

Fine Dining Restaurant Framework Development and Survey

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Abstract: The goal of restaurant owners is to maximise their incomes through satisfying the whole needs and experiences of their diners. This is usually done through a modern point of sales (POS) system. However, with the large number of POS on the market with abundant array of features, very few research has been done on the usability and effectiveness of these systems and their features. Our research investigates POS systems reviews each of their features and then aims to find similarities that have the most impact, and are essential to the day to day processes of existing fine dining restaurants using these POS systems. This paper aims to determine which features of POS systems are most crucial for the decision making in specific restaurant situations.

1 INTRODUCTION

Being able to make effective business decisions can either lead to the failure or success of a restaurant. The typical customer journey of a restaurant involves: customer enters the restaurant, gets seated by a waiter, looks through menu, asks waiter for advice, orders, eats, may order and eat again, pays the bill, and exits, and may visit again if they had a good experience (Designthinkersgroup.com, 2017). A typical customer journey has been mapped in Figure 1 that shows the point from the customer entering the restaurant, all the way to when they pay for their meal.

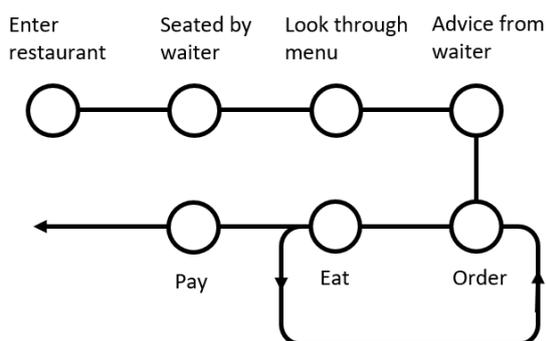


Figure 1: A map of a typical customer journey in a restaurant.

There are already several existing researches covering this topic. One of them includes investigating an interactive restaurant

communication system for providing food ordering and entertainment. It does not take into account the effectiveness of it (Kurland and Gilbert, 1985). Another research looked into the area of developing an information system aimed at online restaurant services and information management, so that customers can find restaurants, reserve parking spaces and even order before having physically entered the restaurant so that waiters can prepare for their arrivals beforehand (Lo et al., 2011). Another research has also been conducted into measuring the perception of a manager in terms of using a restaurant management information system – which is a software used to help manage the restaurant – to determine what factors are most important in the manager’s point of view (Huber, 2003).

The existing research focuses only on a small portion of the restaurant business, such as the manager’s perspective, or how to improve customer satisfaction. None of the existing research relates to a complete restaurant-wide system using a solo POS system.

Our research investigates a random selection of POS systems found on the review website, “Software Advice,” (Software Advice, 2017) and analyses each of their system features, their Facebook pages and then aims to find trends and similarities that have the most impact and are essential to the day to day processes of existing fine dining restaurants using these POS systems. For example, restaurant’s inventory report generations

must be in sync with making orders, so that real-time data can be obtained.

This paper, based on literature reviews, will answer the question, “Which features of a POS system are most important for the fine dining restaurants?”

2 LITERATURE REVIEW

Literature reviews have been conducted on the *hospitality* sector to determine the impacting factors for a restaurant success.

The most essential of these factors are: proper use of equipment, supervision of producing food, schedule, food control, records, use of standardised recipes, use of appropriate purchasing techniques, coordination of payments, and evaluation of customer satisfaction (Mariampolski et al., 1980).

Research also indicates that children’s influences have an impact on a family’s dining out experience. This means restaurants must also satisfy young families. The result showed that children aged between 9 to 12 are the most influential (Labrecque and Ricard, 2001).

Stated in The Academy of Management Executive 1994, there are 10 qualities that can be used to improve service quality: Listening to what customers want, reliability to perform the promised service, good mapping of the customer journey, recovery from problems such as by encouraging customer’ feedback, surprising customers with something better or extra they did not expect, fair play, teamwork, getting feedbacks from employees, and being a servant to the company such as visiting it and deciding what needs improvements (Berry et al., 1994).

