Byteing into the eating out market

A report on the impact of technology on the UK eating out sector

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Executive summary

- The eating out market in the UK generates around £87.2 billion pounds in sales for the UK economy.
- The wider hospitality sector is the fourth largest employer in the UK (BHA 2017) employing some 3 million people and is one of the fastest growing sectors of the economy.
- It is the restaurant sector and the eating out market that drives employment (just over half of all hospitality employees – just over 1.6 million - work in restaurants and pubs) and employment growth.

- Customers have come to expect technology to be part of their eating-out experience, right through the customer journey from choosing where to eat, to choosing what to eat, to accessing the wifi to engage with social media and finally to paying the bill or sharing it with friends.
- Around 88% of customers in the United States (US) use technology to look up restaurant information such as location, directions, and opening hours, 70% to view the restaurant menu, 57% to read restaurant reviews, and 50% to look out for rewards or special offers.
- 65% of customers have used a self-service kiosk in a quick service restaurant
- In the UK, the eating-out industry is trying to provide customers with the payment options they want. The convenience of contactless payment system has contributed to very significant increases in their use in restaurants, pubs and bars in the UK. About 20% of UK customers already opt to order and pay for meals using mobile payments

- The restaurant industry in the UK is predicted to see the rise in tech-led restaurants in coming years as a way to cater to increasingly digital-savvy diners.
- The current technology widely adopted by restaurants includes
  - online reservations through interactive websites,
  - touch-screen ordering kiosks,
  - online ordering for takeout or delivery,
  - smartphone apps,
  - Wi-Fi for guests,
  - mobile and at table payments,
digital menu boards and
sophisticated point-of-sales systems handling credit card processing, mobile payments, table management, loyalty program management, customer demographics data collection tools, labour management, inventory management, and basic accounting tools, all backed up to cloud-based data storage.

- Convenience is touted as one of the main benefits of restaurant technology for customers, followed by speed of service, order accuracy, and enjoyment/fun, all of which lead to customer satisfaction.
- By providing a level of autonomy and anonymity, self-service kiosks can be advantageous for customers who want convenience and speed.
- Customers see tablets as contributing to their experience with server handheld tablets improving their guest experience, and the use of interactive tablet menus providing information about the menu and the innovative technology having a positive impact on customer satisfaction.
- Customers also see significant benefit in being able to order and pay for meals more efficiently by using mobile payment services. In addition to cutting the frustrating waiting time it can take to process a bill, mobile payment is advantageous for easier bill-splitting for a large group of diners and can reduce internal and external credit card fraud.

- In general, investment in information and communication technologies in restaurants helps achieve both market efficiency (coping with the ups and downs of customer demand) and operational efficiency (making business processes work better).
- Many restaurants, regardless of their characteristics, have adopted technology solutions, bringing a widely recognised contribution to their operational efficiency and restaurant image.
- Integrated Kitchen Delivery Systems (KDS) help ensure hot fresh food is always served by sending orders direct from the table or kiosk resulting in faster preparation and service times and so better table turn times.
- Integrated time and temperature monitoring using the Internet of Things technology can cope with increased guest requirements for hygiene and proper food handling and their sensitivity to allergies.

- Restaurant operators agree that technology integration assists restaurants in meeting customer demand, improving the speed of service, controlling labour costs, and increasing productivity.

- Technology can benefit companies and employees from recruitment to retention. Given the younger generation’s predisposition to using the internet and social media, online and social media-powered recruitment is an obvious way in which to find and attract young talent.

- Restaurants can use technology to connect with and engage frontline employees, in order to motivate and retain talent through leveraging new interactive technologies such as internal social media, messaging, surveys and polls, virtual conferences, and crowdsourcing, to improve communications with and allow feedback from both full time and part time employees.

- Getting the right employees scheduled at the right time is imperative for productivity and being able to cope with the patterns of customer demand. Workforce scheduling software, helps managers to create better employee schedules and enhancing punctuality, while giving employees, both full time and part time, the opportunity to take some control of their own schedules.

