

<http://ansinet.com/itj>

ITJ

ISSN 1812-5638

INFORMATION TECHNOLOGY JOURNAL

ANSI*net*

Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

A Study on Airlines Participation in Civil Aircraft Cabin Equipment Selection

^{1,2}Zhang Xin, ¹Liang Gongqian and ²Sun Lei

¹School of Management, Northwestern Polytechnical University, Xi'an, Shanxi, 710072,
People's Republic of China

²COMAC Shanghai Aircraft Customer Service Co. Ltd., Shanghai, 200241, People's Republic of China

Abstract: Cabin equipment can affect the performance of airlines directly. Taking customer participation as the starting point, this study studies the background of airlines participation in cabin equipment selection and puts forward a QFD-based method for the aircraft manufacturer to guide airlines through the process of participating in cabin equipment selection. It stresses that airlines participation in cabin equipment selection is of great importance to the aircraft manufacturer in China and serves as a win-win approach to improving business performance of both parties. With key issues in need of attention pointed out and solutions offered, this study presents a type of thinking to help the aircraft manufacturer achieve commercial success.

Key words: Cabin equipment selection, customer participation, business performance, QFD

INTRODUCTION

As is demonstrated by a large volume of research data and facts, cabin equipment has a remarkable influence upon the sales performance and occupancy rate of civil aircraft. That the aircraft manufacturer and airlines conduct cabin equipment selection collaboratively has already gained consensus in the industrial circles and become a development trend (Oswalt *et al.*, 2009).

SELECTION OF CIVIL AIRCRAFT CABIN EQUIPMENT

Cabin equipment selection, mainly occurring upon the introduction of new airplanes or the retrofit of old ones, is initiated by an airlines and assisted by the aircraft manufacturer and suppliers. Such is the general process: The aircraft manufacturer provides a catalogue of qualified suppliers and the airlines carry out inspections to analyze in a comprehensive way the technology, airworthiness, reliability, economy and comfort of cabin products; then cabin layout and equipment selection are determined through three-party negotiations and finally delivered for application on aircraft. This study aims to discuss cabin equipment selection upon the introduction of new airplanes into airlines.

AIRCRAFT MANUFACTURER NEEDS AIRLINES PARTICIPATION IN CABIN EQUIPMENT SELECTION

Customer participation refers to the involvement of customers in particular activities related to producing and

transferring spiritual and material influence (Yao and Wang, 2011). To encourage customer participation, enhance customer satisfaction and improve business performance is an important strategy for contemporary enterprises to gain market advantage. The cabin of civil aircraft has great economic significance to airlines who are the immediate customers of civil aircraft, as it directly affects operation cost and profit as well as customer opinion. The end customers, i.e., passengers, usually judge an airplane by the cabin and accordingly decide whether to take it or not. Therefore, the aircraft manufacturer has to pay due attention to customer demands for cabin equipment, if it aspires to market success and commercial success (Feng, 2012).

AIRLINES HOPE TO GET INVOLVED IN CABIN EQUIPMENT SELECTION

A high-quality cabin can provide a comfortable, enjoyable and safe flying and working environment for passengers and attendants. The design and decoration of a modern aircraft cabin project the image of an airlines and also serve as an important means to attract passengers. Every airlines makes effort to pursue a cabin design plan that features greater individuality, comfort and more inclusive functions so as to offer a completely new flying experience to passengers. Cabin equipment requires huge investments, is hardly changeable once put into use and directly affects the future operation profit; thus, airlines attach great importance to cabin equipment selection and hope to get involved (Wang and Wang, 2007).

METHOD FOR AIRLINES PARTICIPATION IN CABIN EQUIPMENT SELECTION

Airlines' considerations during participation in cabin equipment selection: Cabins, varying from airlines to airlines, depend on multiple factors such as the development strategy, market positioning, line arrangement, target passenger demands, product properties and engineering maintenance of a particular airlines. Yet all airlines follow some universal criteria in combination with considerations to their own characteristics when selecting cabin equipment (Jiang and Han, 2010).

