# AN EMPIRICAL STUDY OF THE IMPACT OF THE MPOS SYSTEM ON THE PROCESS CHANGE OF RESTAURANTS

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**ABSTRACT.** *This study aims to understand the relationship among IT, processes, strategy. We would like to clarify the impact of mobile Point of Sales (mPOS) on both restaurant processes and service strategy. The research framework is built up based on the Strategic Alignment Model. The data of this study were collected from four different restaurants in Taipei City by using different methods such as observation, interview, and documentary. After analyzing, we found that: (1) mPOS has a significant impact on process changes (process simplification and consolidation); (2) mPOS also influence on the restaurant service strategy change continuously but slowly. This study also provides implications and suggestions for researchers and practitioners.*

*Keywords:* mPOS system, process change, strategy change, organizational change, restaurant industry.

## I. INTRODUCTION

With the change of modern lifestyle, eating out become more and more popular. For years, customers have regarded a restaurant's functional attributes as the most important coming factor. That's still true, but this study also found a shift toward more sophisticated criteria. The intangible, emotional factors are beginning to drive the eating out decisions of customers [1]. Some restaurants use Information Technology (IT) to reinforce its service quality. For example, Abel & Obeten (2015) showed that point-of-sale (POS) systems are a way to help restaurants manage and enhance their competitive advantages [2]. POS systems also can increase managerial control and track all the restaurant operations accurately. However, several investigations have shown the traditional POS is beginning to look inadequate in our current smart and connected business environment. With mPOS systems, restaurants can gain benefits in their business environment. Then, a decade ago, many IT company have tried to develop applications hoping to make the appropriate process for supporting restaurants [3], [6], [11].

The main purpose of this study is to explore the relationship between IT, process and strategy by examining the implementation of a new mPOS system at four restaurants. Based on the above concept, the research questions have twofold: (1) what is the impact of IT on the process change of restaurants? And (2) what is the impact of IT on the service strategy change of restaurants?

## II. THEORETICAL BACKGROUND

Venkatraman & Henderson [7] argue that companies often fail to see the value of investing in IT because of the lack of alignment and alignment between business and strategy, and lack of a dynamically-adjusted process to ensure that business and IT strategies can continue to do fit and practice. Therefore, we based on the Strategic Alignment Model to propose the IT-oriented organizational transformation. This model covers the three facets of strategy, IT, organizational structure.
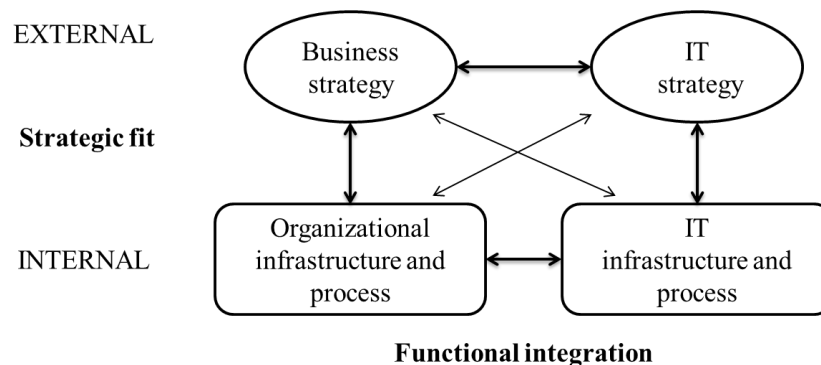


**Figure. 1.** The Strategic Alignment Model [7]
*Source: Henderson and Venkatraman, 1993*

The concept of the model is based on two building blocks: "strategic fit" and "functional integration". Strategic fit recognizes that the IT strategy should be articulated in terms of an external domain (how the firm is positioned in the IT marketplace) and an internal domain (how the IT infrastructure should be configured and managed). Strategic fit is of course equally relevant in the business domain. Two types of functional integration exist strategic and operational integration.

Orlikowski [8] outlines that stability is not the desired state of the contemporary organization since it has to be flexible and adjust itself to ongoing changes. Change is no longer a background but a way of organizational life. Organizational change, in this case, cannot always be planned or managed; it is seen as a continuous process rather than predefined action with exact start and end milestones. Organizational change is seen as an ongoing improvisation enacted by organizational actors trying to make sense of and act coherently in the world. Organizational change is the result of improvisations enacted by organizational actors, and technology is not the main driver for organizational change.

Davenport defines business processes as the specific ordering of work activities across time and place, with a beginning, an end, and clearly identified inputs and outputs [9]. The process objective is customer value added: processes are the structure by which organizations do what is necessary to produce value for customers. Such definitions generally have implied process hierarchies.