In a study that showed elements of why restaurants fail, the researchers found it was due to: lack of documented strategy, unwilling to create standards (such as where to sit), focusing on one aspect at the expense of others, poor communication with customers, the price paid not matching the value of the service offered, and cannot maintain the service (Parsa et al., T, 2005). It should be noted that smoke-free restaurants had no impact to the profit the restaurant made (Glantz and Smith, 1994).

In a study done in Australia, environmental factors can also be taken into account. They include new trends, competition and economic climate, with the first being the most important (Collie and Sparks, 2000).

These hospitality factors are just one part of a restaurant success. A number of elements are also

required for the success of a restaurant, and a list has been selected from a range of sources. In the next section, seven POS systems have been reviewed with their advantages and disadvantages researched that in the third section of this paper will determine if they contain the aspects needed for the restaurant’s success.

3 POS SYSTEMS

Seven POS systems have been reviewed and provided an overview. These POS systems were selected from the consumer review website “Software Advice” (Software Advice, 2017) where their reviews were collected, as well from their corresponding Facebook page. Their positive and negative aspects have been explained. It is not inferred that all essential features have been identified, however the ones chosen have been shown in reviews to carry the most impact.

3.1 Kounta

Kounta is a POS that can be used on desktops, Android and iOS. The important features identified in literature includes the features of inventory management to track the availability of ingredients as foods are ordered. Guests are assigned tables from a virtual table layout with decorations. Reports that can be generated include sales time, average spending, staff selling history, inventory, customer details. The data required for these reports are the customer membership details, time of sale, item sold and ingredients used – all in real time even while the chef is creating the dishes. Other features include customer relationships achieved with loyalty points, and can also be managed with integration to services such as MailChimp.

In the customer journey, the customer enters the restaurant and then the POS creates/retrieves the customer’s profile. The customer is assigned a seat and waiter from the table layout in the POS. The customer orders, the POS records the time of order, and the waiter notes any modification to the order. The chef is alerted, wastage and usage of ingredients are updated in the inventory system. Once the food is prepared, the waiter is alerted, who then serves it to the customer. At checkout, bills can be split by the POS and then updates the table layout to show the new vacancy. The guest tracking is updated with how much the customer had spent during their time in the restaurant. (Kounta, 2016).

The positive aspects were:

- Being able to filter reports to get clearer insights
- Automatic send orders to kitchen
- Links well with popular accounting software so that further business decisions can be made using third-party software
- An inventory system that allows categorising food and able to keep track of ingredients used.

The negative aspects were:

- An add-on software is needed to use EFTPOS and other alternative payment methods, and therefore makes it less flexible.
- The way to group food to show on the ordering screen was not effective because they cannot be in subcategories.
- Order prices are decided by quantity, not how much they weigh.
- Cannot print out more than one tax invoice.

3.2 Ambur

Ambur runs on iOS. Employees are able to log in for clocking payrolls. A table layout with colour codes is shown once signed in. The system is able to assign waiters to serve only certain tables. Red tables are another waiter's tables, green are mine, and grey are vacant. Once submitted, a printer at the kitchen instantly prints the order. A unique feature is that customers can be tracked and monitored until they pay for their orders. The reports that can be generated are only overviews and sales reports, but are in real time. (Amburappcom 2016).

In the typical customer journey, the customer enters the restaurant, and the POS assigns a table and waiter from the table layout. The customer then makes the order and gets shown the timed specials at the same time by the waiter. The waiter takes the order, notes down any allergies, and then manually sends the order to the kitchen. Once the order is ready, the chief manually alerts the waiter. At checkout, the customer's profile is opened on the POS, and have their spending recorded. The table layout is updated to show vacancy.

The positive aspects were:

- Menu can be customised so that customers can order different styles and portions.
- Orders made by the waitress are automatically sent to the kitchen
- Mobile devices can easily be integrated so that waiters can take orders anywhere inside the restaurant.

