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IT Based Business Transformation Research of XLY

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Abstract: Under the impact of mobile e-commerce, traditional supermarket operations are facing greater competitive pressure. Many traditional supermarkets are looking for a way out, relying on their accumulated supply chain, customer base, and brand capabilities to transform into e-commerce channels. XYL is a department store retailing company, has also followed the needs of the times and embarked on the road of digital transformation, opening an online store, and realizing online and offline integration. However, XYL is still in the early stage of transformation and still faces many problems such as long delivery time. This report focuses on the problem of late delivery of goods in XYL, through identify the process most relevant to the problem and diagnose problems in the current process to provide suggestions for the redesign and implementation of the process.

Keywords: IT, transformation, e-commerce, Business to Customers(B2C), online shopping process

1. Introduction

1.1. Background

With the upgrading of consumption and the rise of e-commerce, the supermarket industry has undergone profound changes. Traditional supermarket stores have been unable to adapt to the needs of consumption upgrades, and problems such as reduced competitiveness, decreased customer satisfaction, and decreased sales have occurred. Online and offline integration become a breakthrough for traditional supermarkets. Online shopping malls operated by traditional supermarkets can share resources with offline operations and complement each other's advantages. And its advantage lies in the fact that physical retail has been in business for so many years, has a certain stable customer base, and provides more detailed and comprehensive services to old customers in the form of online shopping malls, which also lays a better foundation for its future development. In recent years, XYL has also vigorously promoted digital and information transformation, and established a full-scale online service system such as intra-city delivery, Business to Customers(B2C), and live broadcast delivery to meet customers' multi-platform and diversified shopping needs.[1]

XLY was established in June 1984. It is a commercial enterprise focusing on department store retailing. The stores are mainly distributed in Tianji, Hebei and Shandong provinces. Since its establishment, XYL has always adhered to the business tenet of "integrity-based, and earnestly safeguarding the interests of consumers and suppliers". After 30 years of exploration and practice,

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XYL has formed an effective cultural concept system and an independent and unique operating management model. In recent years, XYL has also vigorously promoted digital and information transformation, and established a full-scale online service system such as intra-city delivery, B2C, and live broadcast delivery to meet customers' multi-platform and diversified shopping needs.[1] We mainly focus on the business of XYL in Cangzhou, Hubei province. The market type of the XYL in this area is a fragmented market. XYL competes with other small and medium-sized supermarkets and also with large supermarkets such as Aeon, but no single company can dominate the entire market.

1.2. Problems and Triggers

According to our interviews with employees of various positions in XYL, XYL has a strong demand for the reform of the existing business process, and this demand mainly comes from the following parts:

Problems:

Fierce competition (Environmental triggers): Many competitors of XYL have already developed their mature online business. The amount of Gross Merchandise Volume (GMV) and the proportion of revenue have increased year by year, such as Wumart and Yonghui Supermarkets. Their mature online shopping process has brought them a lot of unparalleled competitiveness, and XYL has no advantage in this respect.

Process factor:XYL's own process needs to be improved urgently. Reputation started from a traditional supermarket and they did not have much experience in the field of instant delivery before.Therefore, in XYL, there are many imperfections in the previous process of developing an online business. These imperfections brought a lot of uncertainty to XYL's reputation and operation. And XYL’s management and employees hope to make changes to this status.

Customer factor:At present, XYL's picking system still has many defects, there are still many mistakes such as wrong delivery goods or long delivery time. These problems often cause the dissatisfaction of XYL customers, thus damaging the overall image of XYL.

Changes in people's shopping patterns are opportunities: With the popularity of the Internet and the impact of COVID-19, more and more people choose to shop online [2]. Benefiting from this situation, the business volume of major online shopping platforms has achieved great growth in recent years. During this period, XYL has the chance to make great developments in online business and enrich their business models Many peer companies already have some try and accumulate some experience. With the continuous development of the instant delivery industry, many of XYL’s competitors have applied many advanced processes and models. XYL can make adjustments that suit itself based on the experience of other companies, so as to quickly and effectively find out what is suitable for itself.

In order to meet the needs of the market and the increasing demand for instant delivery to home, XYL began to seek the development of online business, but the transformation of XYL is still at a relatively early stage, it still faces many problems such as long delivery time and low customer satisfaction. To this end, we will put forward optimization suggestions for XYL's existing home-delivery processes to help it strengthen online operations and gain a competitive advantage.