- The case of self-service kiosks is interesting. Logic suggests that the kiosk will replace the need for labour and there will be less employees. However, evidence from their implementation (Toast, 2016) suggests that kiosks encourage higher spend per head and increased throughput with the end result that more employees are actually needed to cope with customer demand if in slightly different roles.

- Technology can release more time for employees to interact more freely with customers and respond to their requests knowing that there is less likelihood in the system for failure and possible customer complaints so providing a more relaxed working environment. Being able to handle more customers in a more efficient manner can improve the profitability of the operation as well providing increased headroom for flexibility in employee reward.
• The use of new technology solutions is clearly important for restaurants to meet the expectations of their digital-savvy diners and gain a competitive edge.
• The industry should focus on systems to enhance the customer journey, such as customer loyalty and promotional campaigns, mobile apps, pre-order and queue-reduction technology.
• Asked how technologies influence how they choose a restaurant, the vast majority of customers looked for positive customer reviews, ease of online reservations, easy access to menu and nutritional information, and free and reliable Wi-Fi.
• Restaurant operators in the future are looking to adopt predictive ordering systems that make use of information on customer preferences as well as automatic menu–price adjustment based on demand, drone delivery, automatic food preparation systems and automated onsite delivery, mobile payment systems, beacons, and how delivery services can be integrated into their normal operations.
• It is clear that the focus of restaurant innovation is on service and the customer experience.
• Robotics can be applied to food preparation, some table service, and cleaning, and many have speculated that robots will revolutionise the way restaurants are run. While introducing robots may mean some restaurant jobs are lost, others may well be created.
• However, restaurants clearly need to balance their new digital capabilities gained through their investment in technology with enhancing employee engagement across the many different ways in which restaurants interact with their customers.
• Automating some operations means cutting repetitive tasks from employees’ jobs and so freeing them to interact more meaningfully with their customers and handling any customer requests with care. When routine tasks are delegated to machines, talented employees can act more as brand representatives and become a key differentiator in a competitive market.
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State-of-the-art

The eating-out market in the UK is very big, very complex and very dynamic, generating around £87.2 billion pounds in sales for the UK economy. According to MCA (2016), there are three main sectors

- the retail, travel, and leisure sector covering coffee shops, sandwich bars, supermarkets and retail stores, roadside and motorways, garages, railway stations, and airports, as well as sports clubs, stadia, visitor attractions and entertainment venues. They estimate this sector has just over 100,000 units and generates around £20 billion in sales.

- the cost sector covering foodservice management and in house operations within business and industry as well as healthcare, education, local government, defence, and justice. This sector has around 63,200 units and a turnover of about £4.2 billion.

- the hotels, pubs and restaurants sector covering hotels, guest houses, conference centres and holiday parks, all types of pubs and clubs and both service-led and fast food or quick service restaurants (QSR). This is by far the largest sector with nearly 170,000 units and a turnover of around £63 billion.

In terms of employment, based on ONS data, the wider hospitality sector is the fourth largest employer in the UK (BHA 2017) employing some 3 million people and is one of the fastest growing sectors of the economy and is important for every region of the UK. Within that, it is the restaurant sector and the eating out market that drives employment (just over half of all hospitality employees – just over 1.6 million - work in restaurants and pubs) and employment growth.

For such an important sector of the economy and for one that impacts on everyone’s daily lives, it is important to reflect on the ways that technology has impacted on the industry and where it is likely to lead.

Customers have come to expect technology to be part of their eating-out experience. Customers’ use of technology starts long before they even enter an establishment. The quarterly dining trends report from Bookatable reported that around 40% of UK customers would use technology to optimise their dining experience, such as choosing the exact time meals are served or picking the exact restaurant table they wish to sit at before arriving (Baurtally, 2016).
Just over half of UK customers (52%) would be happy to use a location-based service to get **offers or discounts** on their smartphone from a restaurant or coffee shop when they were close by (TSYS, 2016).

This is comparable to findings from diners elsewhere. For example, according to National Restaurant Association (2016a), 88% of customers in the United States (US) use technology to look up **restaurant information** such as location, directions, and opening hours, 70% to view the **restaurant menu**, 57% to read **restaurant reviews**, and 50% look out for **rewards or special offers**.

