No Hassle Check-in of Aircraft Customers and Baggage

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Abstract

With today's airline system operating with record load factors, the consequences of traveling customers having an inconvenient experience has become a sensitive area for air carriers in maintaining a competitive advantage. Even though considerable progress has been made with self check-in procedures for customers, the procedures that airline employees have to accomplish for patrons to traverse the airport and, finally, obtain a seat on the aircraft are numerous and time consuming. At Purdue University, the Aviation Technology Graduate Operational Assessment and Improvement class developed a gap analysis of present processes and what could be obtained with existing technology and process enhancement. This analysis focused on customer and baggage check-in procedures from arrival at the airport to aircraft entry at the gate. What resulted from this study was the realization that large reductions in process times could be achieved and customer service benefits obtained with the elimination of non-value tasks through customer self-use of existing technology and task reductions, such as RFID and biometric equipment. The study also indicated that a large portion of customer check-in could be accomplished with no contact or interaction with airline customer representatives, strengthening the concept of improvement in customer satisfaction and increased service levels.

Introduction

Airlines have lowered customer check-in time and employee interaction through the use of ticketing kiosks in the last few years. In a JD Power report, check-in by a kiosk was 7.2 minutes, as compared to 14.2 minutes at a ticket counter and 9.4 minutes at curbside check-in [1]. As customers have accepted and used self-service technology in other industries, the next great leap forward for airlines may be for customers to explore the benefits of the evolving digital and biotechnology. As expressed by Linda Hirneise, "While there are a lot of things airlines can do to improve customer satisfaction, passengers should also educate themselves on ways to minimize the frustrations of travel," suggesting that customers have the will and desire to self-direct their own check-in process [1]. It is apparent that today's public will accept self service processes for subways, buses, or movies, and do-it-yourself cash registers, with the possibility of transactions reaching $1.3 trillion by 2007, according to a study by IHL Consulting Group. "People want this," said Dennis Galletta, an information systems professor at Temple University's Fox School of Business and Management. "I think nowadays people are less patient. People not only want this technology, they demand it." [2]. Daniel Henry, managing director of consumer technology at American Airlines, expressed, "People are getting to the point where they want to use technology." A majority of American

Airlines customers are now using ticketing kiosks, with process time decreasing as customers become familiar with the system [3].

The research focused on customer self service theory, challenging the present system of airline check-in. This was accomplished through analyzing self service technology and improving processes for reducing non-value steps [4]. A goal of the project was to have a customer obtain flight data, purchase a ticket, and obtain his/her seat on the aircraft without interacting with an airline customer agent. It was also a goal to have the customer proceed through the airport check-in functions without having to break a walking stride while checking baggage or entering the aircraft. In regard to any possible need of customer interaction with airline service agents, research by Widener stated that, "airline check-in personnel actually aren't particularly important to passengers' overall satisfaction, unless there's a problem" [5]. Because of this strong movement of customers to accept self service, the researchers concentrated their focus on integrating existing technology and redesigning processes that would decrease time, tasks, and customer interaction.

Concerns of security and passenger identification were also addressed in the project, not focusing on the actual screening process but increasing the identification procedures of the passenger to a higher level of verification at initial check-in, baggage ownership, and aircraft entry. Seeking out a decreased task time for check-in would also be an advantage for security, as best expressed by the Rand Corporation which summarized that "reducing passenger check-in process time at curbside, in the terminal, and reducing processing times through the security screening stations, were the most cost-effective and short-term measures available to improve airport security and to reduce the impact of a potential terrorist attack" [6]. Concentrating security resources on key elements of possible security breaches, instead of dealing with delays and frustrated customers, would possibility increase the quality of overall security measures.

This paper focused on a new approach to airline customer check-in, using existing technology and improving current airline processes. The research project found that large gains could be simulated in the check-in procedure, without using new development of technology or altering processes that would disrupt customer flow and service standards. The results of the project provide insight into the time/task reductions and security enhancements that could be achieved with today's technology, and the project provides a template for future planning by airlines and airports. Although cost/benefit analysis was beyond the scope of this project, the findings suggest that reduced process steps replaced by customer self-service technology may provide positive economic returns. This paper will outline the "future check-in process" and describe in detail how the reductions in task, time, and interaction with customer agents were achieved. Also explored will be how this enhanced customer check-in process could be used by airports in the future, providing the same level, if not improved, security identity verification of passengers.

