a range of new industrial applications in recent years against the context of development of new technologies. This paper intends to generalize the logic path of the theory development of this concept by tracing back from its origins to its more recent applications. That is, the designing core of de-coupling concept has evolved from single-operation-purpose to alleviation of operation dilemma to the complete solution to the dilemma. Based on this analysis and understanding of the perceived shortcomings in current research a new theoretical framework is proposed to help further studies on de-coupling principles by systematically incorporating the mass customization concepts which has been regarded as the key to resolve the dilemma in traditional operations management.

Key words: Front and back stage de-coupling, customer contact, mass customization, modularization, postponement.

INTRODUCTION

The traditional model of service operations divides the system into the front stage where services are provided by contacting customers and back stage where supporting activities are conducted efficiently without customers' intervention, which is also known as system de-coupling method (Metters, 2000). With the acceleration of globalization and the development of information technologies, this traditional methodology has been re-examined and new methods applied successfully to a broader domain. The financial sector has been benefiting most from the de-coupling strategy since the de-coupling of front and back offices and the centralization of back stage businesses were widely adopted by modern banks in 1990s (Wang, 2007). With the service system decoupled, the back stage functions could be highly centralized and efficiently handled like manufacturing production and then outsourced to other companies or even other countries. This facilitates the industrialization of the back stage functions, leading to higher operation efficiency and lower costs. The banks could then concentrate on better customer service provision and marketing issues in front offices. Thus they could possibly provide customized services on a mass (efficient) basis, taking on the typical features of mass customization.

Following the financial sector, other services such as telecommunications, IT services and supermarkets also launched a new wave of operation process optimization based on the de-coupling concepts. We could even find the applications of the concepts outside the service sector, among which the Shared Service Centre (SSC) initiated by Ford is most noticeable. SSC is a centralized business unit that undertakes internal business functions for divisions or subsidiaries of a particular company, instead of having those functions conducted separately, which can help improve operation efficiency and cut down costs. Most of the top 500 companies have set up their own SSCs (Wu, 2003).

As a traditional design methodology, the front and back stage de-coupling has evolved from an operational practice in a few service industries in the past to a multi-disciplinary or global industry operation concept in the new era. Therefore it would be useful to trace back to the

theoretical origin of the front and back stage de-coupling and uncover the reasons why the old wine functions in the new bottle, and better understand its operational principles and give better guidance to industrial practices. This would help to facilitate learning-from-each-other activities across industries and more industries then could benefit from application of the de-coupling concepts. It is also academically meaningful since most of the current research has not merged the new technology and new operation concepts in new era with the front and back stage de-coupling and hence been unable to explain the theoretical mechanism in the new wave of de-coupling. To achieve both the academic and industrial purposes stated above, the paper firstly traces the theoretical origin and research evolution of the front and back stage de-coupling and then generalizes the insufficiency in these researches in explaining the new phenomenon and finally propose a new research framework integrated with a concept of mass customization which is regarded as the operation model for 21st century.

FORMATION OF THE PRINCIPIA FOR FRONT AND BACK STAGE DE-COUPLING

The formation and evolution process of the de-coupling principium will be discussed in two stages divided by the turning point of the new wave of de-coupling (1990s). The phase before the point was the formation of the de-coupling principia which also laid the theoretical foundation for the customer contact approach in service system design.

The efficiency-oriented de-coupling and the customer contact as the source of uncertainty

De-coupling of service system into front and back stage resulted from consideration of the influences aroused by customer contact in service delivery process. Chase (1981), and Chase and Tansik (1983) defined customer contact as the physical presence of the customer in the system. It has been regarded as one of the most distinguishing features in service production and hence one of the focal points in service research. As to its influences, most of the scholars agreed that customers were the source of uncertainty, which may interfere with the provision of services and reduce the system efficiency (Chase, 1978, 1981).

