Empirical Investigation of Key Factors for SaaS Architecture: A systematic summary

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1 Introduction and Background

Software as a Service (SaaS) is a form of cloud computing that delivers cloud applications and all of their underlying IT infrastructure and platforms to end users through a web browser. The SaaS delivery model has garnered significant attention from both software vendors and users. This highly competitive environment presents numerous challenges for SaaS developers and vendors. To remain relevant in this competitive landscape, vendors, and developers must carefully consider several key architectural factors in the SaaS development process. These factors include customization, scalability, Multi-Tenancy Architecture (MTA), security, integration, fault tolerance, and recovery management. The aim of this paper is to empirically examine the impact of these architectural key factors on the success of SaaS applications.

2 Method

2.1 Research Model

To investigate the relationship between key architectural factors and the success of SaaS applications, as well as to comprehend the impact of these factors on the overall quality of SaaS development within the SaaS market. The research model comprises six independent variables: customization, scalability, Multi-Tenancy Architecture (MTA), security, integration, and fault tolerance and recovery management, along with one dependent variable: SaaS application performance. The author used the following model.

$$\text{SaaS application Performance} = \alpha_0 + \alpha_1 f_1 + \alpha_2 f_2 + \alpha_3 f_3 + \alpha_4 f_4 + \alpha_5 f_5 + \alpha_6 f_6. \quad (1)$$

Figure 1: α_0 to α_6 are coefficients

2.2 Research Methodology

The SaaS development process comprises five stages: the requirement phase, analysis phase, design phase, and testing phase. From the design phase to the testing phase, it's essential to consider the key elements of SaaS architecture. For the purpose of this paper, paper have selected an organization involved in the SaaS development process. The following graph is the flow of the experimental design.

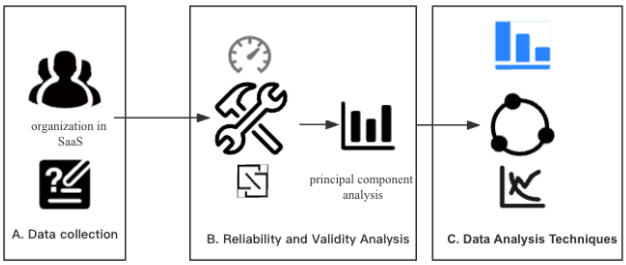

Figure 2: Selection and organization of research methods

A. Data collection: Questionnaires were used to collect data on the key factors and the perceived level of SaaS application performance identified.
B. Reliability and Validity Analysis: To ensure reliable and valid research, quantitative analysis and principal component analysis were performed.[1]
C. Data Analysis Techniques: The writer used normal distribution and parametric statistical tests in stage one, non-parametric statistical techniques in stage two, and both parametric and nonparametric methods in stage three.

3 Analysis

3.1 Hypothesis Testing

Step I: Parametric statistics were employed to test hypotheses H1 to H6. *Step II:* The nonparametric Spearman correlation coefficient was used to test hypotheses H1 to H6. *Step III:* To cross-validate the results obtained from the parametric and nonparametric statistical techniques used in Step I and Step II, the partial

least squares (PLS) technique was employed to test the hypotheses in Step III.

3.2 Model Testing

The research model, as represented by equation (1) in the linear regression, was tested to offer empirical evidence supporting the significant role of factors crucial to SaaS developers in determining SaaS application performance.

3.3 Limitations

The study acknowledges limitations and has implemented measures to mitigate potential threats to external validity. Specifically, a random sampling method was utilized to select respondents from diverse regions worldwide. First limitation, the key factors (dependent variables) have been selected and chosen for the purpose of analyzing their association with SaaS application market performance and assessing their impact. Other key factors potentially influencing the performance of SaaS applications may exist; however, the six variables selected for this study were excluded because they have all been previously documented in the literature. Another significant limitation of this study is the sample size. Despite collecting a large number of responses, the sample size can be considered small in comparison to the overall population size. Consequently, the data is limited in its generalizability.

4 Conclusion

The study concludes that customization, scalability, Multi-Tenancy Architecture (MTA), security, and integration are positively associated with SaaS application performance. The following is my point. Firstly, the language used in this paper is precise and exhibits a strong perspective, with the entire article centered around the argumentation and analysis of the five key factors in SaaS. Secondly, the arguments are comprehensive, and the experimental design is highly logical. The initial data is obtained through survey research, and advanced tools and numerical calculation methods are employed to refine and analyze the data. Consequently, the arguments are not only sufficient but also well-founded.

References

[1] Andrew L Comrey and Howard B Lee. *A first course in factor analysis*. Psychology press, 2013.