The negative aspects were:

- The depth of the reports when filtered by dates is

not enough

- Reports are too simple, and not enough for a manager to make effective decisions
- Orders made cannot be deleted

3.3 Toast

Toast is a tablet POS. It contains a lot of restaurant successful features such as it allows a fair tipping percentage to each customer, easy bill splitting, and transferring a bill to another waitress. Table layout for assigning diners can be set, however decoration is not included. A loyalty program is introduced in the system using membership cards, which allows the manager to track each customer. The reports that can be generated include inventory management, sales, guest preferences and their membership details, and labour cost. (Toast, inc. 2016).

The customer journey takes as the customer enters the restaurant, the waiter gets alerted, and the customer makes the order. The waiter notes down any modifications, and then the kitchen system gets alerted manually. Once the meal is ready, the waiter is alerted to serve to the customer. The only time when the POS is used is wait checkout where digital receipts are stored in the database.

The positive aspects were:

- The reports can easily be exported to accounting software
- The reporting contains insightful graphs, especially the sales graph that can be filtered based on dates, time and staff, and the way an overview can be shown
- Customers can easily split their bills
- The manager is able to view all the sales and transactions from the past, which are beneficial for making future decisions.
- Ordering food is easy, and can be modified with the changes reflected in the price.

The negative aspects were:

- When exporting reports to Excel, it cannot be customised to decide which rows should be shown.
- No way to make reservations
- It cannot monitor restaurant from a remote location
- Cannot recognise phone numbers of customers in customer database
- No inventory management

3.4 SalesVu

SalesVu is a POS made for the hospitality industry in general. Features that have importance to the restaurant success includes the ability to allow the user to monitor their inventory, create detailed reports filtered by day or employee or location or device or product, and manage customer and employees in separate databases. The reports that can be generated are all under sales, however can be categories into hourly, tables, orders that were deleted, labour, discounts and average orders. (Salesvucom 2016).

The customer journey starts as the customer enters the restaurant. The POS assigns the table and waiter, and then loads the happy hour discounts so that the waiter can make orders for them. Modifications are recorded, and then sent to the kitchen, where the wastage is recorded. When the food is ready, the waiter is alerted through the POS and served to the customer. At checkout, the POS splits the bill, updates the table layout to show vacancy, and finally records the average spending.

The positive aspects were:

- Insightful graphs, especially the sales graph that can be filtered based on dates, time and staff, and the way an overview can be shown
- Inventory management

The negative aspects were:

- It cannot add user into the customer database at the same time of ordering

3.5 ShopKeep

ShopKeep is made only for iPads and runs on iOS. It can be used for training staff, taking cash and card payments. A successful feature that they have that our literature has identified to be important is that their inventory and reports can be managed online. The reports available include sales, transaction, departments, shift and inventory. The inventory management is able to track cost and profit margins, and view top sellers. Once one register makes an order, all the other registers in the restaurants will be updated so that they can also see the same order (Shopkeepcom, 2016).

The customer journey starts when the customer enters the restaurant. The POS assigns the table, and then alerts the waiter. The customer makes the order, the waiter notes any modification, and then an order is sent to the kitchen. The inventory system records ingredients that have been used to cook the food. When the food is ready, the waiter is alerted and

served to the customer. At checkout, the POS splits the bill, and sends receipts to the customer's email address. This receipt is also saved into the POS's database.

The positive aspects were:

- The organisation of the system is easy to understand so that even staff with disabilities are able to use it.
- Works with third-party credit card processing systems
- Express pay lets customer pay quickly without having to click on all the buttons as though they were fine dining. This makes it easier for staff to take order and consequently deliver the order

The negative aspects were:

- No chip reader
- Difficult to integrate with Quickbooks Accounting Software

3.6 TouchBistro

TouchBistro is a cloud POS that can function without the internet. The important features include tables are given in a layout that can be tapped to start an order. Users are able to customise the menu, edit and delete menus, and have them assigned to customers at the table, not as a whole. The reports can be viewed are sales, accounting, payment, menu and labour. (Touchbistrocom, 2016).