The use of technology continues once customers are in the restaurant. In fact, one in four customers look for the availability of technology, such as **free Wi-Fi** and **touch-screen kiosks**, when choosing a restaurant (National Restaurant Association, 2016b). About 25% of customers in the US use technology to get **nutritional information**.

Additionally, based on a survey of 1,115 diners in the US, Toast (2016) reported that 65% of customers have used a **self-service kiosk** in a quick service restaurant (QSR), with 55% stating that they use it “sometimes” and 10% use it “every time.” Around 25% of customers take pictures and **share them on social media** while dining at a restaurant (National Restaurant Association, 2016b).

In the UK, the eating-out industry is trying to provide customers with the **payment options** they want, from contactless to biometric ID verification to wearable payments (CGA Peach, 2016). In a recent Restaurants and Bars Report, BDO (2017) showed that the convenience of **contactless payment system** has contributed to 104% increase in their use in restaurants and 188% increase in pubs and bars in the UK in 2015. About 20% of UK customers already opt to pay and order meals using **mobile payments** (Baurtally, 2016). Other research indicates that British consumers are likely to pay for a significant part of their in-store payments **via their smartphone** in coming years, whilst the in-market presence of both AndroidPay® and Apple Pay® will continue to catalyse significant adoption of m-payments in the near future (TSYS, 2016). Comparably, while Toast (2016) found that 58% diners in the US have not used mobile payments in 2016 (the National Restaurant Association reported an adoption rate of about 39% of all adult diners in 2015), it is expected to increase significantly in the coming years.
As the interest in technology among diners is growing, so technology adoption by restaurants is also on the rise. The restaurant industry in the UK is predicted to see the rise in tech-led restaurants in coming years as a way to cater to increasingly digital-savvy diners (Witts, 2016). As restaurant operators realise that technology can be executed in an attractive way, more restaurants at all levels are expected to adopt applications such as tablet ordering and mobile payment.

An example of a tech-led restaurant is Inamo, which offers interactive tables where guests can place an order, pay, and watch their food being prepared in the kitchen through ‘chef cam’ (Witts, 2016). Indeed, experimental kitchens and restaurants elsewhere have started to bring digital technology to the dining table by projecting images onto the food, giving the impression of bringing the food to life for a multi-sensorial dining experience (Spence & Piqueras-Fiszman, 2013).

The current technology widely adopted by restaurants includes online reservations through interactive websites, touch-screen ordering kiosks, online ordering for takeout or delivery, smartphone apps, Wi-Fi for guests, mobile and at table payments, digital menu boards and sophisticated point-of-sales (POS) systems. Many POS systems can already handle such features as credit card processing, mobile payments, table management, loyalty program management, customer demographics data collection tools, labour management, inventory management, and basic accounting tools, all backed up to cloud-based data storage. According to the National Restaurant Association (2016b), limited service and franchise/chain restaurants generally show higher adoption rates of technology in the US.

In terms of smartphone apps, more than half of restaurant apps feature menus, maps and directions, loyalty programme information, mobile payment, mobile ordering, and nutritional information. Restaurants can also collaborate with third-party smartphone app providers to offer cutting-edge technology for customers. For example, numerous London restaurants are part of a smartphone app “eet,” which can use sensors that collect data on sound levels, humidity, and air pressure in London restaurants to automatically determine how busy a particular restaurant is and, allowing customers to track the availability of restaurant tables and book in real time (Witts, 2015).
For diners

“Almost 80% of customers agreed that technology positively impacts their dining experience. The impact of technology on customer experience is expected to be even more significant in quick service and fast casual restaurants.”

“Self-service kiosks can be advantageous for customers who want convenience, speed, without the need for human interaction, which some customers may appreciate in many situations.”

“The machine does not become impatient, nor does it judge a customer because of his/her food choice.”

Most customers love technology innovations in restaurants. According to Toast (2016), in the US. Almost 80% of customers agreed that technology positively impacts their dining experience. The impact of technology on customer experience is expected to be even more significant in quick service and fast casual restaurants.