2. Research Methodology

We investigate the issues involved by designing experiments and using references.

2.1. Literature Review

It is essential for us to do a literature review to capture more information about XYL and its main competitors.

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We reviewed some latest articles related to the company via Google. We found that it has promoted digital and information transformation recently and established an online service system to provide the home-delivery service with online clients to meet their needs. However, it also reveals that the existing process has some deficiencies. In addition, we conducted market analysis and case studies to gain more information about the market strategies and advanced systems of its competitors. Yonghui Supermarket, for instance, has integrated online and offline channels, launching the Yonghui Life app to facilitate the shopping of online clients. Hence, a comprehensive literature review helps us have a deeper understanding of the current situation of XYL and thus conduct further redesign plans.

2.2. Primary Research

A descriptive qualitative design will be conducted in this project to gain more detailed information about the current business processes of XYL.

Table 1: Research design.

Setting	The majority of interviews will be conducted via phone and Wechat due to geographical restrictions. For the on-the-spot interview, the observer will go to the store, observe the whole business process, and conduct an in-depth consultation to find problems related to the current process.
Interviewee	1. Top manager: through interviewing the top manager, we will learn more about the organizational structure, latest marketing strategies, and the whole business process. 2. IT department: We can understand how the existing technology and system facilitate the business process and its deficiencies. 3. Picking department: It is better for us to understand their picking process, the way of receiving the online order, locating the goods, and checking the order. Most importantly, understand how the sub-process affects the satisfaction of online clients. 4. Delivering department: interview the delivery men to know how they ship the order. Last but not least, selecting the consumer to ask about their shopping experience is also needed.
Data Collection	The interview will be conducted within two weeks for the Business Process Management (BPM) project. The method of collecting data is sending the questionnaire, semi-structured interviews.

3. Description of the Processes to Investigate, with Identification of Existing Deficiencies

Customers mainly purchase products through the XYL online mall or third-party platforms (Meituan, Ele.me, etc.), then fill in the delivery address, submit the order and pay. These orders usually have high requirements for timeliness. XYL launches a one-hour delivery service for orders within three kilometers, and it will be postponed for 10 minutes per kilometer beyond this range. After the store receives the order, the order splitting office assigns the order to different pickers. Store personnel manually pick, check, and pack according to the order. According to the order time, the order is delivered to the customer's home in turn by XYL's own distribution team, and the customer confirms that the order is correct and signs for receipt after receiving the goods. The processes are closely connected and interlinked.

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3.1. Identify the Possible Processes Related to the Problems

In view of the problems of late delivery and low customer satisfaction in XYL, we have roughly identified the following possible related processes.

In terms of order processing, XYL may have the problem of slow order processing. At present, XYL still adopts the manual order processing mode. All orders received and sent to the picker need manual operation, and a reliable cloud system has not been formed. However, the speed and accuracy of manual processing are low, and omissions may occur, resulting in the customer's failure to receive the goods, thus affecting customer satisfaction [3].

In terms of the process of shipping the orders, XYL currently just hires little deliverymen to ship the orders from the online channel. There is no criterion about when to go shipping the orders. All the processes are based on experience. During this process, the route is not clear and scientific and the delivery men have to come and go many times due to a lack of scientific time to go shipping which results in slow shipment. In addition, specially hiring employees for shipping the orders also results in higher cost.

3.2. Priority of the Processes

After identifying different business processes, we prioritize these processes according to the customer value and improvement opportunities [4]. Each process is assigned with a score from 1-10, as shown in table 2. Based on the scores we have determined which steps need to be prioritised for improvement, as shown in Figure 1.

Table 2: Priority of the processes analysis table.