Strategy researchers have continued to debate both the sources of competitive advantage and solid performances (the "content" of strategy) and models of the strategic planning process (the "process" view). In firm performance, two contrasting perspectives are dominant: one looks to the importance of external market factors in predicting firm performance; the other looks to factors internal to the organization [10].

This study is a discussion about the role of IT in changing process and strategy based on technological perspective and business perspective. We shift our focus on IT strategy and service strategy instead of general business strategy.

### III. RESEARCH FRAMEWORK

The purpose of this study is to understand the relationship between IT, restaurant processes and restaurant service strategies. We focus on functional integration. We want to know how restaurants integrate mPOS into an organization and to link a company's IT strategy with its business strategy to obtain a competitive and strategic advantage. Therefore, our research framework is shown in Figure 2. By viewing mPOS as one type of information technology (IT), it is a commonly used term that changes meaning with context. From the first perspective, IT systems, applications and infrastructure are components or sub-assemblies of a larger product. They enable or are embedded in processes and services.

From the second perspective, IT is an organization with its own set of capabilities and resources. IT organizations can be of various types such as business functions, shared services units, and enterprise-level core units.

From the third perspective, IT is a category of services utilized by the business. These services are typically IT applications and infrastructure that are packaged and offered as services by internal IT organizations or external service providers. IT costs are treated as business expenses.

From the fourth perspective, IT is a category of business assets that provide a stream of benefits for their owners, including but not limited to revenue, income, and profit. IT costs are treated as investments. It is important to be clear what the term means in a given context. It is often used with different meanings in the same sentence or paragraph, often exacerbating problems. Based on the evidence of restaurants we found that the use of mPOS can eliminate these unnecessary links in the three streams and the invalid steps in the process of value-added. Then the enterprise can conduct the process integration and optimization. The organization can make processes more agile and efficient.

By viewing mPOS as one type of information technology (IT), it can eliminate the invalid steps in the process of value-added. Then the enterprise can conduct the process integration and optimization. The organization can make processes more agile and efficient. The main purposes of this study are discussion the role of IT in changing process and strategy based on technological perspective and business perspective. We shift our focus on IT strategy and service strategy instead of general business strategy. The service strategy guides how to design, develop, and implement service management not only as an organizational capability but also as a strategic asset. Once processes are changed, the administration needs to reformulate another strategy for business. They may figure out a strategy for new IT as well as a new strategy for providing services.
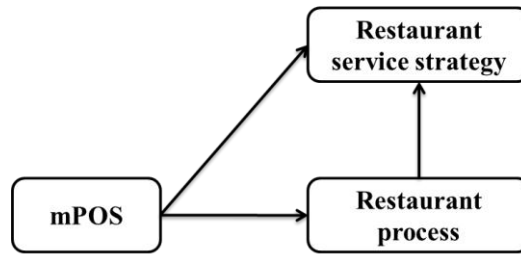
**Figure 2.** IT-oriented organizational transformation model

## IV. RESEARCH METHODOLOGY

### A. Case description

*1.* Introduction of mPOS system

This mPOS system (hereinafter referred to as iCHEF) was developed by a team of "kiosks" in Taiwan. Currently, the operating system developed is limited to iOS, and the entire system is available only by downloading the app and logging in. iCHEF is an assistive system designed to increase the operational efficiency and mobility of restaurants. It uses the concept of cloud computing, so each mobile device can share the same information synchronously, both inside and outside the store. In addition, iCHEF can also manage desk management, reservation management, handle invoice. At present, over 300 restaurants in Taiwan and Hong Kong are using iCHEF system.



**Figure 3.** Screenshot of table's status and menu of mPOS iCHEF [5]

We will conduct 10 case studies over one year to help us understand how restaurants define and manage alignment among mPOS, process, and business strategy. Among 10 cases we selected 4 representative cases to analyze because those cases we get data fully. In the beginning, we conduct this case to have a general view of the traditional POS system. Each case has its own problem need to be handled and by leverage functions of mPOS they fulfill their business strategy in different ways. The unit of analysis is mPOS project that has at least 6 months' duration.

*2.* Restaurant CY

Restaurant CY is a newly opened LA style Vietnamese noodle and rice restaurant, seating about 25 people in a bright, new space with a row of tables leading up to a semi-open kitchen. They would like to blow new wind to traditional Vietnamese noodle and bring fresh image by providing a bunch of options for customers related to meats, noodles, spices and etc. However, when they present this information on paper-based menu, the customer feels too complicated to make a choice and lead to a lot of mistakes and misunderstanding between customer and waiter/waitress. In some cases, waiter/waitress takes a lot of time to confirm the customer's order. After iCHEF implementation, their main problems are solved. By analyzing different types of foods and classify into different categories, restaurant and iCHEF cooperate to design the suitable paper-based menu and digital menu to make the customer feel easy to make choice and also support waiter/waitress avoid mistake due to misunderstanding customer' choice. In a short time, waiter/waitress can handle iCHEF's system well and enhance the performance of the restaurant.