Convenience is touted as one of the main benefits of restaurant technology for customers, followed by speed of service, order accuracy, and enjoyment/fun, all of which lead to customer satisfaction. For example, by providing a level of autonomy and anonymity, self-service kiosks can be advantageous for customers who want convenience and speed, without the need for human interaction, which some customers may appreciate in many situations (Lui & Piccoli, 2010). Customers are able to tailor-make their order using interactive ordering technology, capable of multilingual operations. The machine does not become impatient, nor does it judge a customer because of his/her food choice.

Importantly, a recent study shows that customers using self-order technologies (through the website, app, or self-service kiosks) experience reduced waiting times, which leads to increased demand and sales (Gao & Su, 2017).

With regards to the use of tablets, 68% of US diners agree that server handheld tablets improve their guest experience, but only 52% agree that table top tablets have the same effects (Toast, 2016). Handheld POS systems send the order to the kitchen immediately while the server is still with the customers, allowing for a faster preparation time (Doran, 2010) from placing the order.
Hsu & Wu (2013) investigated the use of interactive tablet menus in a full-service restaurant in New Zealand and found that the information about the menu and the innovative technology have a positive impact on customer satisfaction. Further, Cheong and colleagues (2010) found that customers welcome multi-touchable entertainment applications at the dining table to augment their dining experience, providing them with entertainment while waiting for their meal, which is known to reduce their perception of the waiting time.

Another study based in Taiwan found that interactive tablet menus elicit positive customer attitudes to both the functional and emotional aspects of their experience at restaurants. Customers perceived a significantly higher level of control and usefulness when using the tablet, and a significantly higher level of enjoyment and novelty (Wang & Wu, 2014) a potentially key aspect of competitive advantage. Spence and Piqueras-Fiszman (2013) even suggested using tablets as serving plates in order to bring out the taste of the dish being consumed, by varying the background colours.

When it comes to payment, the use of mobile phones or biometric scans, including fingerprints and/or iris scans, for individual verification means convenience, speed, and security (Doran, 2010). About a fifth of UK food lovers would opt to order and pay for meals more efficiently by using mobile payment services. In addition to cutting the frustrating waiting time it can take to process a bill, mobile payment is advantageous for easier bill-splitting for a large group of diners, which, according to Bookatable (2016), is preferred by 39% of UK customers. Importantly, mobile payment could reduce internal or external credit card fraud, easing the minds of the customers as well as the servers and managers (Doran, 2010).
For restaurants and their employees

In general, investment in information and communication technologies in restaurants helps achieve both **market efficiency** and **operational efficiency** (Sigala, 2003). Market efficiency is the ability to cope with the variations in demand inherent in the eating out market. Operational efficiency is simply the ability to operate more efficiently, where the same basic processes just work better. Collecting information from restaurants in the UK, Sigala (2003) categorised productivity enhancement methods assisted by technology into: reducing demand uncertainty, through shifting or managing demand, discriminatory pricing, providing a personalised experience, reducing uncertainty with the duration of the meal, reducing the time between customers, digitalisation of business processes, and improved multi-unit management. Based on a study with 150 restaurants of varying categories in Spain, Ruiz-Molina and colleagues (2014) also found that many restaurants, regardless of their characteristics, have adopted technology solutions, bringing a widely recognised contribution to their operational efficiency and restaurant image.

Successful integration between POS and back-of-house platforms is the key to operational efficiency as it should **increase servers’ and managers’ productivity**. Doran (2010) gave an example of a Kitchen Delivery System (KDS), which, if programmed accurately with all the food items on the menu and their prescribed cooking times, helps ensure hot fresh food is served. A server using their handheld POS to can send the order off immediately while still talking with the customers, resulting in faster preparation times and so better table turn times.

"Many restaurants, regardless of their characteristics, have adopted technology solutions, bringing a widely recognised contribution to their operational efficiency and restaurant image."

Similarly, the application of robotic sensing for demand projection and robotic planning for production management in restaurants would result in a substantial reduction in waiting times and food waste by the system being able to track customer arrivals and alert the BOH staff to start cooking (Noone & Coulter, 2012).