	Customer Value	Improvement Opportunities
1.The process of assigning the order:	4: The existing system that ships one order to the employee instead of integrating different orders based on the placement of goods, puts more pressure on employees in charge of order picking. And it is inefficient since it increases the frequency of picking. However, customers are not concerned about this process as long as they can receive their goods in time.	7: Reduce repetitive work by using the algorithms of the existing system to combine items from the same area shelves in different orders and distribute them to the pickers in a unified manner when dividing orders in the existing system [5]. Reasonable planning of picking travel routes and space.
2.Order goods sorting process:	9: Currently, the packaging path is long, which may delay the time for receiving the goods. Secondly, in the process of picking and replenishing goods, there may be wrong picking of goods and damage to the goods. Finally, customers reflect that sometimes they encounter situations where they are informed that goods are out of stock after placing an online order. So customers attach great importance to this process since it affects their shopping experience directly.	10: In-house IT staff (skilled) available to integrate offline online stock management systems and provide technical support for the provision of stock monitoring. There is enough space in the store to divide a dedicated warehouse for storing online high-selling products [6]. Use of existing systems to differentiate between items that need to be picked in the online warehouse and in the shop.
3.The process of shipping the orders:	6: The customer values the speed of delivering the order. So for XYL, the inefficient and unscientific delivery route may cause the increase in the time for its customers to receive the order.	8: Through outsourcing the delivery process, streamline internal deliverymen, reduce management pressure and the delivering cost.

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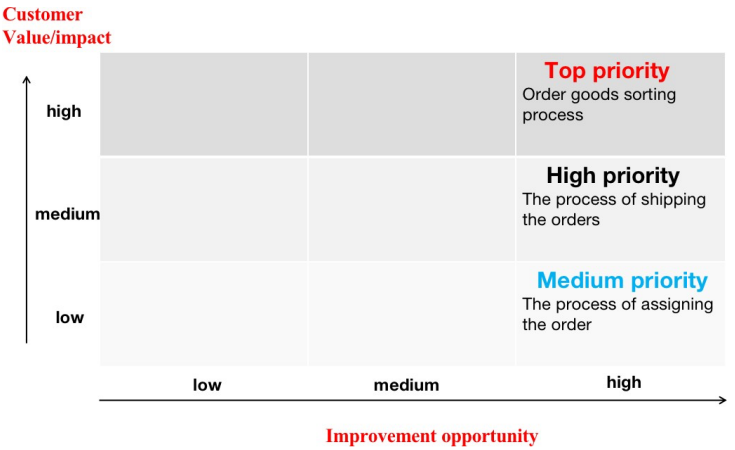

Figure 1: Improved prioritisation figure.

4. Description of AS-IS Process and the Process Boundaries

4.1. Identification of the Specific AS-IS Process

First of all, in XYL supermarket, when a consumer places an order in the mini program of an online mall, the order first arrives at the order center, and the order is placed through the order system at the first time. The order is in duplicate, one for the customer, and another one for the warehouse shipment. Then the order is handed over to the order splitting office, and the order splitting office hands the order to the store pickers. After completing the picking of each item, the picker will check the type and quantity of the goods, check the correctness and mark on the printed order paper. After the final picking of all commodities is completed, the order will be handed over to the packaging staff for verification and packaging. Sometimes the pickers also encounter the situation of no inventory in the store, and they need to register the vacant items on the shelf and contact the customer again for replacement or refund.

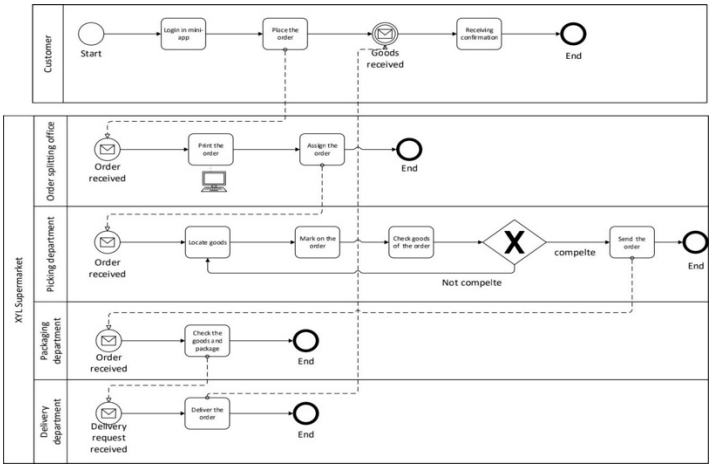

Figure 2: AS-IS process.

4.2. Process Boundaries

ProcessView is applied in defining the process boundaries of the Order goods sorting process. The process trigger, customer of process, enterprise units, external partners and deliverables of process are identified below.