*3.* Restaurant GO

With the purpose to provide customers a fresh feeling in every morning, this restaurant creates a different environment of having French-style brunch area. Using animal to mark each order of customer, drum as table; Western exchange students as par-time waiter/waitress make restaurant create their own style. Before using iCHEF, they already use iPad to handle ordering activities. However, iPad cannot support them to handle every operational activity. They think about using traditional POS system. However, after consideration, they found that traditional POS system is not suitable for a small restaurant like GO. Luckily, iCHEF helps them to solve this problem due to its characters: small, flexible, picture illustrate for strange food/beverage.

*4.* Restaurant FR

Restaurant FR is a café, kitchen, and gallery all in one, which is perfect for the traveller who wants some time away from the hustle and bustle of Taipei. Their facing problem is many café same style, how to enhance competitive advantages; attract more customer, not much investment. Without iCHEF restaurant also work well, they just need to build professional image for customers. Because travellers aim to find something simple, professional in their journey, then iCHEF is the best choice. In fact, this restaurant has not leveraged all functions of iCHEF system. According to owner, she thinks about using iCHEF because it can work as traditional system with cheaper cost. When applying iCHEF, all processes in restaurant are kept as original status. The most important role of iCHEF is back-line service. The owner can collect daily information from restaurant related to customers quickly from iCloud. This information helps her to analyze situation to make further decision related to storage or menu changes. Therefore, the main role of iCHEF is improving activities.

*5.* Restaurant MAZ

Restaurant MAZ is located in a busy shopping district, high requirement not only related to the quality of foods but services. In addition, due to the popularity of eating habit, many customers come to store for dining in and taking out. It is difficult for waiter/waitress to follow customers' requirements because the mixture of different ingredients in each bowl of noodle. Therefore, iCHEF is also one of the best solutions for them. In addition, due to the popular of noodle, to get competitive advantages, they need to create something different from their competitor and the solution brings a professional feeling to customers. iCHEF supports them to fulfill this target.

*B.  Data collection and analysis*

The main purpose of this study was to gain insights into the impact of iCHEF on the changes of process and strategy; we use a case-study approach as the research methodology. In order to answer the first research problem, we review the related documents and conduct observation activities at restaurants from opening to closing time to understand the operational process of the restaurant and the role of iCHEF. Depending on the size of the restaurant, we design the number of team members and the tasks for them.  For example, we divide the restaurant into three main areas: before dinning (reservation, waiting in line), during dining, and after dinning. For the second research question, we interview before and after observation. The interviewees are the owners, managers, chef, and waiter/waitress. The main purpose is to understand the changes in their business after using iCHEF.

After observation, we start to draw the floor-map and process of each restaurant and figure out the differences between these restaurants from others that use a traditional POS system. For the data collected from the interview, the records will be turned into written transcripts. Methods of analyzing the data include a full transcription of interviews which are then analyzed line by line to identify every possible code. Theme analysis by extracting, categorizing and coding will be conducted afterward. Qualitative content analysis will be adopted to identify themes as meaningful for analysis rather than physical linguistic units.