The customer journey involves the customer entering the restaurant, gets assigned their table and waiter by the POS. The waiter showcases and explain the menu on their POS. The customer makes the order. The POS records every transaction at the time they are ordered. The waiter then notes the modifications, and then sends the order to the kitchen via the POS. The inventory is updated based on what ingredient was used. The ready food is alerted to the waiter and served to the customer. At checkout, the POS splits the bill and updates the table layout to show vacancy.

The positive aspects were:

- Daily specials can be easily added into the system so that they reflect at certain times and days.
- Splitting bill
- The ordering function is simple to navigate

The negative aspects were:

- Credit cards can be assigned to a customer for fast payments, but not to tables.
- The reports show only overviews, and cannot be filtered

- Does not keep track of how much money is in till

3.7 POS Nation

POS is a customisable POS system fitted using their own hardware. It has the essential features of customers assigned to tables either by their names or their physical appearances. The system also offers different interfaces for different departments: the waiter, bartender, and certain cooks such as pizza. The reports include staff, sales, inventory management with waste records, and also statistics on what is driving sales. (POS Nation, 2016).

In the customer journey, the customer enters the restaurant, and the POS assigns a table and waiter for the customer. The customer makes their order, the POS records every single transaction at the time they are ordered, and the waiter notes the modifications. Orders are sent to the kitchen, and once ready, the waiter is alerted and served to the customer, all via the POS. At checkout, the POS splits the bill, and updates the table layout to show vacancy.

The positive aspects were:

- Is able to keep track of sales from other stores, and update the inventory
- Card reader is integrated for fast payments
- Inventory system has a simple interface

The negative aspects were:

- Unable to connect with other payment software.
- Unable to charge based on weight

4 RESULT

From our literature review, a list of requirements essential to a restaurant’s success has been identified. This was accomplished by summarising each of the reviewed sources and picking out the features, and then assigning them to a unique category, so that if two features were worded differently but meant the same thing, they would be classified as the same feature. Each feature is given a letter which was used in our evaluation to identify which of these features are satisfied in several POS features. It is also implied that these features alone do not guarantee success as there are other aspects to be taken into account too, such as personality, skills and knowledge. The list of requirements are shown in Table 1.

Table 1: Requirements essential to a restaurant’s success identified through hospitality literature review.

A)	Proper use of equipment (Mariampolski et al., 1980)
B)	Supervision of producing food (Mariampolski et al., 1980)
C)	Scheduling (Mariampolski et al., 1980)
D)	Food control (Mariampolski et al., 1980)
E)	Maintain records (Mariampolski et al.1980)
F)	Standardized recipes (Mariampolski et al., 1980)
G)	Use of appropriate purchasing techniques (Mariampolski et al., 1980)
G)	Coordinating of payments (Mariampolski et al., 1980)
H)	Evaluate customer satisfaction (Mariampolski et al., 1980)
I)	Child's influence (Labrecque and Ricard, 2001)
J)	Listen to what customer wants (Berry et al., 1994)
K)	Reliability (Berry et al., 1994)
L)	Fulfil the basic (Berry et al., 1994)
M)	Have standard of where to sit and staff roles (Parsa et al., 2005)

From our maps of customer journeys derived from our reviews on POS systems, all the distinct features are identified in Table 2.

Table 2: Distinct POS features.

Alert cook	Automatically send orders to the kitchen
Alert waiter	Assign waiter to serve only a specific table
Assign table	Assign customers to tables
Customer profile management	Integrate a membership profile for loyalty rewards, etc.
Customise virtual table layout	The feature to create a digital layout of the restaurant, and assign customers to them.
Different interface for different departments	Each department would have their own interface. For example, a separate interface is used for ordering pizzas, which is different from ordering burgers.
Inventory management	Track the ingredients used to cook the food
Menu showcase	Allow customers to read and learn about the food on a restaurant’s mobile device.
Modify order	Edit food order, such as adding extra or a certain ingredient.
Order	Order the food
Split bill	Dividing the bill among the diners within a table.
Timed specials	Allow the ordering of certain food at certain times with certain prices.
Track average spending	Track the spending of every diner
Track customer by name/ID	Track a user’s order by their name.
Track individual order transactions	Track the orders at the time they order, instead of at the end when the bill is generated.
Wastage record	Record food that has gone to waste or is soon to expire.