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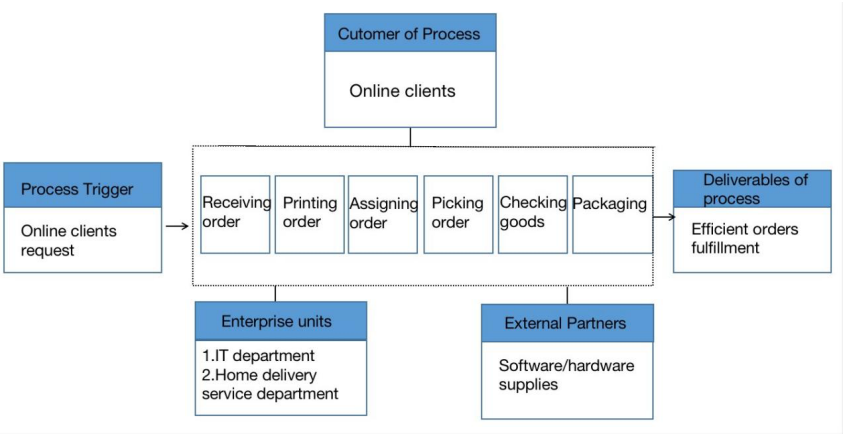

Figure 3: The process boundaries of the Order goods sorting process.

4.3. Analysis and Diagnosis of AS-IS

Strengths: This process requires many pickers to well-known the picking routes. That indirectly trained the pickers on the picking route. The familiarity of the pickers leads them to be highly motivated to work.

Weaknesses: The degree of digital integration is low. The original "fruit picking" picking mode has low efficiency and requires many employees, leading to high labor costs.

Opportunities: "Double Warehouse" model and PDA system's popularization and development is a good opportunity to learn and develop, and provide guidance for XYL.

Threats: With the current picking model, the pickers have a high working pressure with the huge amount of the orders, which may result in personnel loss. The current model has a high error rate, which affects customer satisfaction.

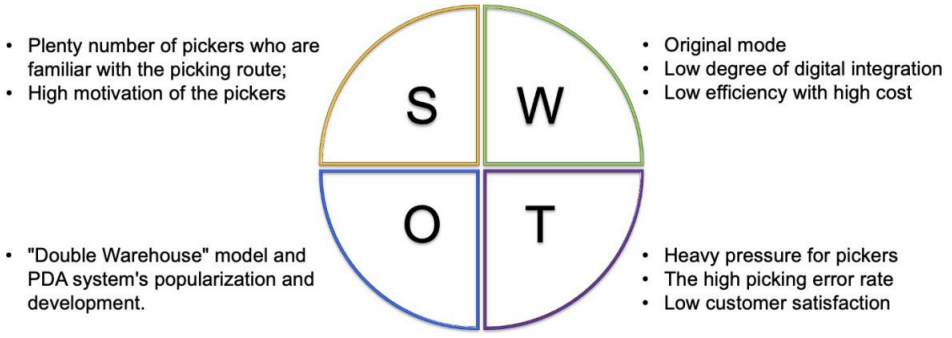

Figure 4: SWOT analysis.

4.4. Best Practices

Corresponding to some shortcomings of XYL, its competitors have made some improvements, which can be introduced to XYL properly.

In terms of product placement, Freshippo innovatively adopts a new model, that separates the picking area into stores (the facade of the supermarket) and the warehouse specially for online hot-selling goods. For some online customers with large consumption or heavyweight and bulky goods that are not easy to carry, the establish of warehouses only for online hot-selling products can help pickers save a lot of time by storing many categories of goods in a relatively small store, so they do not have to pick and move goods in the front warehouse which is large [7].

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In terms of product picking, Missfresh equips each picker with a PDA (Personal Digital Assistant). On this small PDA, the picker can update the picking status of the current order in real-time. After the picker gets a certain item in the basket, he only needs to confirm it on the PDA, and the system will write off the item from the waiting list and display the products to be obtained, so that the picker can accurately grasp the current picking progress and can reduce the error rate. In addition, PDA will also divide the ordered goods according to the category and plan the most suitable picking route for the pickers, saving time for the pickers [8].