Front and back stage de-coupling was proposed to deal with the negative impact of customer contact for improvement of service system efficiency. Thompson (1967) held that the low-contact part or “technical core” or a service process could be sealed off from the environment, thus generating a higher degree of efficiency, and indicating reduction of customer contact. Levitt (1972, 1976) initiated the application of manufacturing principles into service sectors and encouraged managers to decouple the service system to facilitate introduction of the production line approach into the system for high efficiency. Chase (1978) succeeded these viewpoints and proposed that back-office work should be segregated from front-office work, both in terms of the people who performed it and in terms of placing that work in a physically different location. The front stage is the part in service system where activities that require customer contact take place and as such is directly experienced by customers, whereas the back stage contains processes that are carried out remotely from customers and hence cannot be seen or experienced by customers. The design of front office should focus on provision of quality services via customer contacts while the back office should utilize the principles of manufacturing (for example, standardization, division of labour, centralization of facilities and other resources) to increase efficiency (Chase and Tansik, 1983).

In general, the scholars at that time introduced the manufacturing principles into the service system design. Based on this, back stage could be decoupled from the system thus increasing efficiency due to the elimination of uncertainty caused by customer contact. This constructed the initial principia for front and back stage de-coupling focusing mainly on system efficiency.

Multi-objective-balance based de-coupling and comprehensive understanding of customer contact

The understanding of customer contact was further explored with the progress of related research conducted. Cowell (1980) held that customers could be partial employee or co-producer and help to improve service efficiency by taking on part of the service tasks which otherwise should be carried by service employees. Similarly Chase realized the limitation of previous efficiency-oriented research and stated that the closed system philosophy (the view of efficiency-oriented de-coupling) had overlooked the fact that there were positive benefits to both the customer and the organization by having the customer closely linked to the server, even though the job was traditionally performed in the customer’s absence (Chase and Hayes, 1991). The traditional efficiency-based de-coupling concept in essence had put too much attention on the negative influences caused by customer contacts while neglecting the positive aspects including efficiency increase brought by customer participation to the service provision, improvement of service quality and increase of sales opportunities in customer contact.

The reconsideration of the influences caused by customer contact led to further thinking on front and back stage de-coupling. Chase and Aquilano (1992) proposed the service design matrix containing six types of service system based on the relationship between production efficiency and sales opportunity as a function of service delivery options. With the increase of customer contacts

the service production efficiency would decrease but sales opportunities would be boosted. Fewer customer contacts may improve efficiency but reduce the sales possibilities. Therefore the de-coupling of service system should be balanced to deal with this dilemma. Heskett (1986, 1987) also points toward using the back office to provide superior results in non-efficiency strategy by linking the back office to the same marketing directives that the front office is organized around. This would help to provide more professional supports to improve responsiveness, flexibility and customization of services provided in front offices.

The de-coupling concept has been further developed with more in-depth understanding to customer contact. Decoupled front and back offices not only could increase efficiency but also related closely to other operation objectives including service improvement and sales promotion and hence in essence should strike a balance among these various objectives. The de-coupling of service system thus became a strategic decision in service management rather than a tactical one.

Summary: From single purpose to balanced objectives for alleviation of operation dilemma

The separation of the front and back stage was initially a concept to cope with the feature of customer contact in service delivery. Its basic principia was explored with the progressive understanding to the influences on service delivery caused by customer contact, namely from pursuing single efficiency-oriented purpose to balance among multi-objective. This had laid the theoretical foundation for the customer contact approach in service system design initiated by Chase et al. (1981). It in essence physically segmented the service system based on the principium of de-coupling concept and integrated the manufacturing methods with the feature of customer contact for purposes of balancing among high efficiency (low costs) and quality services. This method to some extent could alleviate the fundamental dilemma in service operations between customization (services) and efficiency (costs) but provide no complete solution. It still belonged to the domain of traditional operation.

THE INDUSTRIAL AND THEORETICAL DEVELOPMENT OF DE-COUPLING CONCEPTS IN THE NEW ERA

Financial sector led the way to carry out the de-coupling-focused operation revolution in service sector since 1990s with the development of IT and customer contact technologies during the acceleration process of globalization.

Both the practices and theoretical researches for de-coupling concept entered a new stage of evolution.

Key features of the new practices in system de-coupling

The industrialization and centralization and mobility of back-stage functions

Technology development has enabled the back stage services more “movable”, bringing great flexibility for the spatial deployment of service system.

