A Teaching Case Study on E-Customer Chain

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Abstract

This paper aims at developing a teaching case of electronic-customer (e-customer). The U.S. commercial airline is used as an example to show how to develop e-customer chain model and apply it to the real industry in a classroom setting; and therefore, enhance the teaching of customer chain in a classroom. Specifically, first, an e-customer chain model in the commercial airline industry is developed to show how to integrate Information Technology (IT) into customer chain. Secondly, the e-business solution items are decomposed and derived based on the developed e-customer chain model. Thirdly, analysis of these e-business items is further conducted for the top ten dominant airline companies in the U.S. airline industry. The finding shows that the average and maximum levels of e-business implementation for these ten companies are 60.6 and 68. This teaching case study can be an educational tool of e-customer chain to use in an e-commerce or an MIS course.

Keywords: Commercial Airline Industry, E-Customer Chain, Information Technology Adoption, E-Business

1. INTRODUCTION

Capacity in the U.S. market expanded rapidly during the late 1990's in response to record profits, low fuel costs, and strong global economic growth. However, over-capacity quickly developed after the September 11th terrorist attacks and the ensuing demand-side shock. The demand shock has been exasperated by dramatic increases in the cost of fuel, costly labor agreements, immense debt obligations, and minimal pricing power. While passenger enplanements and overall passenger activity have reached levels comparable to periods prior to 2001 the lasting affects of industry's evolution are not precluded (Corridore, 2005).

The U.S. domestic market for air carriers is projected to grow at a more moderate pace than that of international traffic. Moderate growth in capacity and enplanements will be leveraged by increases in aircraft utilization and a reduced average stage length. However, meager growth in passenger yields will have an adverse impact on domestic routes' profit margins. The passenger yield growth rate is less than that of inflation and in real terms equate to negative yield growth. A shift in the buyer's purchasing power and increases in operating costs will continue to hinder passenger yields and weigh heavily on the long-term profitability forecasts (U.S. Department of Transportation Federal Aviation Administration, n.d.).

The international capacity and traffic considers both U.S. and foreign carriers which provide transportation to and/or from the U.S. International capacity is expected to increase more rapidly than domestic capacity as carriers continue to chase higher yields associated with international routes. Capacity in the U.S. international market remains 7 percent below 2000 levels but growth has begun to rebound. Capacity was projected to grow by 8.0 percent during 2006 while leveling out to an average 4.7 percent through 2016. International passenger traffic is expected to average an annual growth rate of 4.7 percent through 2016. The strongest international growth regions are considered to be Asia/Pacific and Latin American markets with annual growth rates of 5.5 and 5.1 percent respectively (U.S. Department of Transportation Federal Aviation Administration, n.d.).

International passenger yields have witnessed a recovery following the September 11th terrorist attacks and SARS virus. However, continuous geo-political concerns, susceptibility to international economic growth, and biohazards such as Avian flu have the capability to significantly impact the consumer's demand for international travel (Corridore, 2005).

The development of an airline company's customer chains can assist in the identification of potential improvements throughout its operations process. The industry's customer chains are considered as an attempt at identifying the next customer linkage while establishing an understanding of the nature of inter-customer relationships within the industry. The e-customer chain model is developed with aspirations of discovering potential sources of improved service and efficiencies.

The paper is organized as follows: Section 2 discusses the generic customer chain followed by an adoption of the customer chain model to satisfy the passenger airline industry, followed by the derivation of the airline industry's adoption of the e-customer chain in the e-business. Section 3 illustrated the top ten companies' implementation status of e-business solutions. Section 4 provides discussions and conclusions.

2. E-CUSTOMER CHAIN ANALYSIS

During the past decade, many airline companies have started to evaluate their business activities in an effort to increase efficiency and reduce cost. Kearney (2003) developed an emerging airline industry model that is characterized as a single global manufacturing value chain. This model was constructed in an attempt to help understand the integral players in the airline industry. The model is composed of six operator types as well as supporting value chain linkages. These value chain linkages include regulatory bodies, customers, ticket distributors, maintenance and repair operations providers, airports and operators.