5. Description of TO-BE Process

5.1. Description of TO-BE Process with the Using of BPM Process Diagram

For XYL, since the launch of its online supermarket, the picking process is undoubtedly very important, as it not only tells the operation of a warehouse but also the satisfaction and loyalty of customers [9]. In order to solve the many problems in the picking process of XYL Supermarket as mentioned in the previous report, we have designed the following solution to improve the efficiency of XYL's picking process, through a four-step process of intelligent planning of stock levels - rational allocation of picking tasks - efficient execution of picking operations - and picking performance statistics four-step process to improve picking efficiency.

Preparation: XYL needs to digitize its merchandise and enter it into the PDA system, enabling real-time updates of merchandise information in all circulation stages and real-time monitoring of inventory status. At the same time, a storage area (warehouse) dedicated to online hot-selling goods was set up and specially divided in the store warehouse as a way to reduce the frequency of replenishment in stores. This warehouse model will be referred to as warehouse (online) for short in the following chapters. XYL also needs to do a good job of setting up the goods in advance, planning special areas, shelves and spaces in the warehouse (online) and dividing the special collection area, and then setting up the corresponding spaces for goods in the PDA system to prepare for the subsequent PDA scan picking.

Orders are either allocated by the back-office employees or automatically assigned to pickers of the warehouse (online) and store pickers based on the distribution priority, the amount of picking tasks, and the goods location calculations. The order allocation process ensures the optimal and most efficient distribution of orders. The pickers in both sites receive their respective picking task orders and carry out picking operations at the same time. The pickers can view their tasks in real time on the PDA system, enabling batch picking when large quantities of items are repeated, improving picking efficiency and shortening customer waiting times.

When picking, the PDA system classifies the order category, displays the picking name and picking store location, and optimizes the route for the picker. The picker finds the goods and then scans the code to check them. If the scanned goods do not match, the machine will sound a reminder, and if they do match, they can tick a mark to prevent the goods from being picked by mistake or missed. At the picking site, the PDA system shows completed, in-process and to-be-picked goods in real-time, making it easy for XYL to dispatch staff in time to progress the picking process. The equipment automatically prompts when picking is complete, eliminating the need for manual checking. Once both the online warehouse and shop goods have been picked, they are combined and handed over to the distribution staff and enter the distribution process.

The PDA system provides a multi-dimensional display of performance data according to picking orders, commodity quantities, amounts and picking times, helping the HR department to accurately account for staff performance and increase the motivation of picking staff.

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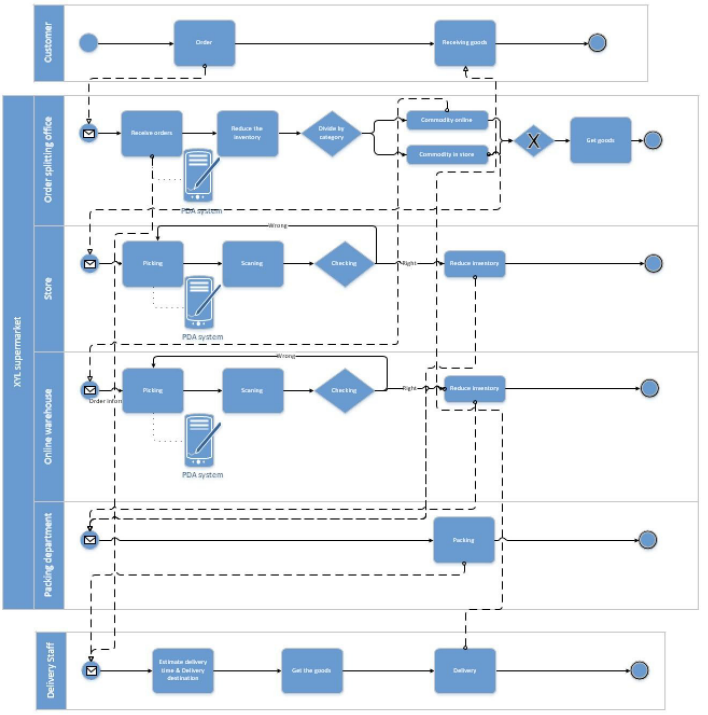

Figure 5: TO-BE process with the using of BPM process diagram.

5.2. Description the Improvements in Using the New Process &Desired Result

For picking operations:

Table 3: The improvements in using the new process & Desired result for picking operations.