Lighter weight for fuel burn reduction: According to statistics from airlines, one airplane with 1 kg load needs about 0.03 kg fuel per flight hour. Given that the annual flight hours of all commercial airplanes amount to 57 million, roughly 1700 ton fuel can be saved every year if weight reduction of each flight reaches 1 kg, which shows that weight minimization is highly important to realizing optimal ratio of payload to range and eventually, fuel burn reduction. Thus a weight-reducing design of cabin equipment is a prior consideration for airlines in urgent need of relieving the pressure caused by fuel burn cost. At present, a widely acknowledged strategy for reducing equipment weight is to select light materials. For example, Aviointeriors has reduced by half the weight of aluminum backrests of economy-class seats on Columbus by adopting alloy of higher specification; SICMA AeroSeat under Zodiac Aerospace is able to make business-class seats 11% lighter by choosing LexanXHR sheet. Besides, for a short-range flight less than 2 h, airplane weight reduction can be achieved by such component improvements as the omission of seat backrest regulating device (Luo *et al.*, 2009).

A more reasonable, economical and comfortable cabin environment: A reasonable cabin involves cabin layout, decorations, lighting and entertainment equipment, etc. Cabin layout design is a major aspect in the marketing and strategy competition among airlines; cabin layout, together with the choice and spatial arrangement of seats that fit in with the layout, presents the quality of service products provided by an airlines. A different cabin layout can lead to changes in cost per unit and sales revenue, thereby affecting the operation performance of an airlines in the long run. As is shown by a test item carried out by DIEHL Aerosystems, during which a long-range flight is simulated on a digital mock-up, colored lights can influence passengers' sense of comfort; a soft, gentle ambience and a clear visual

effect created by LED lighting technology can bring comfort to passengers. Meanwhile, either simple or extravagant interior decorations that are tailored to the target market can satisfy various demands of different customers like business or casual travelers. The in-flight entertainment system that provides passengers with recreational activities including movie-watching, music-playing, gaming and reading, attached with the whole set of office applications to offer convenience for in-flight work, is a major trend in cabin development and plays a growingly important role in the competition of passenger attraction.

A more recognizable aviation corporate culture: Every airlines has its unique corporate culture and operation philosophy, thanks to the varieties in historical, geographical, cultural and environmental elements. It is an important strategy of airlines to have distinct aviation branding for passenger attraction and market expansion. As the main area for passenger activities, a cabin can be designed to present corporate cultural identifiers including company logo, color, shape as well as the folk culture and local customs of the destination, so as to help the airlines project the corporate image and highlight its cultural features.

Three stages of QFD-based airlines participation in cabin equipment selection: Quality function development is a systematic, customer-driven quality assurance and improvement method committed to satisfying customer demands to the greatest extent in the process of product development. It transforms customer demands into quality requirements that are to be met in product design. According to QFD, the process of airlines participation in cabin equipment selection can be divided into three stages shown in Fig. 1. Demand conveyance, design and selection and result assessment.

Demand conveyance stage: Airlines choose customer-tailored products to satisfy their demands. For cabin equipment that requires huge investments, their attention is great, expectations high and will to participate in the tailoring process exceptionally strong. At this stage, the aircraft manufacture needs to acquire the knowledge of customer demands through considerable market research and many customer visits, work out corresponding strategies and procedures to guide airlines in the subsequent selection to stimulate their initiative and creativity. Specific steps are as follows:

- To carry out civil aviation market research, collect, evaluate and identify market information; to communicate with target airlines by visiting them and

