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Possibilities of Implementing Airport Self-Service Technologies

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ABSTRACT

The main objective of this article consists in analysing the possibilities of optimizing check-in system using self-service technologies. These technologies could reduce the time needed for passenger check-in, increase the level of service and contribute to the passenger convenience. As a case study, the Vaclav Havel Airport Prague check-in system in Terminal 2 is analysed.

KEYWORDS : airport terminal, check-in, simulation, self-service

Introduction

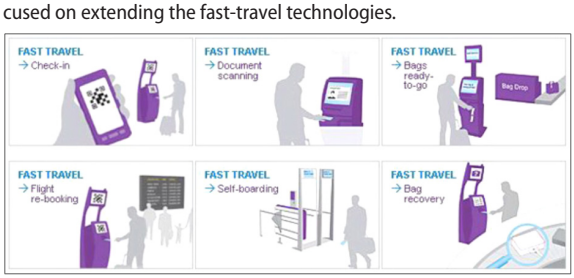
The process of airport passenger check-in is very time-demanding and represents substantial increase of the total transfer time. For that reason, airport operators put effort into optimizing these processes. The aim is to reduce the time needed for passenger check-in and in that way make the airport more attractive both for passengers and for airlines. This paper introduces a case study, based on the analysis of check-in process in Terminal 2 at Vaclav Havel Airport Prague. The aim is to propose possibilities of implementing self-service facilities in order to optimize the process of check-in, as well as estimate the impact of suggested changes. The analysis is based on a model, which was created in the environment of the Tecnomatix Plant Simulation programme. The model was calibrated and validated using data from measurements in the Terminal 2 at Vaclav Havel Airport Prague during March and Mai 2013.

The Use Of Self-Service Systems In Airport Terminals

The technology of passenger check-in is changing last years. In the beginning of nineties the system CUTE (Common Use Terminal Equipment) was introduced. It enables airlines to share check-in counters. The first self-service facility, which was the self-service kiosk, appeared ca. decade later. In the beginning it was developed by airlines for their own use. The maintenance and invest costs were too high, moreover, there wasn´t any common standard of kiosks. That is the reason why the CUSS (Common Use Self Service) technology was developed. It enables sharing of these costs among airlines and reduces the number of kiosks in airport terminals. Besides that, it is easier for passengers to orientate in the terminal.

Kiosks are usually used by airline alliances. Their advantage is mobility – they could be situated wherever in the space, also outside the terminal.

In 2010 the IATA project Fast Travel was presented. This project is focused on extending the fast-travel technologies.



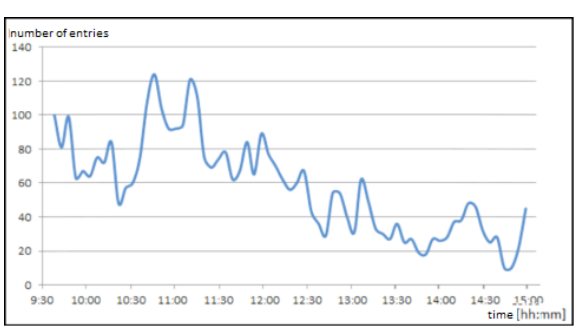
Source [1]
Figure 1: Tools of the Fast Travel project

The self-service technology could be used for the processes in the Figure 1. It involves mobile check-in, internet check-in, ID scanning, flight re-booking for the cases of flight delay, Self Service Bag Drop, bag recovery for finding the location of the baggage or the self-boarding.

Nowadays the trend of on-line check-in and check-in via smart phones is increasing. These modern tools often represent more attractive and comfortable way for passengers then the check-in via kiosk. The SITA company showed in the Airline Business IT Trends Survey 2012, that 71 % respondents believe in smartphones and internet check-in as the dominant form of passenger check-in in 2015. Kiosks will still play the important role for passengers with baggage. There are some attempts of developing the technology of home-printed bag tags, but they are still not completely successful. Kiosks will be still used by those passengers, for whom internet is worse available, e.g. passengers who are returning from the destination to their origin. Another reason for their usage could be the ID scanning for flights in countries, where Advanced Passenger Information is required. In that case kiosks couldn´t be substituted by mobile phones.

CASE STUDY: Self Service Bag Drop installation in Terminal 2 at VAclav Havel Airport Prague

Because of its geographic location and size, Vaclav Havel Airport Prague has a potential of long distances flights hub. In the Terminal 2, especially in so called "rush hours", the queues in front of check-in checks are observable. Figure 2 shows the distribution curve of entries to the terminal according to the time. There are 60 check-in desks available in the terminal. Besides that some airlines offer check-in via CUSS kiosk. The number of CUSS kiosks in this terminal is 17.



Source: Author
Figure 2: Number of entries into the terminal

Using real data from measurements in Terminal 2 at Vaclav Havel Airport Prague during March and Mai 2013 the initial model was created. The program, where the model came into existence was Tecnomatix Plant Simulation. The time period for measurements was 9:30 – 14:30, model is calibrated and validated with that parameters.

Considering the limits, changes which could lead to the process optimizing, were proposed. Limiting criteria for the proposals include operating conditions of airport terminals, financial means connected with personnel resources, legal standards related to safety in air transport and level of service indicators. Vaclav Havel Airport Prague guarantees in the Service Level Agreement (SLA) maximal waiting time for one pro-

cess between 10 – 15 min. For the self-service facilities it is maximally 5 minutes. All of the proposals were discussed with Vaclav Havel Airport Prague´s employees in order to avoid unrealizable visions.

Changes in the check-in - Proposal 1

One of the proposed solutions which could increase the usage of CUSS kiosks as well as reduce the time for check-in consists in installing Self Service Bag Drops with the possibility of bag tag printing.