Method of the Study

A graduate class met as a team and focused on customer and luggage check-in work flow processes and their importance on effectiveness, efficiency, and adaptability. The class was given an objective of creating a work flow process for customer and luggage check-in

processes (excluding the actual security screening process performed by TSA) that would improve the overall operating system, increase customer satisfaction, enhance security, and increase accuracy of matching luggage to the owner. An additional important directive was to use off-the-shelf technologies, keeping the adaptation cost of the improvements to a minimum and allowing quick introduction in an airport facility. Purdue faculty and students have conducted several years of study into operational improvement to customer check-in service of airlines. This knowledge and experience was used by the graduate class in creating a general process that would simulate most check-in procedures commonly used by today's airline customer. This check-in process provided the foundation database for developing improved processes using existing technology. Two improved processes were developed by the student researchers; one (interim) that would take less implementation of new equipment and computer processes to provide a practical approach for entry in the market place and one (future) that gained a larger improvement but relied on more in-depth changes of technology and software adjustments. A gap analysis of the current process to both new processes was performed by the student researchers in demonstrating any reduced number of steps, task times, and customer service face time with the customer.

The class began process mapping by identifying the major activities needed to be completed within a general check-in process. Process maps, or flowcharts, can graphically represent the activities that make up a process and provide guidance for locating areas or policies that disrupt quality and productivity [7]. Details commonly performed by passengers, such as walking and waiting, were also included in the process. Varying methods of check-in and the passengers' choices for checked luggage were included, providing several alternative task processes. For example, it was discovered that there were various steps and patterns one could take when checking-in. The customer could check-in at the airport, at the airline's designated counter, outside at a curbside counter, at a kiosk (without any agent interaction), and online (i.e., at home, printing out their boarding passes at their own personal computer.)

After all check-in activities had been graphically flowcharted, the student researchers set up a mockup of the processes at Purdue's airport terminal and conducted simulated time studies of the procedures, noting adjustments that needed to be made to the process map to accurately capture a customer's experience. Also, process times were compared with common time results of previous studies conducted by Purdue researchers, providing an accurate confirmation of the mock-up times. Once the processes accurately depicted the current state and distances traveled, time studies were applied to the entire process and incorporated into a template model.

The total time to complete each process is illustrated in Figure 1 (CO refers to carry on, CB refers to checked baggage.) One can see from the information that the kiosk option for a customer with carry-on luggage required the least amount of steps, while the web check-in with checked bags option took the least amount of time.

Curbside	15 steps	4.44 min
Kiosk (CO)	7 steps	4.02 min
Kiosk (CB)	13 steps	5.04 min
Counter	13 steps	4.04 min
Web (CB)	12 steps	3.56 min

Figure 1: Check-in Tasks and Total Times
Purdue Airport Simulation

Taking a closer look at the elements in Figure 1, web check-in accumulated less total time than the other check-in processes because the boarding pass had been printed prior to arrival at the airport, eliminating the time spent completing that step. Even though the boarding pass step was eliminated from the process, a passenger still had to complete 12 steps prior to boarding the plane. A passenger checking-in at a kiosk with no checked bags had to complete far fewer steps than the other check-in methods, yet the total process time was not significantly lower. This was because the kiosk customer, one with carry-on bags only, was merged back into the same queuing lines as other customers after his/her boarding pass was retrieved from the kiosk, neglecting a portion of gain achieved through overall process step reduction. The scope of the project only included those check-in processes where a customer had to check-in their luggage themselves within the airport terminal. The researchers assumed that web check-in customers with carry-on only would go directly to security and the gate, skipping the check-in process at the airport.