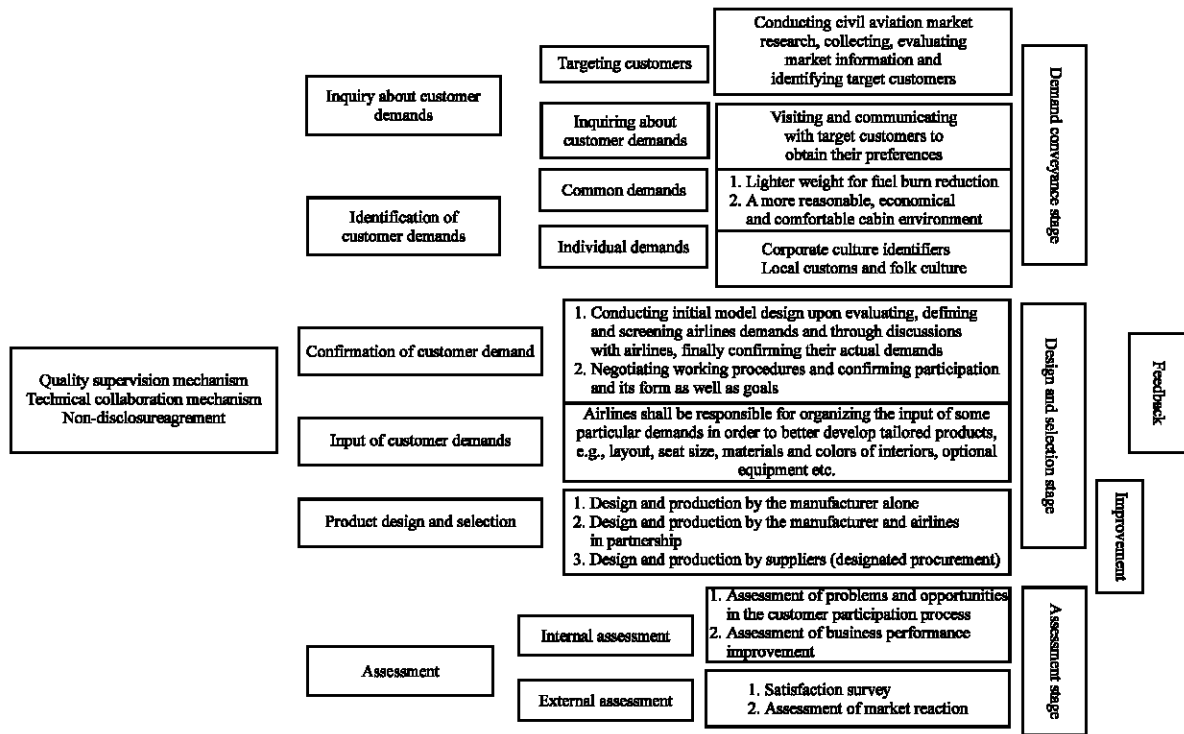


Fig. 1: Flow chart of QFD-based selection of Civil Aircraft Cabin Equipment

get informed of their preferences. It is necessary to know the characteristics of the lines to which airlines intend to assign the purchased aircraft type, the target customer groups, brand positioning and equipment requirements that are as detailed as possible

- To identify customer demands. For instance, among the airlines' key considerations during cabin equipment selection listed above, the aircraft manufacturer needs to identify the following types of market information: Which ones are common demands (i.e., similar demands of various airlines) or special demands (i.e., individual demands); which can be developed with the involvement of airlines, whereas into which airlines can provide input for reference; which can be developed by the manufacturer, whereas which shall involve supplier selection. To identify such information can help the manufacturer guide airlines through all stages of selection with clearly defined purposes

The major task at this stage is to identify the demands of clearly targeted airlines and determine solutions accordingly.

Design and selection stage: The design and selection stage mainly includes a series of activities to facilitate

airlines participation in selection. It aims to give full play to the capabilities of airlines by involving them in the tailoring process in an all-round way so that they obtain not only the tailored products and services but also extra experience and satisfaction.

At this stage, the manufacturer may encourage airlines' role as participants in the following aspects: (1) Demand confirmation, i.e., based on the results of the demand conveyance stage, to reach an agreement with airlines on their actual demands. The manufacturer shall conduct initial model design upon evaluating, defining and screening airlines demands and through discussions with airlines, finally confirm their actual demands. Apart from clarification of product design requirements, a series of more concrete activities are to be launched, including negotiations on working procedures, confirmation of participation and its form as well as goals to be realized, etc. (2) Input of airlines demands, i.e., airlines shall be responsible for organizing the input of some particular demands in order to better develop tailored products, for example, layout, seat size, materials and colors of interiors, presence or absence of galleys, locations of lavatories, etc. (3) Product design and selection, i.e., based on the previous exchanges and negotiations, airlines and the manufacturer implement certain production activities to develop products or design plans. There are three major approaches to product design and selection: Design and