In principle these Self Service Bag Drops work as follows:

- passenger uses internet, mobile phone or kiosk for check-in,
- Self Service Bag Drop loads a boarding pass´ bar code,
- the passenger is identified,
- the bag tag is printed,
- passenger drops off his baggage,
- Self Service Bag Drop loads the Licence Plate Number and connects it with the Passenger Name Record,
- if the baggage meets airline´s requirements, a conveyor belt delivers baggage to the baggage claim area for security check.

Self Service Bag Drops are already in use at some European airports. Figure 3 shows the Self Service Bag Drops at the airport in Dubai and Frankfurt. More than 50 measurements of time need for baggage dropping-off via Self Service Bag Drop were performed at Frankfurt Airport. This measurement showed the values between 58 and 199 seconds. The average value was 70 s.



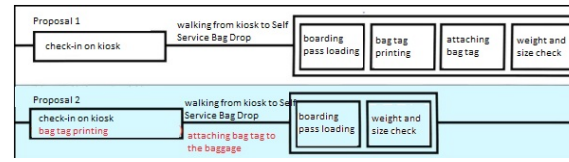
Source: Author
Figure 3 – Self Service Bag Drops in Dubai and Frankfurt

Installation of Self Service Bag Drops, as it was said before, could increase the attractiveness of kiosks. According to IATA Baggage Report 2012, just 8 % of passengers use voluntarily kiosk. As SITA demonstrated, whole 53 % of passengers hold the opinion that kiosks are not attractive, cause after check-in they have to wait in second queue for baggage drop off. [2] If there was a possibility of using self-service device for baggage drop off, these 53 % of passenger would in some cases use kiosks. That means the usage of kiosks could rise to 62 %. Nevertheless, this number is not expectable. It should be supposed, that there will be still a large group of passengers using phones and internet. Moreover, the trend of smartphones leads to making mobile check-in more available. Airport IT Trends Survey 2012 found, that in 2015 around 67 % passenger will use online check-in via computer or mobile, 12 % will be checked classical way on manual check-in desk and 21% will use kiosks. Assuming these preconditions and values above, the new, changed model was created and calibrated.

Changes in the check-in - Proposal 2

The Proposal 2 is based on the idea, that passengers would spend less time on Self Service Bag Drop handling if they have their bag tag already printed and attached. They would only scan their boarding pass code and bag tag via Self Service Bag Drop. The weight and size requirements would be checked by the facility and if the baggage doesn´t meet airline´s requirements, passenger would be invited to pay for the excess baggage.

Figure 4 shows an imaginary timeline representing difference between this proposal and Proposal 1. Passengers attach the bag tag to the baggage wherever inside or outside the terminal, so that the time needed for interaction with the airport facility is reduced.



Source: Author
Figure 4: Comparison of Proposal 1 and Proposal 2

The bag tag printing function is offered by the new generation of airport kiosks. There is also an idea, consisting in „home-printed bag tags". It means, that passengers can print their bag tags on their own within internet check-in. If this technology and kiosks with the printing function were fully implemented, the Self Service Bag Drop functions could be limited (without bag tag printing). These bag drops would be more affordable.

Simulation of proposed changes

Based on the mentioned assumptions, new models of check-in and security check system in Terminal 2 at Vaclav Havel Airport Prague were created. Simulating the airport terminal operations with proposed changes in the Tecnomatix Plant Simulation programme environment, differences in behaviour of the system were observable. For the waiting time limit of 5 minutes and the common use of all participating airlines it is adequate to install 10 Self Service Bag Drop facilities with the bag tag printing function (Proposal 1). For the case of Proposal 2 (kiosks with bag tag printing function and Self Service Bag Drop technology installation) it is sufficient to install 5 Self Service Bag Drops.

The outputs of proposed changes simulation and initial system simulation are showed in the Table 1.

Both proposed innovations bring the identical benefit. Theoretically it would bring the system throughput increase of 10, 2 %. Passengers would spend in average 9 minutes in queues, instead of current 16 minutes. Proposal 2 is less affordable, because it involves substitution of current kiosks for new types.

Table 1: Simulations outputs

Model	check-in and security check system throughput [PAX/hour]	maximal length of check-in queue [PAX]
initial system	589	21
Proposal 1	656	9
Proposal 2	656	9

Source: Author

Conclusion

For the case of Terminal 2 at Vaclav Havel Airport Prague, two changes in current check-in system were proposed. The first of them (Proposal 1) consists in implementing Self Service Bag Drops. The second one (Proposal 2) involves combination of Self Service Bag Drops with modern CUSS kiosks with the function of bag tag printing. For realisation of both of these proposals, the upgrade from CUTE to CUPPS is required.

The analysis of the proposed changes showed the optimal number of 10 Self Service Bag Drops (Proposal 1). If the new kiosks with bag tag printers were installed, the optimal number of Self Service Bag Drops would fall to 5 (Proposal 2). Simulating both proposals, the same benefit was observed. The throughput of check-in and security check system in the modelled time period and operational conditions would rise to 111 %. It would radically reduce the queues.

Considering the simulation outputs, it was recommended to prefer Proposal 1. In the future, installation of modern CUSS kiosks with the bag tag printer should be considered (Proposal 2). Because of continual innovation of technologies it is not recommended to invest in new kiosks nowadays. They will contribute to modernization of the terminal, but besides, they wouldn´t have any other radical impact now. If the traffic volume grows, it would be beneficial to contemplate installing the modern kiosks.

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INVESTMENTS IN EDUCATION DEVELOPMENT

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