Some of the back-stage services could be relocated from the urban areas characterized with expensive labour and land rent favorably to places with lower costs (Breathnach, 2000). Apte and Mason (1995) focused on geographic separation of front and back offices in a global context.

The cost advantages from this approach are the abilities to exploit international wage differentials and tax treatments in addition to possible benefits from a better labour market for the back stage. In the banking industry, the operational model featured with centralized back offices has been widely adopted. (Gao, 2005). The extent of commercialization and industrialization of back stage functions has been raised also in this industry (Lacity et al., 2004).

Improvement of the entire service system and the complete solution to the operation dilemma

In those de-coupling practices, operation costs in service system could be substantially reduced with the back stage functions being removed, centralized or industrialized. And at the same time, expertise could be developed and more professional supports could be provided to front offices.

In addition, the adoption of related technologies and new operational concepts facilitated the cooperation between front and back offices. These factors contributed to the holistic improvement of service operation system and achievement of multi-operational objectives in the mean time.

Therefore the most remarkable feature of the system de-coupling in new era, which is also the reason why more and more industries are adopting this concept, lies in the operational characteristics of mass customization brought to these industries by the de-coupling activities, namely providing high quality and customized service products without sacrificing benefits from economy of scale, and providing a complete solution to the operation dilemma in services.

The further development of de-coupling research

The influences of de-coupling on operation strategy

Metters and Vargas (2000) linked the extent of de-coupling and operation strategies and argued that the customer

contact approach was only one of the possible optional strategies for structuring front office and back office works. They have explained that under different strategic conditions, different de-coupling strategies for front office and back office activities are appropriate. They have also stated that the objectives of back-office processes-contrary to the traditional thinking-are not always to minimize the cost of operations. For certain services, they maintained, the objective of the back-office process is to help the front-office employees do a more effective job of serving the customers. Moreover, they argued that the front-office process of some low-volume services might be designed with the objective of minimizing cost.

Safizadeh et al. (2003) also used the financial service data to reveal that the best performers among the processes with a front-office orientation emphasized capital investment, while the best performers among those with a back-office orientation embraced higher degrees of labour intensity. It appears that in order to achieve its superior performance, each process type adopts an additional design characteristic commonly attributed to the opposite process type.

De-coupling of physical system and activities and employees

In recent study, Zomerdijk and Vries (2007) argued that traditional de-coupling method only physically or geographically partitioned the service system without further considering the related service activities and staffs. In the context of new technologies a decoupled service system do not necessarily mean front-stage works should be allocated to front-stage staffs while the back office tasks to back office staffs, neither staffs of front and back stage should geographically separated or belonged to different groups. Hence they have identified three design decisions which are more suitable for describing today's practices than traditional front office – back office thinking. The design decisions regard the degree of customer contact in the process, the de-coupling of activities and the grouping of employees.

Primary efforts on de-coupling for mass customization

Feng (2006) stated in his analysis of mass customization model of services that the de-coupling point of front and back offices could be used as "customer order de-coupling point (also known as CODP in postponement)" to distinguish mass produced services and customized services. The back offices would be in charge of standardized services for low costs while customized services would be delivered in front stage, thus achieving the objective of mass customization. Chen et al (2008) tested the effectiveness of de-coupling method for realization of mass customization based on case study in catering services and also discussed the importance of modularization and new technology in the de-coupling process.

To sum up, academic efforts on de-coupling issues lagged relatively behind the flourish industry practices in new era. Safizadeh et al. (2003) mainly provided a justification of past de-coupling theory. Progress made by Metters and Vargas (2000) focused on the relationship between de-coupling extent and operation strategies and they understand that customer contact approach proposed by Chase was only one of the patterns of front and back stage in service system. Of course, they also noticed the affect of technologies. Zomerdijk and Vries (2000) contributed to distinguishing the physical de-coupling, activities de-coupling and staffs de-coupling in the context of technology development, and thus made the de-coupling decisions more practicable. Feng (2006)'s significance lied on the connection of system de-coupling and mass customization. But the simple division of the "front stage corresponding to customization while back stage to mass production" system need to be questioned, which was also against the early discussion by Heskett (1986, 1987). Similarly Chen et al. (2008) provided only a primary discussion and justification on de-coupling for mass customization in a specific industry and did not based the research systematically on theory of mass customization although they mentioned the modularization and technology issues.