	AS-IS	TO-BE	Desired Results
Order splitting	After receiving the customer's order, the system places the order to the order splitting place, and the personnel at the order splitting place distribute the order to the employees. Orders are given by humans throughout the process.	Through the use of PDA systems. Orders are allocated by back-end warehouse managers or the system is automatically assigned to online warehouses and store pickers after calculation of assigned priority, picker task volume, and product location. The combination of labor and system ensures accuracy.	The process of allocating orders ensures the best and most efficient allocation of orders. The pickers in both the warehouse (online) and the store receive their respective picking orders and carry out the picking operations at the same time. Through PDA, multiple orders can be dispatched to pickers at the same time, which improves overall efficiency and achieves “Lose wait”.

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Table 3: (continued).

Order picking	XYL currently only picks goods through stores. The order is placed at the sorting place, and the picking staff will sort, weigh, pack, and paste the order information into the store. According to the goods in the order, a single order is picked in the whole store. Low efficiency and error-prone.	1. Set up a warehouse for online subjects to store a special storage area for online hot products. 2. Participate in the picking process using the PDA system and divide orders in batches. The PDA system classifies the order categories and displays the picking name and picking location. Real-time scanning and recording through PDA when picking up the goods.	The establishment of new warehousesreduces the frequency of store replenishment and eases the pressure of store picking. Use a PDA to optimize the route for pickers. Pickers can view their tasks in real time on the PDA system, which can realize batch picking, improve picking efficiency, and shorten customer waiting time. The use of the PDA's scan, record, and punch-in function can effectively avoid the situation of wrong picking and missed picking. At the same time improves the accuracy of picking.
Inventory management	Manual inventory check and write-off situation.	Use the PDA system to plan the layout of the product location. Use digitalization to check and accept.	Real-time inventory updates are conducive to reducing oversold and online out-of-stock problems and improving consumers' online. shopping satisfaction. Digital processing is used to realize the real-time update of commodity information in various circulation links and real-time monitoring of inventory status, and effectively plan and monitor the location of commodities to lay a solid foundation for the picking path. Effectively reduce labor costs and time costs.

6. Explanation of the Principles and Tactics Employed in Your Redesign

Lose wait: By setting up the warehouse (online) and PDA, it could achieve the goods picking in the store and the warehouse(online) at the same time. Achieve real-time information processing and modify upstream practices to alleviate downstream bottlenecks and realize the target of "Lose Wait". Thus, improving overall efficiency, reducing delivery time, and improving customer satisfaction.

Synchronize: According to the synchronization principle, the PDA is used in the picking process could synchronize online and offline inventory to match offerings on the physical and virtual channels. Effectively reduce time and inventory costs, ensure the number of inventory. Updating the inventory

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in real-time is conducive to reducing an oversold and online out-of-stock problem that could improve consumers' online shopping satisfaction.

Digitize and propagate: According to digitize and propagate principles, the sorting system could help the picker to capture and process the information digitally at the source. This process could help XYL reduce human effort and errors and shorten this process cycle time. The information is easier to access and modify, shrinking the distance between the information and the decision, and helping pickers' efficiency.

Vitrify: According to Vitrify principles, the PDA was chosen as the standard partner interface to achieve the purpose of the whole exchange of information. The process could provide reporting capabilities, which provide instant analysis for pickers, and serve as a standard partner interface to them. That could make picking orders a more straightforward thing.

7. Description of the Implementation Approach and How the Human Issues Be Handled

7.1. Description of the Implementation Approach

Business process redesign is a complex project involving multiple subjects who would be affected by the change. Leavitt diamond is an important tool for internal effects among different parts of an organization [10], which includes business processes (task), information technology use, people and organizational form. In our project, the trigger and our target is the business process. Therefore, when we analyse the diamond, we regard it as the root and then identify the effects and measurements to the other 3 factors.

Table 4: The Leavitt Diamond analysis.

Business Processes	In our project, we redesigned some parts of the picking process. The key measurements are separating the warehouse (online) and offline-oriented goods, picking goods for multiple orders together. They involve some issues with organizational structure, people and information technology use.
Information Technology Use	IT can be regarded as a tool to ensure the synchronized picking process. As we mentioned before, we will take a system named PDA into practice to instruct the employees to pick the goods from different physical areas.
People	The use of new information technology proposes new requirements on practical skills to people. The IT system could also transfer some work from artificial to automatic, which needs the HR department to train the employees and rearrange employees' work.
Organizational Form	To raise the efficiency of picking goods, we need to make the existing responsibility clear to each department. In addition, due to the set-up of the different kinds of warehouses, their responsibility and who will take charge of them need to be authorized from the organizational form aspect by the top management.