The simulations and outlined template allowed student researchers to identify bottlenecks and determine value and non-value steps. Using three criteria, each process step was evaluated. The criteria for each step included three questions: Is the customer willing to pay for it? Does it add value? And is it done right the first time, every time? [7]. If the answer to these questions was “yes,” the step was a value step; if the answer was “no,” it was a non-value step. These non-value steps were broken down further to explain the nature of the non-value steps, and designated as a delay, control/inspection, preparation, or move process.

A non-value step (delay) present in all methods of check-in was waiting in line. This step accounted for 13.29 percent of the total check-in time. Personal identification inspections accounted for 25.79 percent of check-in time, showing a need for improved methods of security within check-in. Confirming or changing the flight reservation was the only value step in the check-in process.

Fishbone diagrams were created to visually display the cause and effect relationships of non-value problem areas [4]. From these fishbone diagrams, student researchers could analyze the root cause, not the symptom, of the problem at hand to determine the possible solutions. Six categories were used that may cause delays or issues in any process and included environmental, human, method, measurement, machine, and material issues. To create the fishbone diagram for the current customer and luggage check-in process, the six categories were written on a white board and each student researcher brainstormed a list of causes for each category. Then, the causes were discussed by the student researchers and ranked, as shown in Figure 2 (BP refers to boarding pass, ID refers to identification).

Human (man) causes, as shown in Figure 2, had three main issues associated with delays, which included passengers not being prepared with their boarding passes and identification upon arrival at security checkpoints (actual TSA screening process was not included in the check-in process). This caused a delay because a passenger would have to rummage through their bags to find those items, while other passengers must wait in line. Another event discussed was passengers attempting to bring non-approved items in their carry-on or on their person at the security checkpoint. This time was determined to be wasted as the passenger must decide how to deal with the item(s).

Repeating processes was also a cause of delay. Reconfirming identification and boarding passes at the gate was determined to be redundant and cause a delay in the passenger boarding the airplane. For example, broken machines, having to use a machine to double-check a boarding pass, and machine sensitivity were additional reasons for delays. If a machine was too sensitive and rejected a boarding pass, the pass would have to be run through the machine again, causing another delay.