Summary: theoretic research could not provide sufficient explanation on de-coupling practices

The decoupled service system has taken on obvious feature of mass customization since the new wave of de-coupling practices. However, synchronous progress in academic research has not achieved in this filed. Most of the research has not taken into account the emerging characteristics of the new era, including technology development and application of new operation concepts especially the concept of mass customization which has been regarded as the operation model for 21st century. Hence, they could hardly explain the mass customization features held by the decoupled system in new era which was to provide high quality and customized services on a mass-production base. Although, a few works had noticed the technology issues and even the related concepts of mass customization, none of them could answer questions as "why de-coupling in new era could provide complete solution to operation dilemma?" and "what facilitate this?" and "how to facilitate this?", not to mention to provide effective guidance and methods to practical de-coupling decisions.

THE OPERATION DILEMMA AND MASS CUSTOMIZATION

The fundamental operation dilemma for managers has

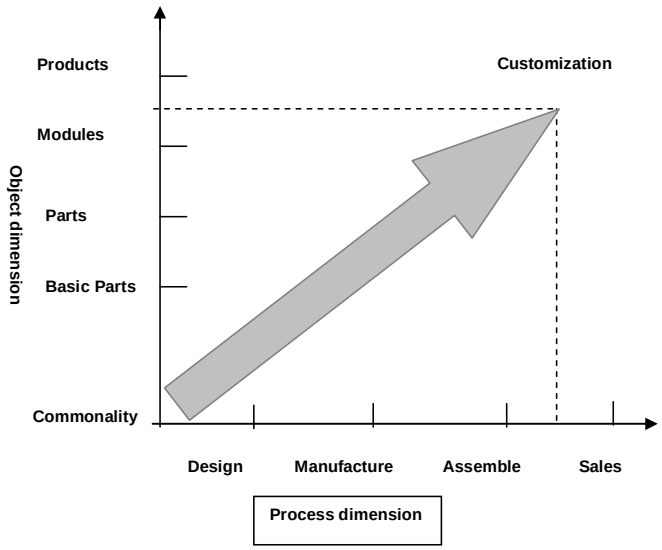

Figure 1. Two-dimension view on mass customization (Li et al., 2003).

been that they have to choose only one in two extremes: either achieving economy of scale by mass production or customizing production to satisfy customers' individual needs. The emergence of mass customization concept has brought a complete solution to this dilemma. The notion of mass customization was dated back to 1970 when it was anticipated by Alvin Toffler in Future Shock. The visionary concept of MC was first coined by Stanley (1987) in Future Perfect, and promoted mass customization as the ability to provide individually designed products and services to every customer through high process agility, flexibility and integration. The concept of MC was first fully expound by Pine (1993), who implied a view of MC as in some sense a historically inevitable successor to mass production, a principal to complete in the future. It is essentially an oxymoron since it puts together seemingly contradictory notions - the production and the distribution of customized goods and service on a mass basis (Åhlström and Westbrook, 1999; Jiao et al., 2003). Hence, it has been seen as the dominant operation model in 21st century and a mostly concerned topic in management research.

To overcome the operation dilemma and achieve mass customization, Duray et al. (2000) proposed that this lied in two important aspects: firstly to find the ways to integrate the customers' individual needs into the design of products and secondly to achieve high productivity by adopting certain production methods. This view actually implies that the keys to achieve mass customization would be found in the two dimensions of the production: the objects (products) and the process, the former referring to 'what to be produced' while the latter referring to 'how to produce'. Based on the two-dimension view, Li et al. (2003) explained the general principle to realize mass customization as shown in Figure 1. They proposed that optimization should be conducted along the two dimensions of production for the purpose of mass customization. In the object dimension of production, optimization could be achieved by striking a balance between the customization and commonality based on the thorough analysis of the relationship among the products and their elements (basic parts, parts, modules, etc.). While in the process dimension, re-arrangement of production process and resource utilization in each stage in the process could be helpful for optimization purposes. And in the IT management domain a lot of solutions to mass customization have been introduced (Sia, et al) comparing to the slower process in "actual operations".