A KDS also assists in anticipating service failure. For example, an order that is not served by the end of the pre-determined cooking time would send an alert to a manager and to a server’s handheld device so that action can be taken to avoid it becoming a larger issue. Doran (2010) suggests that the server could offer a free drink or appetizer to eliminate the perception of a long waiting time, even before the customer realises.

Further, integrated time and temperature monitoring, using the Internet-of-Things (IoT) technology, can cope with increased guest requirements for hygiene and their sensitivity to allergy and proper food handling, which will assist restaurants to avoid liability issues. The system could automatically detect the violation of food time and temperature holding, alert staff or even automatically remove items, eliminating any dish containing hazardous items from the menu (Doran, 2010).

Improving digital customer engagement and loyalty was listed as one of the top tier strategic goals of tech investment by restaurants in the US (61%), followed by improving business and customer analytics, enhancing payment and data security, increasing employee productivity, and reducing the cost of managing technology (Hospitality Technology, 2017). A study conducted with managers from 243 restaurants in the US linked technology adoption to financial success by showing that highly successful restaurants used seven more software applications than the minimally successful restaurants (Huber, Hancer, & George, 2010). It is believed that when managers are given the right tools, they are better able to manage their restaurants.

The National Restaurant Association (2016b) reported that restaurant operators agreed that technology integration assists restaurants in meeting consumer demand, improving the speed of service, controlling labour cost, and increasing productivity. Additionally, 87% of restaurateurs in the US believe that incorporating technology into their restaurants can help attract more customers (American Express, 2016). Notably, restaurants in the US saw customer spend increase by 26% when ordering food via technology (Deloitte, 2016). In the UK, a report from Omnicoo (2017) shows that 48% of restaurant operators believe that being able to ‘offer people the ability to pay using a mobile app, kiosk or iPad to reduce queues’ will improve operational efficiencies. Further, customer engagement via a mobile app can be a way to boost restaurant revenues by between 10-20%.
“Online and social media-powered recruitment is an obvious way in which to find and attract young talent.”

From the human resources perspective, technology can benefit companies and employees from recruitment to retention. In the UK, the workforce in the hospitality sector has traditionally been much younger than across the economy as a whole. More than 40% of hospitality employees are currently under the age of 30 years. Given the younger generation's predisposition to using the internet and social media, online and social media-powered recruitment is an obvious way in which to find and attract young talent (Ladkin & Buhalis, 2016). The trends are similar in the UK and other developed economies, such as Japan and Germany, where hospitality companies and recruitment agencies are using technology to find, vet and compensate competent personnel (Staff Heroes, 2016). Using apps, websites, and advanced hiring algorithms, hospitality companies can easily fill vacancies, agree on terms of service, and complete projects ranging from a few days to several months.

Further, restaurants can use technology to connect with and engage frontline employees, in order to motivate and retain talents. Leveraging new interactive technologies such as internal social media, messaging, surveys and polls, virtual conferences, and crowdsourcing, to improve communications with and allow feedback from frontline employees may help restaurants gather and analyse data about employees' reward preferences, help them grow by using goals and budget, and develop more flexible and effective reward systems (Hospitality Technology, 2017; Stone and colleagues, 2015). Furthermore, based on in-depth interviews with restaurant owners/managers from 12 restaurants in Cardiff, UK, Sobaih and colleagues (2010) suggest that technology can be an effective tool for communicating with part-time employees. Nurturing positive communications with part-time employees, such as updating them with things that occurred in their absence, will benefit in establishing trust.

Finally, getting the right employees scheduled at the right time is imperative for productivity (Hospitality Technology, 2017) and being able to cope with the patterns of customer demand. An online labour scheduling programme, such as POS-integrated workforce scheduling software, assists foodservice managers in creating better employee schedules and enhancing punctuality, while giving employees, both full time and part time, the opportunity to take some control of their own schedules at the same time.”
Online scheduling systems help enhance employees’ personal well-being through satisfaction with schedule flexibility and job autonomy (Xu, Van Hoof, & Nyheim, forthcoming). As a result, employees will come to work happy, engaged, and productive (Hospitality Technology, 2017).