## V. FINDINGS AND DISCUSSION

*A.  Changes in process*

Before deciding to use iCHEF, restaurants are facing some specific problems. iCHEF can be seen as a supporting tool for providing solutions. To get better results, restaurants try to figure out the way to integrate a new system into existing processes, and one of the most solutions is process changing. Figure 4 illustrates the existing processes and Figure 5 provides a unique view of the restaurant after implementing iCHEF. In the beginning, operational activities in restaurants can be divided into 4 main modules and 9 types of processes. Later, these activities are made shorter and can be classified into four main areas based on related stakeholders.
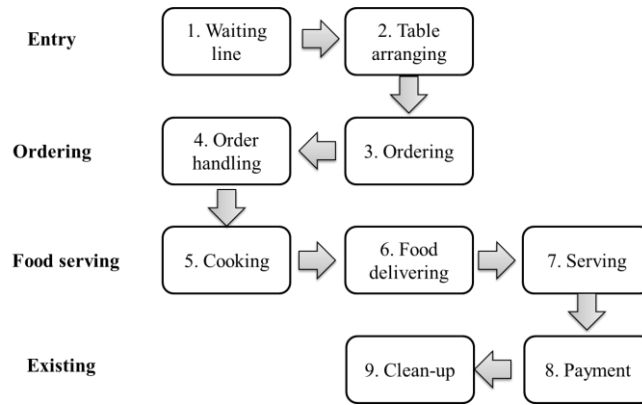
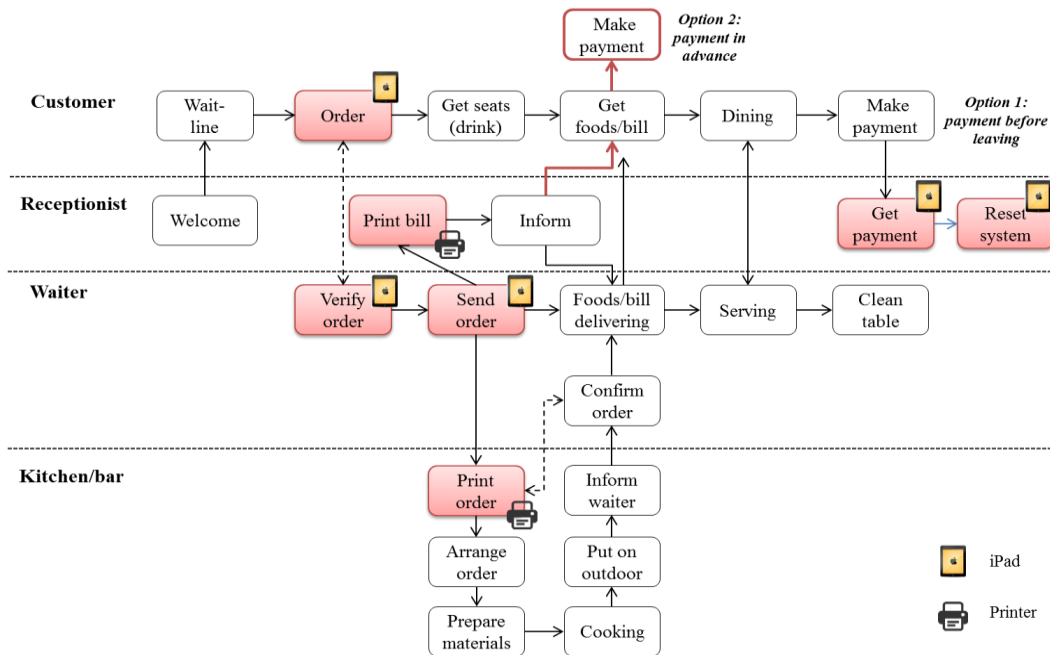**Figure 4.** Operational process in restaurant



**Figure 5.** iCHEF based operational process in restaurant [4]

After using iCHEF, restaurant process has changed. The operational process becomes more efficient, agile, and professional. Before using iCHEF, the waiter/waitress must wait for the customer to complete the orders, and then she/he can enter the information into the system and spread to the kitchen for cooking. After using iCHEF, they can send an order to the kitchen in advance, and at the same time, the meal order is still in progress until the customer completes the order. Also, using the iCHEF, waiters can serve customers anytime, anywhere. Sometimes the guests can start ordering while waiting outside. Upon getting into the restaurant, they can enjoy the meal. Therefore, we found that the use of iCHEF will indeed bring changes to the restaurant process.

## B. Changes in service strategy

Once the operational process is changed to become more agile, efficient, and professional management can leverage this change to think about new things. They can conduct new strategies which are unable conducted before with traditional POS system or without POS. Moreover, the restaurant can conduct a new approach if they can leverage all functions of this mPOS system. For example, iCHEF provide time calculating function; restaurants know the starting time and finish time of each table. Based on this information, they can calculate the dining time of each customer. Another thing, by proving a picture on the screen, the restaurants can reduce time to introduce their menu to customers. Each type of dish, they can prepare some related pictures; if customers want to know about content, ingredients, or display of foods, the waiter/waitress can explain easily.

However, for the four restaurants observed in this study, the size of the restaurant remained unchanged during both visits, as can be seen from several aspects, such as the same number of employees, the same number of tables, and no expansion of other services. We can reasonably conclude that the scope of application of iCHEF is very limited. It can only help the restaurant's basic process and cannot bring more changes to the restaurant.