The approaches to reach mass customization have been proposed along the two dimensions. In the product dimension, most of the literatures agreed that modularity would be the key. Both Pine (1993) and Duray et al. (2000) held that modular design in product and process could facilitate the MC. And modularization is seen as the way to achieve both scale and scope economy required by mass customization (Baldwin and Clark, 1994). Besides modularization within the organization, some studies proposed that the optimization in the object dimension could be achieved in broader operation scope, not limited in the domain of a single organization, namely lower-cost modules or parts could be attained from the outside of the organization for the mass customization purposes (Qi and Gu, 2000). This is actually a broader or open system view and brings about more approaches for MC such as outsourcing and supply chain management (Gupta and Zhender, 1994). In the process dimension, the postponement is regarded as an effective way (Feitzinger and Lee, 1997). It means delaying activities in the production process until customer orders are received (Van Hoek, 2001). This helps to achieve more scale of economy without affecting the level of customization since the customizing activities can be "postponed" until orders come in while the common parts of the products can be mass-produced in advance with high efficiency.

FRONT AND BACK STAGE DE-COUPLING IN SERVICE SYSTEM BASED ON MASS CUSTOMIZATION

The initial purpose for front and back stage de-coupling was to deal with the disturbances and uncertainty due to customer contact in service delivery and thus increase system efficiency. With further understanding to the effects of customer contact, the de-coupling method was used to balance multi-operation objectives including efficiency increase and service improvement, bringing alleviation to the operation dilemma, but not complete solution. In the new era the de-coupling concept was put into new applications in many industrial practices and featured with operation mode of mass customization which offered absolute solution to the operation dilemma.

However the theoretical progress in this domain could not catch up with the industrial practices and could not provide adequate explanation to this phenomenon since the current researches have not systematically integrated the principles of mass customization into the de-coupling issues. This analysis helps to find out the future research directions in the field, namely basing the research systematically on the theory of mass customization, introducing the two-dimension operational optimization together with methods including modularization and postponement to uncover the principia of system de-coupling with features of mass customization. Based on this the way of de-coupling, decision-making could be found and provided for practical guidance for the managers.

Mass customization in service system

The principium of mass customization originated from manufacturing could not be directly applied into the service sector because of different features of these two domains. Mass customization can be realized from two aspects: the product and process dimensions of production in manufacturing sector. Optimization in these two dimensions can be carried out independently. However it is not the case in service sector since “for services the product is the process” (Fitzsimmons and Fitzsimmons, 2001). In the production structure of services there are not the actual “physical or tangible products”, but conceptual “content of product”, or collection of service functions to be delivered to satisfy customers’ needs (Chen and Hao, 2010). These “virtual” products by themselves have no actual significance and should be integrated with the service system or put into the service process that provides these functions for the actual provision of the service products. Similarly there is no “pure service system” without functions. Therefore in the structure of service production, neither product dimension nor process dimension can exist independently. For purpose of mass customization the optimization of the two dimensions should be integrated.

Based on the discussion earlier, a basic framework for service system optimization for mass customization could be described as shown in Figure 2. To realize mass customization, the design of service system should be reconsidered by integrating the optimizations of two dimensions of service production. In the product dimension, the modularization could be utilized for construction of the “virtual” modular structure based on service functions, while in the process dimension the method of postponement and physical system planning could be adopted to identify the timing and spatial features of the “virtual” modular structure, thus completing the integration of the function modules and system (process) base. Among the two-dimension-based approaches to mass customization, the modularization is the most fundamental since it constructs the function-based virtual structure of service system, based on which the postponement and physical planning are used to determine the timing and spatial structure of service system.

Fortunately we could find many researches on integration of process and product dimensions in the field of IT engineering (Wan, 2001). The principles and methods (for example, Capability Maturity Model Integration, CMMI and Integrated Product and Process Development, IPPD) proposed in these researches could be very helpful for us to understand the integration of process and product in actual service operations.