The case of self-service kiosks is interesting. Logic suggests that the kiosk will replace the need for labour and there will be less employees. However, evidence from their implementation (Toast, 2016) suggests that kiosks encourage higher spend per head and increased throughput with the end result that more employees are actually needed to cope with customer demand if in slightly different roles.

Investment in technology can benefit employees in many ways. Simplifying and automating processes and moving some direct to the customer can result in more accurate ordering, quicker and more efficient service and reduced travel back and forth to the kitchen. Technology can release more time for employees to interact more freely with customers and respond to their requests knowing that there is less likelihood in the system for failure and possible customer complaints so providing a more relaxed working environment. Being able to handle more customers in a more efficient manner can improve the profitability of the operation as well, providing increased headroom for flexibility in employee reward.
Looking to the future

“The food industry ... should focus on systems to enhance the customer journey, such as customer loyalty and promotional campaigns, mobile apps, pre-order and queue-reduction technology.”

The use of new technology solutions is clearly important for restaurants to meet the expectations of their digital-savvy diners and gain a competitive edge. Omnico (2017) suggest that with the vast choice of new and advanced technology that the food industry could invest in, they should focus on systems to **enhance the customer journey**, such as customer loyalty and promotional campaigns, mobile apps, pre-order and queue-reduction technology. These technology solutions are all high priorities for restaurant and food service businesses in the UK. With regards to the future restaurant technologies that customers want, diners in the US have mentioned having improved GPS technology to find restaurants more easily, better wait-time technology so that less unproductive time is spent in a queue, providing better menu information and the opportunity to make modifications to dishes more easily such as more cheese on their pizza or less dressing on the salad, a progress bar to track how the cooking of their meal is getting on, a server call button to politely let their server know they need help, splitting bills more easily between a number of guests, simplifying restaurant feedback, keeping better data on regular guests and their preferences, and receiving occasional emails with menu updates and special offers. (Toast, 2016).

Generally, customers have developed a favourable attitude towards self-service and mobile payments in restaurants. Asked how technologies influence how they choose a restaurant, the vast majority of customers looked for positive customer reviews, ease of online reservations, easy access to menu and nutritional information, free and reliable Wi-Fi, as well as order tracking. (Hospitality Technology 2016). More than half also expected feature-rich mobile apps, mobile payments, loyalty programmes,
the ability to self-order at the table, and personal communication based on prior history.

When asked about the future adoption of leading-edge technology, a little more than half of US restaurant operators stated they are willing to adopt predictive ordering systems that make use of information on customer preferences (National Restaurant Association, 2016b). Other advanced tech applications they are interested in adopting when they become available in the future include automatic menu–price adjustment based on demand, drone delivery, automatic food preparation systems and automated onsite delivery. Hospitality Technology (2017) asked restaurants operators to identify technology items that are on their innovation roadmap and found three-quarters of innovative restaurants are focusing on mobile payments, 63% of innovators are looking at beacons, and half are paying attention to how delivery services can be integrated into their normal operations. It is clear that the focus of restaurant innovation is on service and experience.

Deloitte (2016) see automation high on their list of future restaurant technology, which also includes 3D printing, artificial intelligence, augmented reality and wearables, autonomous vehicles for delivery, crowdsourcing, robotics, the internet-of-things, and synthetic biology such as the production of lab-grown meat. Sensors and the internet-of-things are expected to be useful for equipment maintenance, automated service requests, and location-based campaign management. Robotics can be applied to food preparation, some table service, and cleaning, which could dramatically change operations and reduce the cost to serve. In fact, many have speculated that robots will revolutionise the way restaurants are run (Lutrario, 2016). While introducing robots may mean some restaurant jobs are lost, others may be created. For example, the adoption of predictive ordering may require restaurants to have data scientists on their payroll (Staff Heroes, 2016) to handle the extra management information.

However, restaurants clearly need to balance their new digital capabilities gained through their investment in technology with enhancing employee engagement across the many different ways in which restaurants interact with their customers. Automating some operations means cutting repetitive tasks from employees’ jobs and so freeing them to interact more meaningfully with their customers and handling any customer requests with care. When routine tasks are delegated to machines, talented employees can act more as brand representatives and become a key differentiator in a competitive market.
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