4.1 Features Evaluation

With our list of restaurant success features identified from Table 1, all the features identified from all the POS systems reviewed are matched together. These are ordered from most to least important based on what was identified in the user-reviews of POS.

Table 3: Evaluation of POS features from Table 2 linking to the successful restaurant features from Table 1 they satisfy.

Track average spending	C) D) E
Track individual order transactions	E) H) I) J) K)
Track customer by name/ID	C) D) E) H) I) J)
Inventory management	B) C) D) E) G) L)
Wastage record	B) C) D)
Order	C) E) K) L)
Split bill	G)
Alert waiter	A) C) H) K) L) M)
Alert cook	A) C)
Customer profile management	E) H) J)
Customise virtual table layout	C) M)
Modify order	G) G) J)
Assign table	C) D) G) E) M)
Timed specials	C) D)
Menu showcase	L) H) J)
Different interface for different departments	A) B) C) D) E) F) K) M)

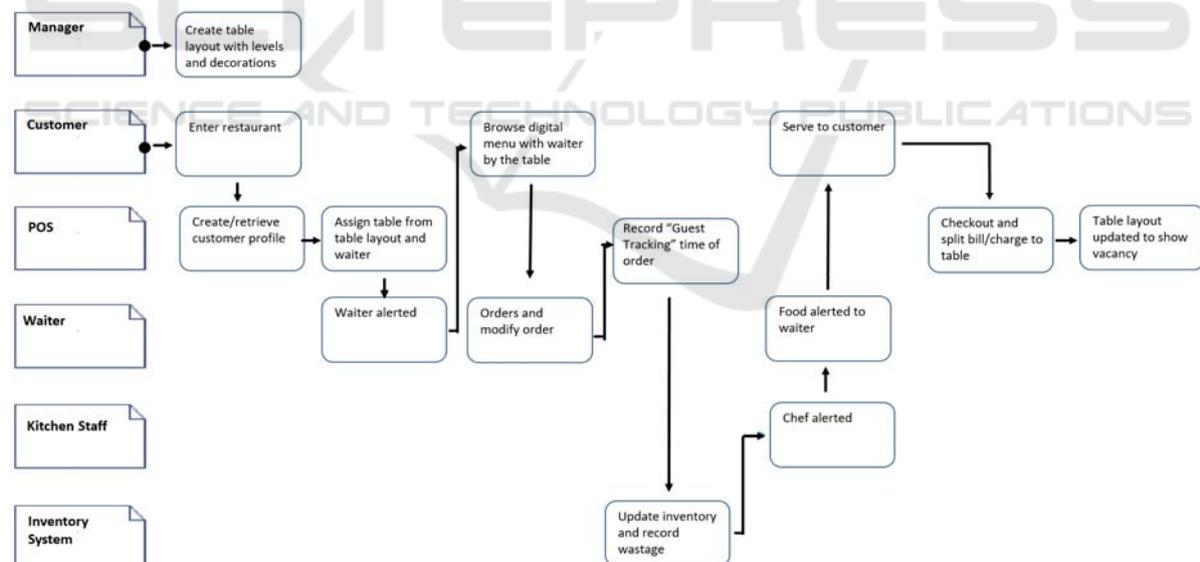


Figure 2: A proposed map. Before the restaurant opens, the manager should be able to create the virtual layout of the restaurant using their POS. Once the customer journey begins, the POS would create/retrieve the customer’s profile, and assign them a vacant table and a waiter. The waiter would give the customer a tablet with the menu on it so that timed specials are automatically displayed. The waiter is required to be present to make the order so that they can be modified, such as if the customer has any allergies. The POS at this point would record the time of the order and update the inventory system to reflect what ingredients are needed. The chef is alerted, and once prepared, the waiter is alerted to serve to the customer. At checkout, the POS is able to either split the bill or charge the entire table, and then update the table layout to show vacancy.