Front and back stage de-coupling based on mass customization

Service system could be seen as a production system for transforming customers which should exist in definite timing and spatial structure or be constructed according to definite timing and spatial rules. There is not only “virtual” function relationship reflecting customers’ need but also “solid” relationship of spatial and timing features among modules in service system. This is the core of service system optimization for mass customization.

De-coupling the system into front and back offices is a sort of construction structure of service process to fit the feature of customer contact. The distinguishing nature of front and back stage provide ways of achieving different operation objectives. To realize mass customization, namely to attain both efficiency and service customization, the relationship between front and back stage should be carefully handled. Thus front and back office de-coupling becomes a basic and important decision for determining the spatial structure of service system in the optimization of process dimension for mass customization.

Considering the conceptual framework of service system optimization for mass customization discussed above, de-coupling service system into front and back parts for mass customization as an optimization in process dimension is not merely a spatial issue since it should be integrated with the considerations of the optimization in product dimension and also the timing aspect of the service process. Different from traditional operation, the system de-coupling for mass customization is constructed on the basis of modularization of service system which distinguishes the customized modules, and general-use modules reflecting the optimization of service functions based on customers’ demands, and make it possible to mass produce the general-use modules and individually provide the customized ones. On the modular basis, deploying these various modules to front or back offices can facilitate both the mass production and customized service delivery by utilizing the different nature of front and back part of the service system. In the

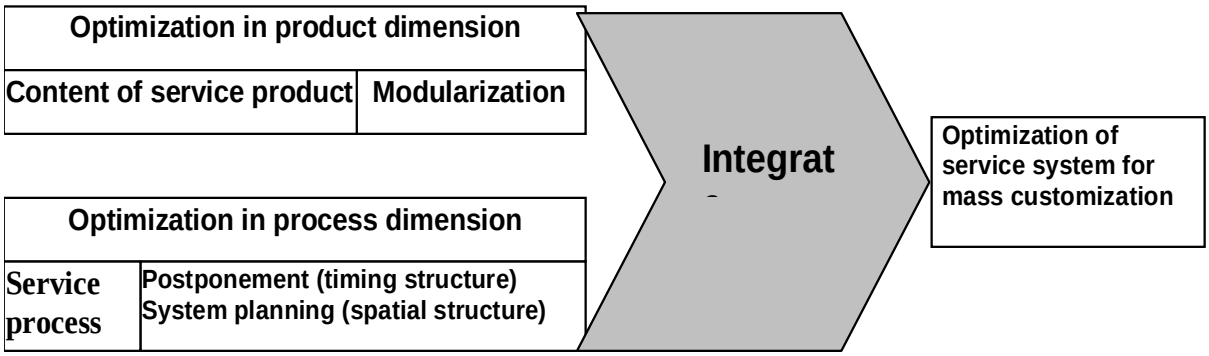

Figure 2. Model for mass customization in service system.

mean time, de-coupling issues can be also jointly considered with the optimization of timing structure by using postponement methods. This matches the spatial structure of the service system with the timing position of service provision process, leading to more effective solution to the operation dilemma.

Technologies play important role in the de-coupling process. They have changed the nature of customer contact (Voss, 2003) and hence made the de-coupling strategy more flexible due to the enriched ways of contacting customers. Some service functions that had to be carried out in front offices, for example, now can be converted to efficient back stage works. The technologies also make the deployment of back offices more mobile to be located favourably for higher efficiency and more professional back-ups. This can be regarded as the optimization in product dimension in broader domain since companies can utilize more back office modules by outsourcing and commercializing them. In addition the related technologies are much helpful for the transferring and analysis of customers' information in delivery of customized services.

Decision-making for front and back stage de-coupling based on mass customization

According to the principia analysis above, the decision-making for front and back stage de-coupling in service system of mass customization could be conducted in steps as following:

Modularization of service system

Modularization is the major ways for optimization in product dimension and becomes the premise for front and back office de-coupling for mass customization. Based on the analysis of customer demands, basic service functions can be found out and integrated into basic service modules according to the relation among service functions and the extent of re-usability. The basic modules may then be further optimized to construct a hierarchy of service modules which can be also distinguished into two categories: general-use modules and customization modules. This is actually a sort of conceptual modularization and answers the question "what to be provided" and also provides the objectives for de-coupling decision-making.