production by the manufacturer alone, by the manufacturer and airlines in partnership and by suppliers (designated procurement). For instance, spray painting and lighting schemes can be given by airlines and then delivered to the manufacturer for production. For such optional products as tablet PCs, music players, lighting equipment and tray tables, airlines can designate manufacturers or suppliers, which helps airlines give play to their capabilities in the value-adding process of transforming their demands into the finalized cabin products and also helps the manufacturer bring product tailoring to fruition. In addition, quality assurance must claim close attention at this stage. A supervision mechanism may be introduced to allow airlines to supervise and review the process and give feedback on milestones, which can, on the one hand, promote product quality assurance or improvement on the part of the manufacturer and boost participation and satisfaction on the part of airlines on the other hand.

By involving airlines into cabin equipment selection process, the manufacturer can obtain airlines' requirements for cabin product innovation, enhance cooperation with airlines, reduce product defects, increase business efficiency, save manpower and material costs by drawing upon customer capabilities and meanwhile improve airlines satisfaction with cabin products.

Result assessment stage: The third stage of airlines participation in cabin equipment selection is result assessment, at which the manufacturer needs to know and assess airlines' feedback on results during the participation process and their additional demands so as to continuously improve participation environment and method, work out measures that are more conducive to promoting airlines participation in product tailoring process and better create common value together with airlines.

Result assessment can be divided into internal and external assessment. (1) Internal assessment: One aspect is to analyze the problems and opportunities that arise in the participation process, i.e., through collecting and summarizing the process and airlines' feedback, to reflect upon the problems during the planning and implementation of airlines participation, analyze the effective and ineffective activities in the participation process, spot key causes of problems and identify beneficial approaches and procedures. Corresponding measures shall be taken in accordance with the analysis results to further optimize strategies, come up with new thoughts, improve the environment and procedures for airlines participation, readjust corporate resource allocation accordingly and set up new goals or performance yardstick for the future. The other aspect is

to evaluate business performance, i.e., to make a comprehensive comparison between the costs of manpower, procedure, management, technology, etc and such benefits as profit addition, promotion of brand value and increase in market share, so as to spot the differences between the manufacturer's expected performance and the actual performance. (2) External assessment: Firstly, satisfaction survey, i.e., by means of inquiries, research and interviews, to identify the gap between airlines' expectations before participation and actual feelings after participation; secondly, to assess market reaction, i.e., to study the market reaction and attitude towards the selection activity in question and the influence of market reaction on order acquisition and customer opinion, etc.

The key to success of airlines participation in cabin equipment selection is a win-win outcome, while its foundation is mutual trust. The manufacturer shall inform airlines of market feedback and the assessment results and formulate optimization measures together with airlines. By virtue of such information sharing, mutual trust and benefit can be strengthened, which is conducive to obtaining more customer support and increasing the efficiency of cabin equipment selection.

AIRLINES PARTICIPATION IN CABIN EQUIPMENT SELECTION IS HELPFUL TO THE PROMOTION OF THE AIRCRAFT MANUFACTURER'S BUSINESS PERFORMANCE

Airlines participation in aircraft cabin equipment selection is a complicated coordination process that involves multiple activities such as information input, collaborative development, technology innovation, etc. It can help the aircraft manufacturer and airlines enhance mutual trust, bear long-term benefits in mind, reduce opportunism, share market information and technological improvements and facilitate resource utilization as well as product development efficiency.

Lowering development cost and raising economical benefit: During participation in cabin equipment selection, airlines will convey market information, their demands and preferences plus development requirements to the aircraft manufacturer for the sake of obtaining satisfactory tailored products; then the manufacturer can get hold of information resources quickly, shorten the market research process and understand customer and market demands in a direct way. At the same time, the aircraft manufacturer may develop some equipment in partnership with airlines and may also encourage airlines to carry out independent development according to their own technical capabilities and managerial experience. Whether with information sharing or involvement in development,

the aircraft manufacturer will be able to eliminate information twisting and all sorts of resource waste during production, effectively reduce cost, urge itself to improve working procedures, design and production methods, all transformed to driving forces for the company's economic benefits and the goal of rapid response to airlines demands will be reached as a result.