5 DISCUSSION

Based on what was learnt from this research, we designed a new customer journey map in Figure 2 that takes into account essential POS features.

Figure 2 shows that as soon as a customer enters the restaurant, their customer profile is automatically retrieved and used to track all the orders they make during their time in the premise. If a credit card is assigned to their account, it can be assigned to their table for faster payment at the end. If they do not have one, their physical appearances will be noted as their temporary identify. The customer is assigned a seat from a customisable table layout from the POS system by an alerted waiter.

We recommend a digital menu, such as a tablet, to be given to the diner so that the daily and timed specials can be automatically be shown. This will fulfil the requirement of being reliable.

Once the customer is interested in a dish, they can view more information by clicking on it on their iPad. This will also fulfil the role of getting advice. The waiter may also suggest dishes that are popular at the certain time of the day, based on historical reports generated by the POS system.

For every dish ordered, the time and price are tracked at the time of order. The cook is immediately notified, and the inventory is decreased, including the ingredients, before the dish has finished being made.

At payment, customers are asked if they need to split the bill, charge one person only, or charge the entire table.

A set of GUIs has been proposed to accompany future POS systems to ensure all the essential features are easily accessible. The GUIs to assign customers their seats (Figure 3), the digital menu to be given to diners (Figure 4), and the order screens (Figure 5) have been designed.

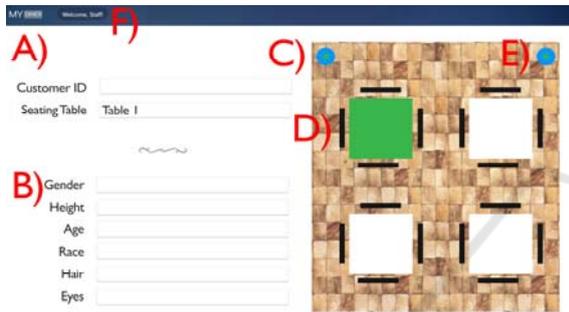


Figure 3: The first GUI used by the waiter when a customer enters a store and is assigned their seat. The waiter would either A) retrieve the returning customer’s profile, or B) identify the user with their physical attributes to save time. When the customer pays, they will be able to create an account if they have not. C) A seating arrangement should be available and D) be colour coded. The table selected will be entered into the seating table automatically. E) Decoration should also be taken into account. F) The staff serving the customer is tracked.

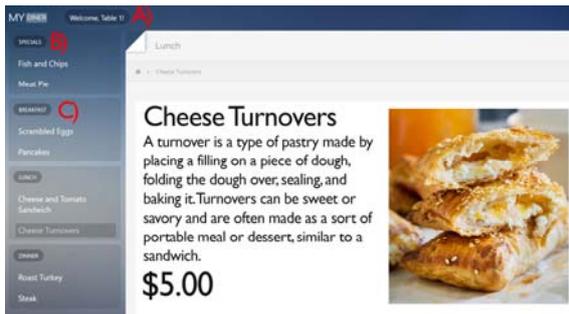


Figure 4: The digital menu offered to the diner in which the waiter can get the food details from to put into their order in Figure 5. It should contain A) the customer/table being tracked, B) the timed-specials that are automatically updated, and C) food categories to track which items are most popular. Each food in the menu shown should also have their own views so the system can determine how long a user is viewing each food.



Figure 5: The POS ordering screen used by the waiter when taking order. It should contain A) categories for better report of data, B) the customer/table being tracked, C) the feature to modify the order and/or add notes to determine what the customer wants, and D) the feature to move on to the next customer while putting the current customer on hold.