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7.2. How Does Each Department Help XYL Implement the System?

Customer-first has always been XYL's belief. In order to provide customers with a better online shopping experience, XYL needs to improve the current picking process and increase picking efficiency. A company is a collection of people, and implementing a goal-based strategy requires inter-departmental coordination and cooperation, rather than building "goal silos" one by one [11]. So when XYL implemented its new PDA system, the whole company needs to know about it, and all departments should be involved.

Management: The management team should set the strategic goal of "improve picking efficiency and customer satisfaction in the online store"; and build a corporate culture that breaks down departmental boundaries and communicates directly and cooperatively in a responsible manner; choose the person in charge of each department to build a professional team to cooperate with the implementation of the PDA system; establish Object and Key Results(OKRs) for each department, combine organizational OKRs with individual OKRs, and pay attention to the working style and enthusiasm of each employee, so that each job should be done with high quality.

IT department: Technical support is important. The introduction of a new system needs to be evaluated, and the system needs to be considered to match the existing business processes, the stability of the system needs to be tested continuously, and problems need to be identified and solved through data analysis.

HR department: As the process of implementing business processes is bound to involve the adjustment of organizational structure and job responsibilities, the whole redesign process is inseparable from the collaboration of the HR department. As the leading department of enterprise learning, it should simplify the learning process of business process redesign, simplify the content, make it easy to understand, formulate process manuals, and hold training meetings to make it easier for employees to accept. In addition, HR needs to motivate employees and involve them in activating the knowledge and information of the organizations to help XYL process transformation to match the KPIs. In addition, the implementation of IT technology is involved and the existing technical staff lacks relevant experience, as well as the implementation process of the warehouse (online), which requires the wisdom and support of professionals, so the HR department needs to integrate the existing resources and determine whether the company needs to recruit or outsource a professional team.

Warehouse management department: XYL has set up a new warehouse (online) for this business process redesign. Within the existing store warehouse, the special area for online hot-selling goods is reasonably divided, so that the picking process of both sites can be realized at the same time. This requires the warehouse management department to carry out the rationalized layout and management of the new warehouse and formulate the accuracy management standards for the planning, marking, fire prevention, and theft prevention of the new warehouse space. It is also necessary to cooperate with other departments to provide information about the current warehouse, analysis of process improvements, and feasible rationalization suggestions.

Employee training: Through the introduction of the structure, design, and operation of the newly introduced PDA system, employees can have a general understanding of its principles and functions. In addition, a description of the purpose of process reengineering and its expected results also needs to be provided to employees.

User Training: Employees and managers related to the picking process should participate in the user training of the PDA system to more intuitively remember and understand the specific work process. The pickers who are about to be dispatched to the new warehouse should be provided with separate special training. The technical personnel in the IT department responsible for system upgrade and maintenance should also actively participate in the training courses provided by the system

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supplier to master the core technology and support the operation of the new process. User manuals and instructional videos can be produced to support the use of the training process.

8. Conclusion

Based on the existing business process of XYL, low satisfaction of customers, fierce competition from competitors, and the current customer's shopping patterns, it is necessary for the company to identify problems related to the process and redesign it to improve customer satisfaction.

Through interviews and literature review, we find main processes related to problems and give a top priority to the picking process based on the high customer value and feasibility. After analyzing this process, we discover that the bottlenecks of the AS-IS process are manual assigning and checking the order, increased frequency of replenishment in store, long time of packing path, and even wrong picking. To achieve our target goals: reduce the picking time and error rate of the picker, and optimize the picking mode. We redesign the process by equipping the PDA and adopting the warehouse (online). And the principles and tactics employed in our redesign process are to lose wait, synchronize, digitize and propagate and vitrify.

Finally, we provide some suggestions with XYL to encourage cooperation among different departments (IT, warehouse, picking, HR department) and top managers to facilitate the TO-BE process.

To sum up, each enterprise unit plays a significant role in implementing, deploying, and executing the new business process to improve online shopping customer satisfaction.

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