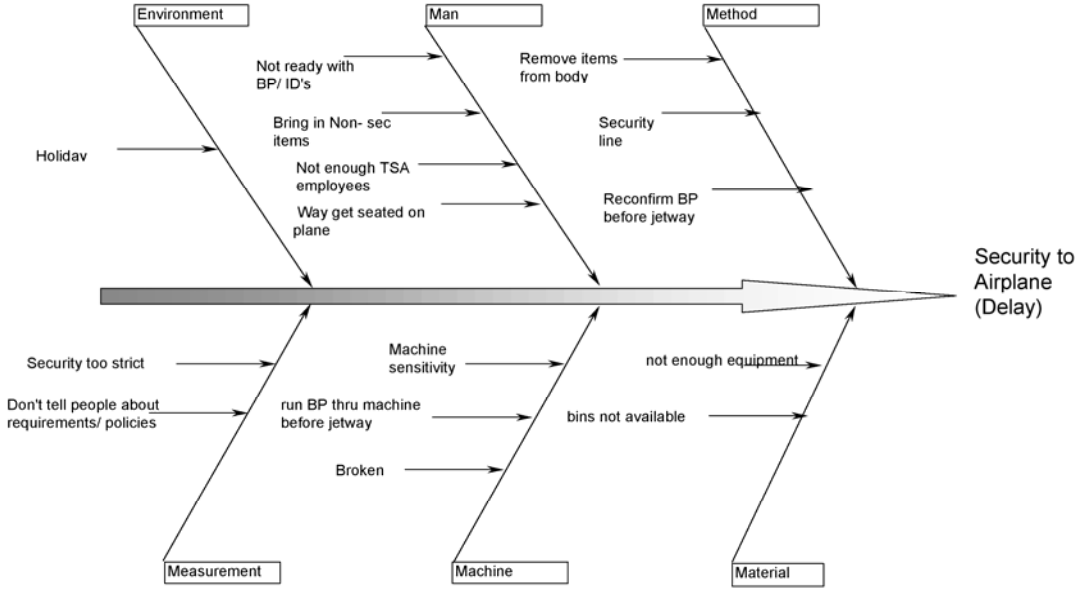

Figure 2: Fishbone of Current Process Map

Using summary analysis of value/non-value tasks, fishbone diagrams, and incorporating current off-the-shelf technology, student researchers were able to research and brainstorm ideas for creating both an interim and futuristic check-in process for improving overall customer service. The student researchers first designed an interim process that would include some of the current processes used in today's environment. This was accomplished by providing a practical approach for immediate implementation by an airline, without a complete overhaul of computer programming technology and with minimum training of employees. A second process (future) was developed that provided larger improvements by using current technology and software programs.

Because inspection tasks were the highest rated non-value steps, both RFID (radio frequency identification) tagging devices and biometric card access devices were chosen for implementation in the process and provided benefits of low estimated cost to implement, while using current technology and providing security with the additional value of matching luggage with the owner. RFID tagging has characteristics similar to bar code technology, but with many added benefits that bar coding does not provide. For example, RFID can provide real-time tracking of people and objects that can be displayed in a computer system. Alarms can be programmed to alert personnel of a tampered bag or one that has been left in an unauthorized area. RFID tagging has been currently utilized in passports, allowing the future process to be implemented by using the existing technology and without making dramatic changes to the overall present operation. For the card access system, it was recommended to use a card that stores biometric information about the traveler. This information can not only be used for identification but can also assist in matching the traveler with their boarding pass and checked luggage, minimizing the chances of luggage being stolen or picked up by the wrong individual at the claims area.

Results Discussion

Figures 3 and 4 illustrate the total step reductions and process times achieved by redesigning the current check-in process into an interim process and a longer term future process. Redesigning for the interim process eliminated 27 tasks from the typical process being used by today's passengers. The future check-in process eliminated 41 steps, achieving a 79 percent reduction rate. The future total process, as compared to the current process, decreased times of 7.7 minutes for checking-in with carry-on luggage and 8.0 minutes for checking-in with luggage. This reduced the overall check-in time to 73 percent, which produced a 70 percent reduction as shown in Figure 4. It was concluded that the decreased times and number of steps may be designated as high value for travelers because customers may be willing to pay the extra costs for the faster services. In addition, this could allow airlines to obtain efficiency gains by re-distributing employee loads. Figure 5 demonstrates the ability to build a future system that would reduce the customer airline customer service face time to zero. This would be of high value to a customer and the airlines in reducing the amount of needed labor allocation, leaving customer service agents to concentrate on problem areas of customers instead of routine processes.