In industrial practices modularization is a fundamental task for de-coupling issues. This requires accumulation of customer data by careful and in-depth market research and quantitative analysis of service products. Then the customers' needs could be matched appropriately with the service modules by adopting related methodology and the optimized modular structure for service system can be finally constructed for further decision-making.

Comprehensive decision-making from the perspective of time-space integration

On the basis of modularization of service system, the service modules in various natures should be spatially deployed to answer the questions of "how to do" and "where to do". The issue of decision-making for front and back stage de-coupling has been in essence converted into determination of front or back stage deployment for the service modules. Firstly the decision should be carried out according to the extent of customer contact and the modules with high customer contact that "have to" be arranged in front-stage could be sorted out. In this step the technology issue should be taken into account to consider whether to adjust the deployment of modules by changing the ways of customer contact with technologies. Secondly service modules except the "have to be in front office" ones should be analyzed according to the nature of the modules. The general-use modules have more priority to be in back stage for mass production and the customization modules in front offices for quality service delivery. Finally comprehensive considerations are required for balance-thinking the benefits from being put

in front or back stages with special concern on the position of the modules in timing structure optimized with postponement methods.

In practices the optimization of the holistic service process should be conducted for the de-coupling decision-making, which is to reengineering the service process based on the postponement principles. And new technologies can be also utilized for increasing the flexibility of system de-coupling during the reengineering process. For the comprehensive de-coupling decision-making, the assistances from experts and decision-making tools of IT and implications from the IT engineering can be helpful for building a practical model which includes various factors mentioned earlier.

Conclusions

As a traditional design concept for service system, the front and back stage de-coupling has aroused new wave of attention and has been put into new applications with huge success by more and more industries recently. Against this background the paper traces the theoretic origin of the de-coupling concept whose evolution process started from single efficiency-pursuing to balanced-thinking among multi-operational objectives till the final complete solution to the operation dilemma. Before the new wave of de-coupling applications in 1990s, the front and back stage de-coupling had remained still in the traditional operation domain since it could not solve completely the operation dilemma. In the new era the practices of de-coupling have taken on the features of mass customization and provided fundamental solutions to the operation contradiction but the theoretic research could not catch up the step of practices and give explanation to the issue due to inadequate integration of the principles of mass customization into the studies. With this view the paper proposed a new research framework featured with the systematic incorporation of the concept and approaches of mass customization. A service system model of mass customization based on integration of product and process dimension is proposed, which refers to the match of “virtual” modular system of service functions with “solid” time-space features of service system. The role of front-back office de-coupling is hence identified as the key decision for spatial structure of service system in the optimization of process dimension for mass customization. The de-coupling decision-making should be based on the modularization of service system and then conducted with comprehensive consideration of various factors including the timing structure of the system. The limitation of the paper is that only a general conceptual framework in the domain is proposed, and thus further researches could be carried out for detailed empirical test and more accurate model construction, including quantitative modeling of the de-coupling decision-making.

