USING AHP AND QFD IN THE INVESTIGATION AND REFINEMENT OF E-BANKING SERVICES

ABSTRACT

The purpose of this paper is to introduce a Quality Function Deployment - Analytic Hierarchy Process decision tool in the direction to support e-banking services. The final product of the model is a House of Quality matrix and AHP was used to determine the intensity of the relationship between e-banking quality attributes and e-banking platform activities. Through this research the established QFD-AHP model supports decision makers in adopting innovating strategies that might increase e-banking usage and reduce customer churn. A case study from a Greek bank was used to validate the model.

Keywords: Analytic Hierarchy Process, Quality Function Deployment, e-banking services.

1. Introduction.

Technological evolution has created great opportunities for the global economy, influencing banking services. Internet spreading has increased dramatically (especially during the COVID-19 period) and its growth puts the 4th industrial revolution in the fast lane. In this respect, this paper introduces a QFD based decision aid to support innovation ventures for e-banking services in the banking sector in the direction of reducing customer churn, encourage retention and acquiring new customers. The model is based on the specific customer segmentation a banking organization in Greece but it can be easily expanded to pertain to any similar organization.

2. Literature Review

E-banking is one of the most valuable alternative channels. Through this channel banks provide information and offer convenient services to their customers. Despite the obvious advantages of faster transactions and low costs for the customers, there still exists a considerable percentage of customers reluctant to endorse e-banking, due to uncertainty and security concerns (Kuisma et al., 2007). It is thus important to understand the critical factors that lead to select an e-banking channel. Bauer et al. (2005), validated a quality based measurement model for the construction of a web portal on the following criteria: security and trust, basic services quality, cross-buying services quality, added value, transaction support and responsiveness. Similarly, Shankar and Jebarajakirthy (2019) investigated a mechanism for enhancing customer loyalty for e-banking platforms via service quality (EBSQ) practices using dimensions such as reliability, website design, privacy, security and customer service and support.

3. Research Design/ Methodology

This decision tool combines the Quality Function Deployment (QFD) method and the Analytic Hierarchy Process (AHP) to incorporate customer needs into the technical characteristics of the e-banking service in order to ensure customer satisfaction. The main idea of this framework is the identification of the ‘‘Voice of the Customer’’, obtained

through surveys, and our research followed three interrelated stages in order to formulate the proposed QFD-AHP model. Moreover, the determination of the customer segmentation (based on e-banking activities) was of vital importance in order to support the development of the proposed decision tool, since different market mixes or goals of increasing the usage of e-banking might exist for specific organizations.

In the first stage of the study an extensive literature review was used to detect the most critical e-banking quality criteria. Fifteen items in total stood out, namely: access from anywhere, access at any time, faster services, usage instructions, easy to use, ease of navigation, restoration, security, technical reliability, service reliability, benefits-gifts, pricing, customization, skills and aesthetics.

In the second stage a field survey was carried out among bank executives in order to group the previous fifteen items into a manageable number of key factors. A questionnaire customized to the special needs of the study was specifically designed based on earlier surveys and the academic and professional experience of the authors. This stage resulted to a novel House of Quality (Appendix).

In the third stage of the research we validated the produced HoQ for a Greek bank for a specific customer segmentation and desired level of targets. An additional survey was conducted using an AHP approach blended within QFD for quantifying the strength of the relationships, or preferences of the customers between e-banking activities and their needs (wants) (Saaty, 1980, Partovi and Corredoira, 2002). Needless to say that the initial scenario was modified in order to examine changes and implications for different levels of market segmentations and targets (sensitivity analysis).

4. Data/Model Analysis

Exploratory factor analyses (EFA) was applied on the data collected in the 1st survey to extract the relationships among the initial fifteen criteria. The process indicated five main quality factors (security-trust of the system, pricing, design, skills, convenience). In the second stage of the research the five quality factors represented the columns of the novel HOQ, while the customer segmentation according to their main e-banking service activities became the rows of the relationship matrix. In the final stage of the research customers participated in an AHP survey to determine the strength of the relationships between the e-banking quality factors and the segments. The sample size included 200 cases. The results provided a vector of weights for the key factors. In order for further confirm the accuracy of the proposed decision-making tool alternative scenarios of market mix and goals were investigated. The additional survey was addressed to a sample of 100 cases of the banks' customers. Comparing the results with the initial scenario, we noticed that the importances of quality factors are prone to changes depending on the variations of market segmentation or goal targeting. The results for basic and alternative scenario are presented at Table 1.

5. Limitations and Conclusions

This research develops a QFD-AHP tool to determine the intensity of relations between variables from the customers' point of view in the e-banking sector. The proposed changes can support e-banking services in their effort to be more reliable and attractive and provide important information to managers for eliminating actions that might waste resources. Findings suggest that "Security-Trust of the system" is the most important factor on which specific banking organization should focus based on customers' needs and aspirations

regarding their future position in the market, followed by "Convenience" and "Pricing. Moreover, the implementation of alternative scenarios showed that the weights and the ranking of quality are prone to changes depending on the organizations market mix and goal setting. Several interesting issues for further research can be explored. For example, a consequent HOQ relating banking quality attributes with platform technical key specifications may be of interest. In addition, comparative results for several financial institutions of different sizes or e-commerce services, can lead to performance evaluation studies.

6. Key References

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7. Appendix

Table 1. Relationship Matrix (Main and Alternative scenario)

e-Banking Transactions (segments)		**%Market Mix (1)**	Alternative scenario (2)	**Security-Trust of the system (1)**	Security-Trust of the system (2)	**Pricing (1)**	Pricing (2)	**Design (1)**	Design (2)	**Customer Skills (1)**	Customer Skills (2)	**Convenience (1)**	Convenience (2)	**e- Banking % (EBS-1)**	e- Banking % (EBS-2)	**Goal % (1)**	Goal % (2)
1	Transfers amounts between my accounts and third party	**16.82**	6	**0.341**	0.252	**0.197**	0.194	**0.117**	0.117	**0.087**	0.087	**0.258**	0.350	**25**	25	**50**	30
2	Transfer money to others banks (Domestic/ Foreign)	**7.20**	3.10	**0.337**	0.337	**0.205**	0.205	**0.118**	0.118	**0.138**	0.120	**0.202**	0.220	**15**	10	**70**	12
3	Payments to public agencies (Taxes, pension fees etc.)	**20.00**	6	**0.301**	0.242	**0.171**	0.221	**0.128**	0.128	**0.141**	0.150	**0.259**	0.259	**12**	15	**50**	25
4	Payments to private entities	**17.85**	5	**0.349**	0.322	**0.184**	0.173	**0.102**	0.112	**0.103**	0.093	**0.262**	0.300	**14**	26	**50**	30
5	Stock Exchange Transactions	**1.21**	20	**0.314**	0.214	**0.217**	0.235	**0.126**	0.190	**0.102**	0.110	**0.241**	0.251	**18**	12	**40**	50
6	Monitoring deposit and loan accounts	**19.87**	24.9	**0.292**	0.260	**0.180**	0.180	**0.135**	0.135	**0.126**	0.100	**0.267**	0.325	**5**	11	**50**	80
7	Watch and Pay credit card accounts	**17.05**	35	**0.282**	0.262	**0.174**	0.205	**0.166**	0.166	**0.121**	0.110	**0.257**	0.257	**12**	10	**50**	70
8	Importances	**1.00**	**1.00**	**0,313**	0.254	**0,182**	0.279	**0,128**	0.201	**0,120**	0.157	**0,257**	0.109				