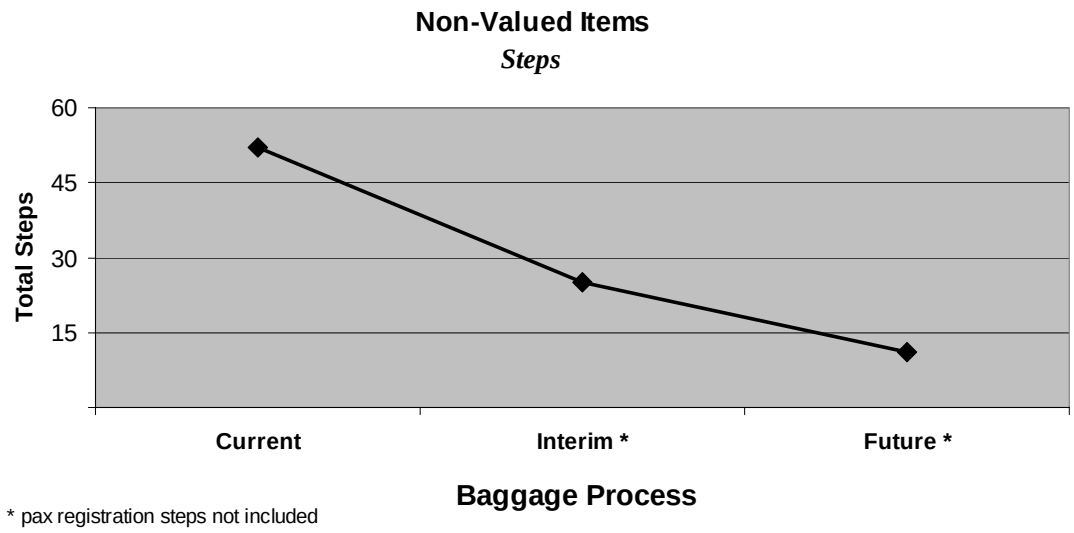

Figure 3: Non-Value Step Reduction

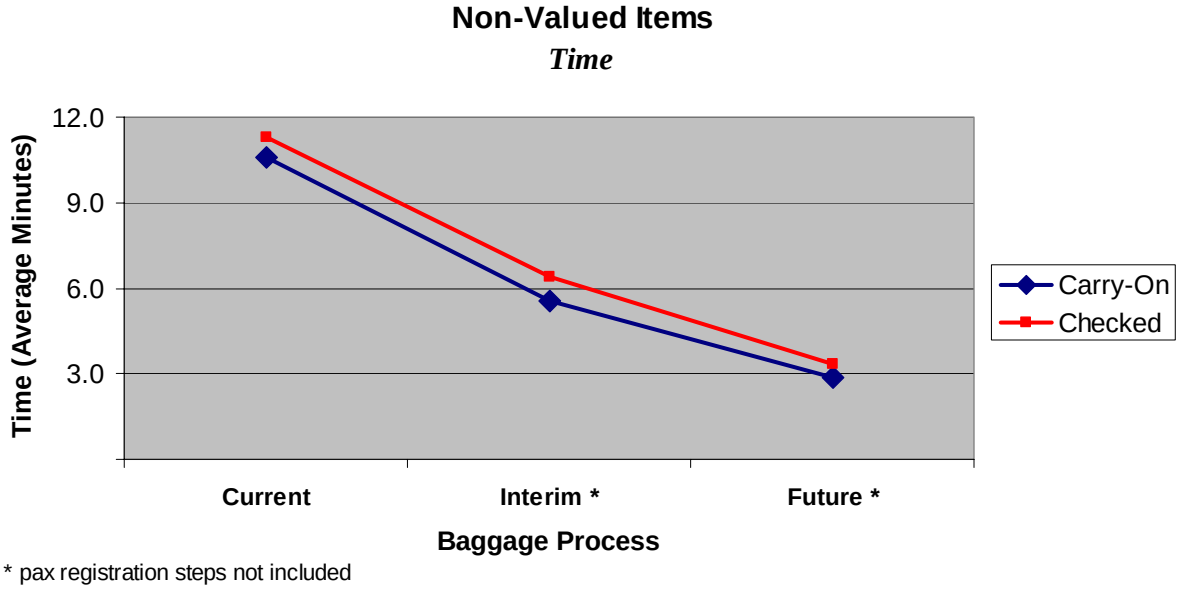

Figure 4: Non-Value Time Reduction

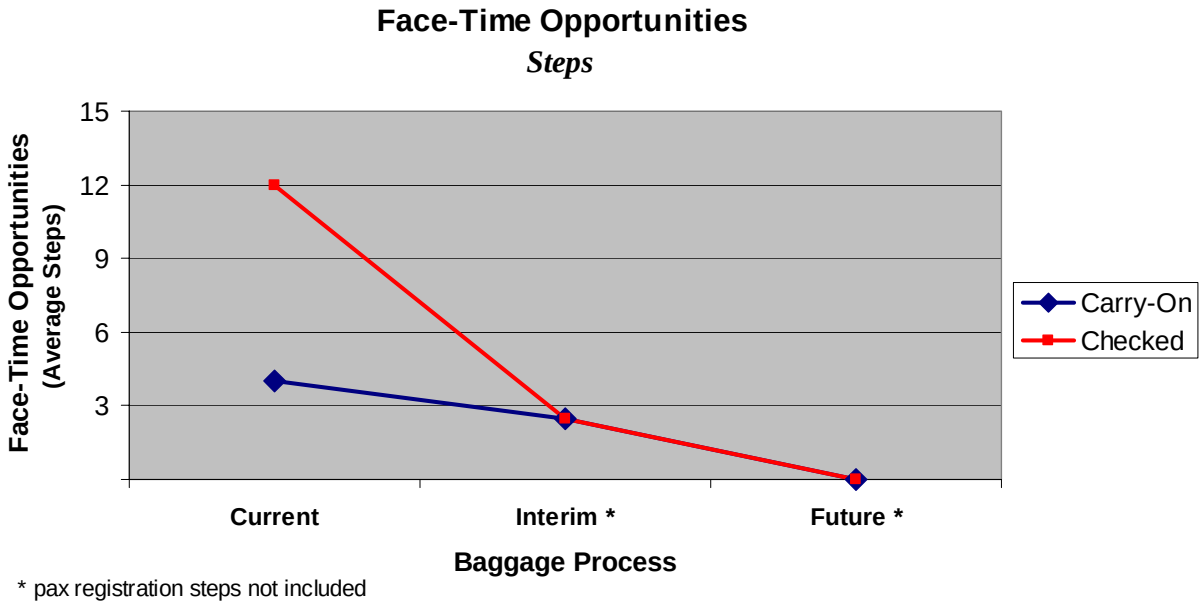

Figure 5: Customer Service Passenger Interface (Face-Time) Opportunities

Conclusion

The student researchers in Purdue University's Aviation Technology Operational Assessment and Improvement graduate course created a simulated airline customer check-in procedure that reflected the process that customers currently encounter at an airport. By performing key analysis and brainstorming techniques, two new processes were developed, an interim that would provide a practical application in today's environment and a future process that could be implemented with today's technology but would require larger changes in process support and acceptance. The gains by the processes showed promising results with a decrease in tasks by more than 79 percent in the future process and reduced customer checks-in time by approximately 72 percent. An added feature was the ability to reduce customer face time during check-in to zero with the future process. This was accomplished by applying existing technologies and realigning the check-in processes through business improvement methods. This enhanced customer check-in process provides some insight into the possible future uses by airlines, and provides the same level, if not improved, security identity verification of passengers and luggage, as well as improves customer satisfaction with the airlines industry.