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REFERENCES

Åhlström P, Westbrook R (1999). Implications of mass customization for operations management, Int. J. Oper. Prod. Manage., 19(3): 262-275.
Apte UM, Mason RO (1995). Global Disaggregation of Information-Intensive Services. Manage. Sci., 41(7):1250-1262
Baldwin CY, Clark KB (1994). “Modularity-in-Design: An Analysis Based on the Theory of Real Options.” Working Paper, Harvard Business School, Cambridge, MA.
Breathnach P (2000). Globalization, Information Technology and the Emergence of Nich Transnational Cities: The Growth of the Call Centre Sector in Dublin. Geoforum, 32(4): 477-485.
Chase RB (1978). Where Does the Customer Fit in the Service Operation. Harv. Bus. Rev., 56: 137–142.
Chase RB (1981). The Customer Contact Approach to Services: Theoretical Based and Practical Extensions. Oper. Res., 29(4): 698-705.
Chase RB, Aquilano NJ (1992). A Matrix for Linking Marketing and Production Variables in Service System Design. In: Production and Operation Management, 6th ed. Irwin, Homewood, III.
Chen J, Hao YH (2010). Mass Customization in Design of Service Delivery System: Review and prospects. Afr. J. Bus. Manage., 4 (6): 842-848.
Chen J, Hao YH, Jin TT (2008). Research on Key Issues in System De-coupling for Service Mass Customization. Proceedings of IEEE International Conference on Engineering Management and Service Sciences.
Duray R, Ward P, Milligan G, Berry W (2000). Approaches to Mass Customization: Configurations and Empirical Validation. J. Oper. Manage., 18: 605-625.
Feitzinger E, Lee H (1997). Mass customization at Hewlett-Packard: The Power of Postponement. Harv. Bus. Rev., 75 (1):116-121.
Feng GY (2006). Model of service product optimization for mass customization”. Value Eng., (1):64-66.
Fitzsimmons JA, Fitzsimmons MJ (2001).Service Management 3rd ed, McGraw-Hill, Inc.
Gao JW (2005). Study on Impact of Information Technology on the Back Desk Organization in Commercial Banks. J. Beijing Tech. Bus. University (Soc. Sci), 20(4): 65-69.
Heskett JL (1986). Managing in the Service Economy. HBS, Press, Boston, MA.
Heskett JL (1987). Lessons in the Service Sector. Harv. Bus. Rev., 65(20): 118–126.
Jiao J, Ma Q, Tseng MM (2003). Towards High Value-added Products and Services: Mass Customization and Beyond. Technovation, 23(10): 809-821.
Lacity M, Willcocks L, Feeny D (2004). Commercializing the Back Office at Lloyds of London: Outsourcing and Strategic Partnerships Revisited. Eur. Manage. J., 22(2): 127–140
Levitt T (1972). Production Line Approach to Service. Harvard Business Review, September-October: 41-52.
Li SC, Liang GQ, Liu CG (2003). The Theory of Mass Customization Operation, Science Publishing House: Beijing.
Lin QP (2005). Research on “big back office” operation model for commercial banks. Modern Commer. Banks, (12):54-55.
Liu X, Jiang JT, He CJ Xiang FM (2006). Relocation of Financial Back Offices- The Case of Pearl River Delta. Urban Planning Forum, (5):81-85.
Metters R, Vargas V (2000). A Typology of De-coupling Strategies in Mixed Services”. J. Oper. Manage., 18: 663-682.

Pine II BJ, Victor B, Boynton AC (1993). Making mass Customization Work. Harv. Bus. Rev., Sep/Oct: 108-19.
Safizadeh MH, Field JM, Ritzman LP (2003). An Empirical Analysis of Financial Services Processes with a Front-office or Back-office Orientation. J. Oper. Manage., 21(5):557-76.
Sia SK, Soh C, Weill P (2010). Global IT management: structuring for scale, responsiveness, and innovation. Comm. ACM, 53(3): 59-64
Stanley DM (1987). Future Perfect. Reading, Massachusetts: Addison-Wesley.
Van Hoek RI (2001). The rediscovery of postponement a literature review and directions for research, J. Oper. Manage., 19: 161-184
Voss CA (2003). Rethinking paradigms of service. Service in a virtual environment, Int. J. Oper. Prod. Manage., 23(1):88-104.
Wan J, Kong X, Yang J (2001). Research on CMMI Model. Appl. Res. Comput., 18(10): 10-13.
Wang L (2007). The research on new trends of front and back stage de-coupling in financial industry. Financial Trade Econ., (7):19-23.
Wu YJ, Zhang GF, Zhang Y (2003). Organization innovation in internationalization process for enterprises". World Econ. Res., (3):85-89.
Zomerdijk LG, Vries JD (2007). Structuring Front Office and Back Office Work In Service Delivery Systems: An Empirical Study of Three Design Decisions. Int. J. Oper. Prod. Manage., 27(1): 108-131.