## VI. CONCLUSION

In general, to maintain a competitive advantage, organizations need to consider how mPOS can add value to their business, both today and in the future. By using iCHEF, restaurants can spend less time dealing with exhausting administrative and work. iCHEF is a vehicle to support business translates its strategy into practice. We all understand that iCHEF or cloud-based POS system become more popular in the future along with the development of a different type of tablet due to their advantages such as simple or low cost. To explore and exploit all functions of this type of system, the restaurant needs to identify their strategy clearly and understand restaurant's characteristics well because system implementation much depends on the restaurant's size, location, and main foods. This study also opens another door for research in new POS system since cloud-based or tablet-based POS systems are different from traditional ones. Moreover, the findings also provide useful implications for restaurants that intend to leverage the advantages of mPOS. They are able to figure out suitable strategies for IT investments to fit their business strategy.

## REFERENCES

[1] Venard, B., "Organisational change in service multinationals: From radical change to destabilisation". Service Industries Journal 2002, 22 (1), 57-76.

[2] Abel, E. E., & Obeten, E. (2015). Restaurant Customer Self-Ordering System: A Solution to Reduce Customer/Guest Waiting Time at the Point of Sale. International Journal of Computer Applications, 111(11).

[3] Ching J.: "iCHEF sets the new standard for restaurant POS system", Vulcan Post, 2014, http://vulcanpost.com/3579/taiwans-iCHEF-sets-the-new-standard-for-restaurant-pos-system/

[4] Lin, Yao, Nhu Hang Ha, and Kuo Sung Lin. "The Role of mPOS System in Process Change and Strategy Change: A Situated Change Perspective." Technologies 3, no. 4 (2015): 198-218.

[5] https://www.techinasia.com/ichef-is-bringing-startup-savvy-to-taiwans-new-class-of-food-entrepreneurs, [Accessed date: Apr-18, 2019].

[6] Lestariningati, S. I. "Mobile point of sale design and implementation." In IOP Conference Series: Materials Science and Engineering, vol. 407, no. 1, p. 012094. IOP Publishing, 2018.

[7] Henderson, J.C.; Venkatraman, N. Strategic alignment: Leveraging information technology for transforming organizations. IBM Syst. J. 1993, 32, 4-16.

[8] Orlikowski, W.J. Improvising organizational transformation over time: A situated change perspective. Inf. Syst. Res. 1996, 7, 63-92.

[9]  Davenport, T.H.; Short, J.E. The new industrial engineering: Information technology and business process redesign. In Operations Management: Critical Perspectives on Business and Management; Taylor & Francis US: Florence, KY, USA, 2003; pp. 97-123.

[10] Earl, M.J.; Sampler, J.L.; Short, J.E. Strategies for business process reengineering: Evidence from field studies. J. Manag. Inf. Syst. 1995, 12, 31-56.

[11] Courtney Manion & Fred J. Demicco PhD (2005) Handheld Wireless Point of Sale Systems in the Restaurant Industry, Journal of Foodservice Business Research, 7:2, 103-111, DOI: 10.1300/J369v07n02_07.

# NGHIÊN CỨU THỰC NGHIỆM ẢNH HƯỞNG CỦA HỆ THỐNG MPOS ĐẾN THAY ĐỔI QUY TRÌNH PHỤC VỤ TRONG CÁC NHÀ HÀNG

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Anh Dao Nguyen, Quyet Thang Huynh**

***TÓM TẮT***. *Nghiên cứu này nhằm tìm hiểu mối quan hệ giữa CNTT, quy trình, chiến lược trong doanh nghiệp, cụ thể là trong nhà hàng-khách sạn. Chúng tôi muốn làm rõ tác động của hệ thống điểm bán hàng qua di động thông minh - mPOS đối với quy trình phục vụ trong nhà hàng và chiến lược dịch vụ. Khung nghiên cứu được xây dựng dựa trên Mô hình chiến lược phát triển ứng dụng CNTT. Dữ liệu của nghiên cứu này được thu thập từ bốn nhà hàng khác nhau ở thành phố Đài Bắc bằng cách sử dụng các phương pháp khác nhau như quan sát, phỏng vấn và tài liệu. Sau khi phân tích kết quả, chúng tôi thấy rằng: (1) mPOS có tác động đáng kể đến thay đổi quy trình (đơn giản hóa và hợp nhất quy trình); (2) mPOS cũng ảnh hưởng đến sự thay đổi liên tục trong chiến lược dịch vụ của nhà hàng tuy chậm. Nghiên cứu này cũng cung cấp các đánh giá và đề xuất có ý nghĩa trong áp dụng thực tế và trong nghiên cứu.*

***Từ khoá:*** *hệ thống điểm bán hàng qua di động thông minh, thay đổi quy trình, thay đổi chiến lược, thay đổi tổ chức, ngành nhà hàng.*