This paper develops an e-customer chain model in the commercial airline industry by expanding and modifying Keamey's model (2003) and focuses on customer relationships. The items in e-business will be classified based on four types: business-to-business (B2B), business-to-customer (B2C), customer-to-business (C2B), and business-to-internal (B2I).

2.1 Customer Chain and E-Customer Chain Model

A customer chain analysis can prove to be an invaluable resource in identifying areas for improvements. The customer chain is defined as provider-customer links which extend from the beginnings of the supply

chain to the end consumer. The fundamental premise of the customer chain is that each solitary component and/or process has a customer waiting at the next step (Knod & Schongerger, 2001). Therefore, it is essential that a firm establish a means of identifying methods to help improve service/product quality at each customer linkage.

The depiction of an airline's customer chain seen in Figure 1 in Appendix A provides a generic framework for analyzing customer interactions. The customer chain is segregated into two primary flows which consist of passengers and the airplane itself. This segregation is derived to follow the linkages between passenger's and their next customers as well as the customer linkages which involve the processing of aircraft. The two flows converge at the point of passenger boarding and persist throughout flight operations. Upon consummation of the flight the two paths again diverge onto their respective paths.

The development of an e-customer chain can provide significant insight into how Information Technology (IT) can persuade customer linkages. The directive of implementing IT that affects customer linkages may be multifaceted. Primary benefits may include the circumvention of certain linkages and substantially increased service levels throughout the remaining linkages (Figure 2 in Appendix B).

Much has been done to eliminate many of the passenger contact points within the customer chain. Likely the most prolific recent advent has been the development of online flight bookings. Specifically, tools such as internet travel booking, either through an airline's website or via a consolidated resource such as Orbitz, has greatly increased the consumer's accessibility to flight information and allowed passengers to eliminate the middle-men travel agents. The elimination of travel agents have helped airline firm's reduce distribution costs. As an exemplary, Southwest Airlines contends that an internet booking costs one dollar while booking through travel agents cost between six and eight dollars (Corridore, 2005).

The development of baggage handling systems and alternative check-in systems has greatly increased operational efficiencies while decreasing a passenger's required time in the airline system. Many firms have implemented check-in procedures that may include the printing of a boarding pass via the internet or through a kiosk within the airport (Barua, Konana, Whinston, and Yin, 2001). Furthermore, baggage tracking systems and automated routing has benefited in the reduction in lost baggage and logistical difficulties. The primary objective may include the reduction in waiting time associated with lost luggage and improve service quality by reducing a passenger's waiting time (Penton Publishing, 2004b).

Information technological tools also have an impact on the customer chain of the airplane. However, unlike the passenger customer chain the airplane's customer chain largely seeks increased communicability rather than the circumvention of customer linkages. Technologies may be implemented throughout this portion of the customer chain and may include tools for collaboration with suppliers, EDI systems utilized for maintenance requirements and parts procurement, as well as tools targeted at improving flight performance (Takeoka & Bjorn-Anderson, 1997).

Maintenance and repair organizations have played an essential role in improving airline performance. The Electronic Data Interchange (EDI) systems have been introduced which greatly improve operational efficiency with regard to aircraft maintenance. The EDI systems have assisted in establishing Just-in-time (JIT) inventory management. IS have also benefited communication between airlines and suppliers in order to help reduce downtime associated with unanticipated repair events. The flight performance has been improved through the development of weather monitoring systems, navigational systems, and traffic control systems. Each of these technological advances have either targeted reduced cycle time, improved operations, or reduce costs and have in large part accomplished their respective goals (Penton Publishing, 2004a).

A comparison of the e-customer chain found in Figure 2 to the customer chain identified in Figure 1 suggests the elimination of passenger customer chain linkages. These encompass flight booking, check-in,

and baggage handling. Meanwhile, the customer chain of the airplane does not exhibit any eliminated linkages, but rather suggests that information flows increase the value adding activities at each linkage.

2.2 E-Business Solutions in the Commercial Airline Industry

Based on discussions on e-customer chain model in Figure 2, the e-business solutions are derived and classified in terms of B2B, B2C, C2B, and B2I (Table 1). There are total ten solutions in B2B, fourteen solutions in B2C, five solutions in C2B, and eleven solutions in B2I.