Based on our finding, a new customer journey map has been proposed along with the recommendation of using a tablet. GUIs have also been designed to go along with the POS.

6 CONCLUSION

The list of distinct features has been identified and ranked from most to least important ones. A number of POS systems have been reviewed and their customer journeys mapped out. Through our literature review, a list of essential requirements needed for a restaurant to succeed has been determined, and matched with the distinct features found in the POS.

It is clear from this finding that restaurants must be able to track all the processes in the restaurant, including customer details, their orders, and the ingredients being used. Being able to provide an interactive digital menu, such as on a tablet, is also beneficial as it allows the customer to learn more about the menu items, and also increase the reliability of food that are on timed specials to come into effect at the exact times they are scheduled to be on special. With these data, they will be able to have better inventory and wastage management, which can then be used to organise the menu more efficiently. Being able to automatically alert staff is also an important feature as it creates standards.

Our future work will include interviews with restaurant owners. This will include carrying a specific study with a restaurant currently in business, and utilising their data to determine the authentication of the results found in this paper.

REFERENCES

- Mariampolski, A., Spears, M.C. and Vaden, A.G., 1980. What the restaurant manager needs to know: the consensus. *Cornell Hotel and Restaurant Administration Quarterly*, 21(3), pp.77-81.
- Labrecque, J. and Ricard, L., 2001. Children's influence on family decision-making: a restaurant study. *Journal of Business Research*, 54(2), pp.173-176.
- Berry, L.L., Parasuraman, A. and Zeithaml, V.A., 1994. Improving service quality in America: lessons learned. *The Academy of Management Executive*, 8(2), pp.32-45.
- Parsa, H.G., Self, J.T., Njite, D. and King, T., 2005. Why restaurants fail. *Cornell Hotel and Restaurant Administration Quarterly*, 46(3), pp.304-322.
- Collie, T. and Sparks, B.A., 2000. Perceptions of key success factors and key success inhibitors in Australian restaurant and catering business operations. *Australian Journal of Hospitality Management*, 6(2), pp.23-23.
- Glantz, S.A. and Smith, L.R., 1994. The effect of ordinances requiring smoke-free restaurants on restaurant sales. *American Journal of Public Health*, 84(7), pp.1081-1085.
- Designthinkersgroup.com. (2017). *DesignThinkers Group / Designing with Customer Journey Mapping for Hospitality Services Government of Taiwan*. [online] Available at: http://www.designthinkersgroup.com/portfolio_page/designing-with-customer-journey-mapping/ [Accessed 12 Mar. 2017].
- Kurland, L. G., & Gilbert, E. 1985. U.S. Patent No. 4,553,222. Washington, DC: U.S. Patent and Trademark Office.
- Lo, C. Y., Lin, C. T., & Tsai, C. L. 2011. Mobile Restaurant Information System Integrating Reservation Navigating and Parking Management. *International Journal of Engineering and Technology*, 173-181.
- Huber, M. M. 2003. Measurement of Restaurant Manager Perceptions of Restaurant Management Information Systems (Doctoral dissertation, The Ohio State University).
- Amburappcom. 2016. Amburappcom. Retrieved 19 May, 2016, from <http://www.amburapp.com/>
- Toast, inc. 2016. Toasttabcom. Retrieved 19 May, 2016, from <https://pos.toasttab.com/>
- Salesvucom. 2016. Salesvucom. Retrieved 19 May, 2016, from <https://www.salesvu.com/>
- Shopkeepcom. 2016. Shopkeepcom. Retrieved 19 May, 2016, from <http://www.shopkeep.com/>
- Touchbistrocom. 2016. TouchBistro. Retrieved 19 May, 2016, from <http://www.touchbistro.com/>
- Kounta. 2016. Kounta. Retrieved 19 May, 2016, from <https://www.kounta.com/>
- POS Nation. 2016. POS Nation. Retrieved 19 May, 2016, from <https://www.posnation.com/>
- Software Advice. 2017. Retrieved 13 March, 2016, from <http://www.softwareadvice.com/>