Promoting information sharing and technology innovation: The process of airlines participation in cabin equipment selection is a process of common development. Research shows that common development has a positive impact on technology innovation. Airlines and the aircraft manufacturer can exchange and complement know-how and technologies in the process of common development, which is beneficial to technology innovation. Moreover, in the context of involvement, the aircraft manufacturer and airlines keep closer ties and more sufficient exchange and sharing of information to greater depth and scope. The aircraft manufacturer will have the opportunity to find new thinking and fresh ideas among airlines demands, dig out new requirements to meet and concretize creative ideas. It will be easier for the manufacturer to gain airlines support and assistance in product testing and optimization so that technology innovation can be fueled.

Boosting customer satisfaction and achieving commercial success: There is an evident positive correlation between customer perceived control and customer satisfaction. When involved in cabin equipment selection, airlines make comparatively heavier expenditures in psychological, physical and emotional terms and acquire a stronger sense of identification with the products or corporate philosophy; therefore, their sense of decision control and perceived control will be stronger, which more easily elicit higher satisfaction. That the aircraft manufacturer attaches importance to airlines participation helps to pave a smooth path for fostering tailoring capabilities to better satisfy airlines demands on the one hand and lay a solid foundation for obtaining stable customers and promoting business performance on the other hand. In some crucial participation activities, the aircraft manufacturer and airlines maintain frequent and in-depth contact; thus, the manufacturer will find it easier to master the demands of similar customers, thereby creating greater competitive advantages, raising airlines satisfaction, strengthening purchase willingness, cultivating brand loyalty, winning more customers and meanwhile achieving commercial success.

CAUTIONS FOR THE MANUFACTURER IN THE PROCESS OF GUIDING AIRLINES PARTICIPATION

Airlines participation in cabin equipment selection means that the manufacturer needs to incorporate airlines

into the entire process of aircraft design, manufacture and final assembly, from the very beginning to the end. But participation shall to be kept to certain limits. The aircraft manufacturer needs to maintain independence while ensuring that airlines demands are met on the principle of mutual benefit. Accordingly, three cautions to which the manufacture has to pay attention when getting airlines involved are listed below.

To establish a contractual relationship with airlines that features cooperation, trust and mutual assistance and formulate definite participation guide and working scheme to ensure the normal proceeding of participation in its entirety.

To set up a monitoring mechanism to regulate the two-party relationship and ensure that no interest of either party shall be jeopardized by means of strict, standardized and procedural management.

To set up a non-disclosure system and reach a non-disclosure agreement with airlines, in which confidentiality obligations of both parties are clearly defined, the limits of airlines participation in selection process and scope of information opening are set, so as to avoid any loss caused by information and technology leakage.

REFERENCES

- Feng, T., 2012. A review on frontier studies on customer and supplier participation in new product development and the prospects. *Foreign Econ. Manage.*, 7: 75-81.
- Jiang, S. and H. Han, 2010. Research on selection solutions for civil aircraft cabin configuration. *J. Changsha Aeronautic Vocational Techn. Coll.*, 3: 56-60.
- Luo, M.Q., H.C. Feng, H. Liu and Z. Wu, 2009. Rapid cabin design and automated scheme adjustment for civil aircraft. *Acta Aeronautica et Astronautica Sinica*, 1: 73-80.
- Oswalt, P., S.B. Dessau and M.G. Bau, 2009. *Bauhaus Conflicts, 1919-2009: Controversies and Counterparts*. Hatje Cantz, Ostfildern, ISBN: 9783775724883, Pages: 303.
- Wang, H. and T. Wang, 2007. A study about the relationship of customer participation, perceived control and customer satisfaction. *Scient. Manage.*, 6: 48-54.
- Yao, S. and Y. Wang, 2011. Mechanism of impact of customer participation in new product development on technological innovation performance of enterprises: An empirical research in B-B context. *Sci. Sci. Manage. S. T.*, 5: 34-41.