3. E-BUSINESS SOLUTIONS IMPLEMENTATION IN THE TOP TEN DOMINANT COMMERCIAL AIRLINE COMPANIES

The ten largest U.S. domestic airline firms were chosen for the analysis. Size was determined by assessing total 2004 passenger enplanements. America West and American Eagle airlines were in the top ten firms as measured by enplanments, however, these two firms were recently involved in mergers and hence were not included in the analysis. The top ten airlines by 2004 domestic market share of number of enplanements are: Southwest airlines (13%), delta airlines (13%), American Airlines (12%), united airlines (10%), northwest airlines (6%), US Airways (6%), Continental Airlines (5%), America West Airlines (3%), American Eagle Airlines (2%), and Alaska airlines (2%) (Source: http://www.bts.gov/press_releases/2005/bts012_05/hetml/bts012_05.html).

Specifically, e-business applications are approached with respect to four e-business terms which include; B2B, B2C, C2B, and B2I. Initially, potential technology applications are considered. Next, each applications impact on the customer chain is evaluated. Finally, each firm is measured by the level of e-business application implementation.

To conclude the discussion of e-business applications, an analysis of e-business applications at the firm level is considered. Data was collected from the respective firms' websites as well as industry trade publications, more specifically the publication Air Transport World. Table 2 presents the implementation status for e-business solutions. In Table 2, 2 represents fully implemented (daily based), 1 partially implemented, and 0 not implemented at all. These rankings are collected based on companies' web site view, interview conduct, and other news portals.

Some finding in Table 2 are:

The firms under consideration average an implementation level of 16.3 when considering B2B e-business applications. Of the firms considered Delta, American, US Airways, Continental, and Alaska Airlines exceeded the sample's average. Delta, American, and Continental exhibited the largest amount of e-business applications while Southwest and Northwest are the laggards.

- It should be considered, however, that not all applications are deemed necessary by each firm and hence the respective level of implementation may be construed. Case in point is Southwest Airlines whom scored an implementation level of zero for travel agent information exchange because the firm has eliminated all dealings with travel agents. Therefore, it should be considered that alternatives to the processes themselves may prove superior to application implementation.
- An evaluation of B2C applications reveal that American and Alaska Air provide a superior level of applications. United and US Airways proved to have the lowest level of application implementation. The sample average of B2C implementation is 21.7. The most highly implemented applications include CRM, boarding kiosks, frequent flyer account management, flight and gate IS, virtual check-in, and flight notification. The majority of these applications have been targeted to increasing information transparency or the elimination of customer linkages (i.e. ticket counters & baggage handlers).

- The level of implementation of C2B applications is relatively consistent throughout the sample. The most common applications are interactive contacts and feedback. Following is access to Mapquest, frequent flyer miles exchange, and consumer bidding sites. C2B applications are limited within the industry and would not appear to be, as of yet, a significant basis for differentiation.
- An analysis of B2I applications reveals that Delta and American Airlines has a superior level of applications targeted internally. The most developed applications have proven to consist of yield management, flight guidance, scheduling, weather, and e-mail systems. The highly implemented applications often target increasing information transparency to employees to help facilitate customer service. Another major objective of the B2I applications has been resource planning and decision making. Applications which are likely to be heavily implemented in the future may include baggage handling, maintenance diagnostics, and decision support information systems (Penton Publishing, 2004b).
- An aggregate analysis reveals that Delta, American Airlines, Continental, and Alaska Air maintain a superior level of e-business application implementation. The lowest scoring firm proved to be Southwest Airlines followed by United and US Airways respectively. Interestingly, while Southwest scored the lowest of the sample they are the lone airline which has remained perennially profitable. However, the implementation of e-business applications will help the legacy carriers improve their cost structure such that they are increasingly comparable to that of the low-cost carriers (i.e. Southwest Airlines).

4. DISCUSSIONS AND CONCLUSIONS

This paper develops an e-customer chain teaching case study in terms of e-business to show how IT solutions can be integrated into customer chain and be applied to B2B, B2C, C2B, and B2I in the commercial airline industry. An airline company can gain a competitive advantage if it implements IT that enables it to have more effective and efficient customer chain. The findings from this study provide information about the degree to which e-business solutions have been implemented by the top ten companies.