References

[1] J.D. Power and Associates, "JetBlue Airways Ranks Highest in Airline Customer Satisfaction; Check-In Process Dramatically Shortened by Using Electronic Alternatives," J.D. Power and Associates Reports, Westlake Village, CA, 2005, http://findarticles.com/p/articles/mi_m0EIN/is_2005_March_14/ai_n12936646.

[2] Stevenson, S. S., "Service Gets Lost in Self-serve World," *Chicago Tribune*, Retrieved April 24, 2005, http://www.pitt.edu/~galletta/chicagotrib.html.

[3] Yu, Roger, "Airline Service Evolves into Do-It-Yourself," *USA Today*, Retrieved February, 19, 2006, http://www.usatoday.com/money/biztravel/2006-02-19-air-experience-usat_xhtm.

[4] Eckes, G., *The Six Sigma Revolution, How General Electric and Others Turned Process into Profits*, New York, NY: John Wiley and Sons, Inc., 2001, p. 126–127, p. 132–134.

[5] Widener, S., 2005, "Friendly Skies Mean a Lot to Airline Passengers," *Research@Rice*, 2005, http://www.explore.rice.edu/explore/NewsBot.asp?MODE=VIEW&ID=7402.

[6] Rand Corporation, "Faster Check-in, Improved Screening are Recommended for Short-Term Improvements," News Release, Los Angeles World Airports, Retrieved Sep. 24, 2004, http://www.lawa.org/news/newsDisplay.cfm?newsID=635.

[7] Harrington, H., *Business Process Improvement: The Breakthrough Strategy for Total Quality, Productivity, and Competitiveness*, New York, NY: McGraw-Hill, 1991, p. 57–60.

Biography

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