In conclusion, the use of IT to increase e-business capabilities is an inevitable part of the future for the commercial airline industry. Many of the major forces will continue to shape the airline industry. For example, the global economic environment, industry consolidation, increasing fuel costs, government regulation, technological innovation, geo-political and security concerns, and labor relations are all likely to have a significant impact on the future development of the U.S. passenger airline industry. As globalization continues to increase, it will become increasingly important for airline companies to adopt IT to communicate effectively and efficiently through e-customer chain.

The future research will expand the U.S. airline industry by including 60 discount airlines in continental Europe, and compare the e-business implementation for airline companies from these two groups of companies (http://www.lowcostairlines.org).

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Appendix A - Figure 1: Customer Chain in the Commercial Airline Industry
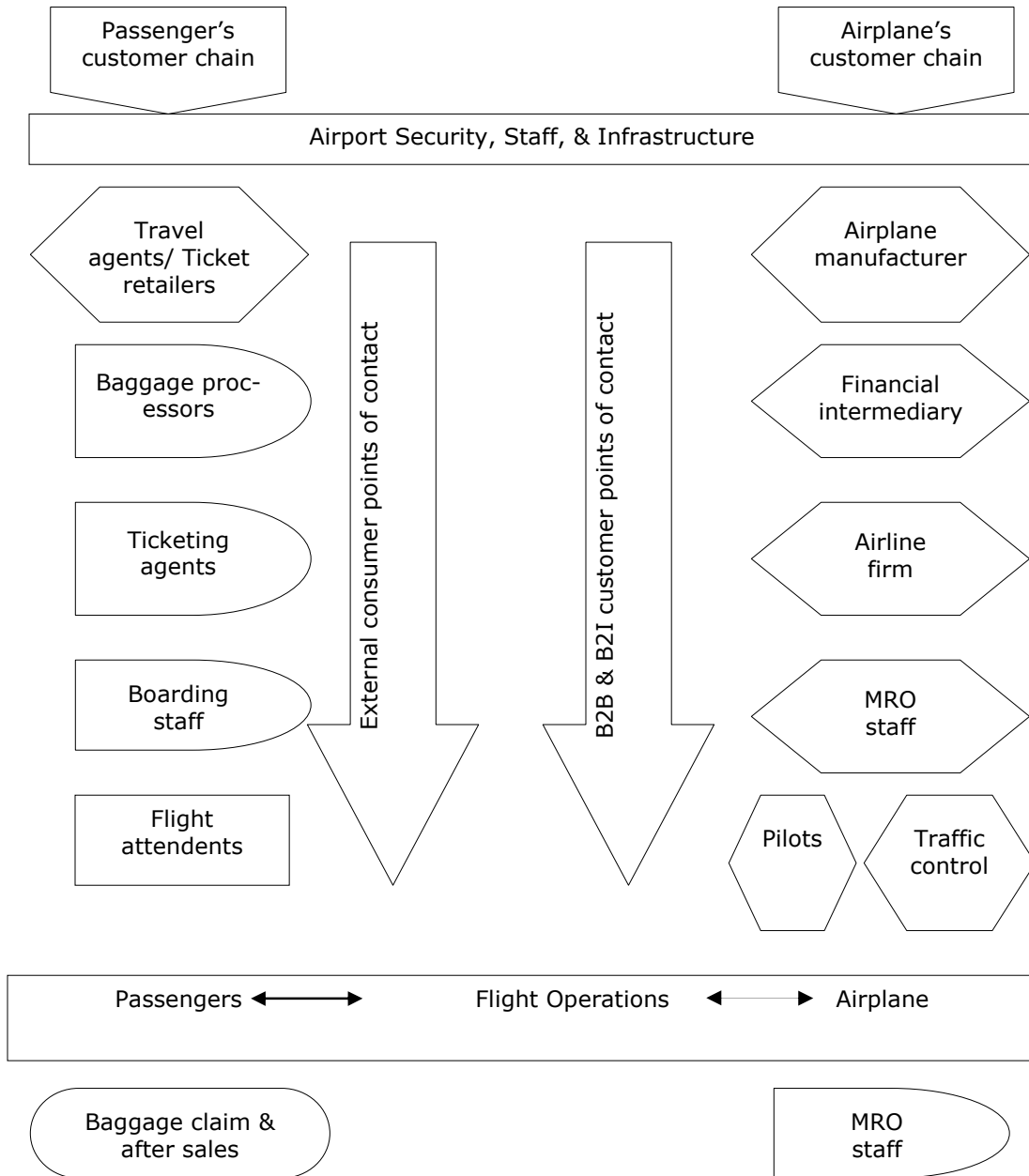
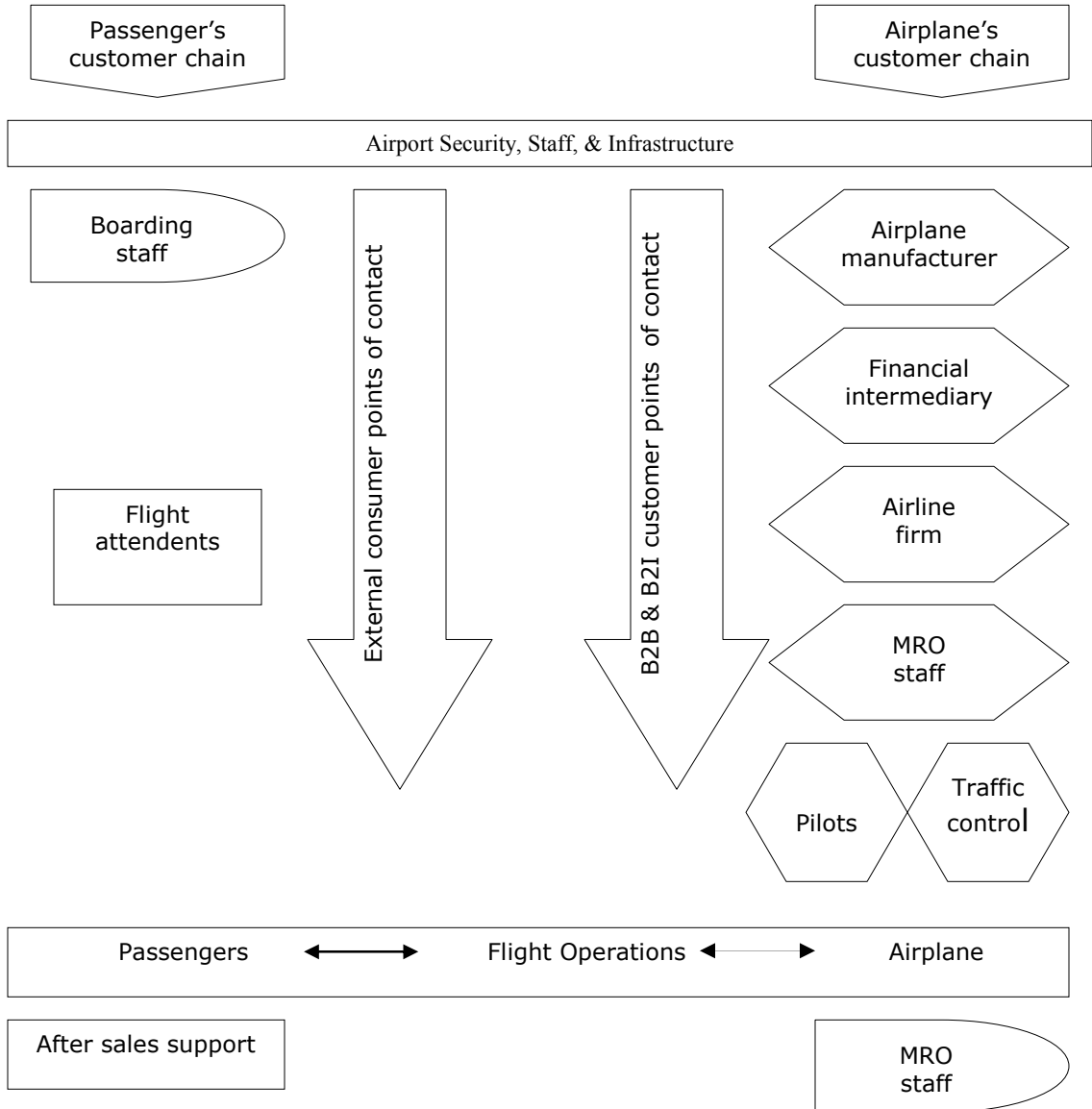Appendix B - Figure 2: E-Customer Chain in the Commercial Airline Industry

Table 1: E-Business Solutions in Commercial Airline Industry

Business to Business	Business to Consumer	Consumer to Business	Business to Internal
1. Resource procurement	1. Gate information display system	1. Priceline.com	1. Flight planning and scheduling data systems
2. Enterprise resource planning	2. Flight information data system	2. Flight rescheduling	2. Flight and weather information and decision support systems
3. E-enabled logistics	3. Passenger service coordinator	3. Contacts/feedback portals	3. Baggage handling IS
4. Aircraft parts exchange	4. Virtual check-in	4. MapQuest	4. IT initiated preventive maintenance
5. Traffic data	5. Boarding kiosks	5. Points.com	5. Decision support IS
6. Code-sharing	6. CRM systems		6. Passenger service coordinator
7. Training & consulting	7. Forward integration into supplementary products (hotels, cars)		7. Corporate e-mail
8. Travel agent information exchange	8. Vacation planning/ Itineraries		8. Pilot & flight attendant bidding & vacation systems
9. Payment processing	9. Frequent flyer account management		9. Travel benefits access
10. Global distribution systems	10. Weather updates		10. Yield management
	11. Flight notification		11. Flight guidance systems
	12. Flight upgrades		
	13. Specials & last minute deals		
	14. Wireless services		

Table 2: E-Business Solutions for Top Ten Commercial Airline Companies

No	Southwest	Delta	American	United	Northwest	US Airways	Continental	Alaska Air
B2B (ample Average Implementation = 16.3)								
1	2	2	2	1	1	1	2	2
2	2	2	2	2	2	2	2	2
3	2	2	2	1	1	2	2	2
4	1	1	1	1	1	1	1	1
5	2	2	2	2	2	2	2	2
6	1	2	2	2	1	2	2	2
7	0	2	2	0	0	0	2	0
8	0	1	2	2	2	2	2	2
9	2	2	2	2	2	2	2	2
10	1	2	2	2	2	2	2	2
Σ	13	18	19	15	14	16	19	17
B2C (ample Average Implementation = 21.7)								
1	2	2	2	2	2	1	2	2
2	2	2	2	2	2	1	2	2
3	0	2	1	1	1	0	1	0
4	2	2	2	2	2	2	2	2
5	1	2	2	0	2	1	2	2
6	2	2	2	2	2	2	2	2
7	2	2	2	1	1	2	1	2
8	0	2	1	0	1	0	1	0
9	2	2	2	2	2	2	2	2
10	2	2	2	0	2	2	1	2
11	1	2	2	2	2	2	2	2
12	1	0	2	1	1	1	1	2
13	2	1	2	0	1	2	2	2
14	1	0	1	2	2	1	2	2
Σ	20	23	25	17	23	19	23	24
C2B (ample Average Implementation = 6)								
1	1	0	1	1	1	1	1	1
2	2	2	1	2	0	1	1	2
3	2	2	2	2	2	2	2	2
4	0	1	1	1	1	1	1	1
5	0	1	1	1	1	1	1	1
Σ	5	6	6	7	5	6	6	7
B2I (ample Average Implementation = 16.25)								
1	2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2	2
3	2	2	2	1	2	2	2	0
4	1	2	1	1	2	0	2	0
5	0	2	2	2	2	2	2	2
6	0	0	1	1	1	1	1	1
7	2	2	2	2	2	2	2	2
8	1	2	1	0	0	0	0	0
9	1	2	1	0	0	0	0	0
10	2	2	2	2	2	2	2	2
11	2	2	2	2	2	2	2	2
Σ	15	20	18	15	17	15	17	13
Overall E-Business (ample Average Level of E-Business Implementation = 60.6)								
Sum	53	67	68	54	59	58	65	61

Note: 2 – fully implemented, 1 – partially implemented, and 0 - Not implemented.