

Provide a pricing framework for enterprise software as a service (SaaS)

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Abstract

Product pricing in the current business world is one of the main concerns of companies and organizations active in the field of production, and the rapid and significant progress of information technology and software has also become a reason for pricing in the field of software to become a serious challenge. In this regard, this research has been carried out to provide a hierarchical pricing framework for enterprise software as a service. For this purpose, this research was carried out using a mixed method (qualitative-quantitative), extracting 28 indicators of the desired pattern in the qualitative part using the method of meta-composition and content analysis. The pattern in the quantitative part was obtained using the Interpretive Structural Modeling (ISM) method. The statistical population in the quantitative section included 16 research experts. The finding of this research is the achievement of a five-level model where the most influential indicators of this model at the fifth level were order compatibility and software performance value and quality.

Keywords: pricing, software, software as a service, information technology, sales
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1 Introduction

Pricing of goods and services has always been one of the most important topics in the world of sales and marketing. Product and service pricing is one of the factors that can even affect the success rate of a business. Product pricing methods in accounting are actually a process during which the value of goods or services is determined manually or automatically. The effect of pricing is so important for a business that it can completely change the amount of sales and profit of an economic unit. Also, information technology is growing at an astonishing rate in such a way that each of its branches has undergone many changes and developed. One of the areas that has grown a lot in recent years and has had a great impact on the productivity and efficiency of other industries is the enterprise software industry. Investing more in this sector leads companies to develop information technology, and that is why 56% of large companies expect their budgets to grow in the next year. IT accounts for approximately two-thirds of all

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outsourcing services, while business process outsourcing covers the rest. The growth of technology in the software as a service industry is very high and its services are very complex. In addition to the mentioned cases, the hybrid nature of services (simultaneous interaction of machine and human to provide service) is one of the other characteristics that have made service delivery out of the traditional mode [7]. The rapid transition of large companies to these models and the explosive growth in the number of new companies using the software as a service is due to the significant benefits offered to its providers. However, these benefits come with commercial and technical challenges. The market landscape changes and requires software companies to design and implement different business models, product management practices, and development processes for software-as-a-service solutions. Therefore, in contrast to traditionally providing software, providing software as a service is recognized by researchers as a major and important trend in information technology [16]. Determining the price of a product or a service is a multidimensional problem with internal and external influencing variables. Pricing is an important part of marketing and also affects the overall goals of the company. Deciding on this complex issue is impossible without a systematic approach [18]. The vital importance of pricing for businesses has promoted research in this field. Faced with software pricing challenges, large software and technology companies employ economists who work with product and project managers to address all pricing challenges for their products, including software-as-a-service solutions. Therefore, this research seeks to find the answer to the question, what is the hierarchical framework of enterprise software pricing as a service?

2 Theoretical foundation

2.1 Software as a service

Currently, many definitions for software as a service have been provided from various sources, and some of them even refer to software as a service using similar terms. For example, the term “e-services” was introduced by Rast and Kanan and computation-oriented computing (SOC) by Papazoglou. In addition to these different terms, many people still misunderstand the concept of software as a service. The table below describes all the important elements of software as service definitions that are clearly stated in these different studies. Software-as-a-service stocks can be quite profitable investments. The business model is subscription-based, forcing customers to pay monthly fees. Because the software is often part of the operations of the organizations that use it, customers are likely to stick with the providers they sign with and expand their business with them over time. Also, the software has minimal costs for physical production and distribution, which allows these companies to operate with high gross margins. Software as a Service is a software delivery model that supports multiple data leases, where vendors host their software on a data center (independently or through a third party) and deliver it from they provide their customers through the Internet and usually jointly or use the basis of payment. The term “software as a service vendor” is used for a company that produces and develops software, while the term “software as a service provider” is used for a third party company that provides infrastructure including servers and data storage space. Provides is used to ensure that the vendor’s software is properly provided as a service to end users. In relation to the above definition, researchers have classified two main scenarios on how the software cycle and the money of software as a service, in the market. The first scenario is when the company develops, hosts and runs its software on an existing data center or infrastructure. In this case, the term “software as a service vendor” also applies to this company, although most companies act as both a vendor and a provider. But for the second scenario, the company hosts and runs its software through software as a service provider, or a third party. Traditionally, software companies have three main revenue streams when they sell their products and services to other organizations. The first income stream is related to the income from the license granted to each user. Licensing revenue was the main source of revenue for software companies in the 1990s. The second stream of income is related to annual maintenance and repair costs, which is equivalent to about 15 to 25 percent of the license fee. The third income stream is related to the cost of services such as installation and commissioning, customization and training. Between 2000 and 2010, many software companies generated equal revenue from these three sources [8]. With the expansion of cloud services and the provision of software products as a service on the cloud platform, the development space of software products has faced a leap, and there are few software companies that do not provide their software products as a service.

3 Pricing

Pricing is one of the four marketing mixes (product, price, distribution and advertising). Choosing the right pricing strategy can be very successful in achieving the company’s goals. With the increase of competition at the global level and within countries, the effect of pricing methods in achieving the goals of companies increases [9]. The price element is one of the effective factors in retaining and attracting customers and gaining their special satisfaction, and in fact,

it is the amount that is spent for a specific product or service. Pricing in simple language means determining the price for a specific product or service. As mentioned, the concept of price is one of the main elements of the marketing mix and actually one of the four pillars of marketing. The other three ranks include the product, promotion and incentive activities, and place or distribution channel, which are called marketing mix. A comprehensive review of pricing literature shows that no extensive studies have been conducted on pricing, which is more related to physical goods than services. While today, services provide a lot of benefits to organizations, and understanding the pricing of services has become very important. Simply put, pricing means determining the price for a product or service. Pricing is an activity that must be repeated and is considered a continuous process. This continuity is caused by environmental changes and the instability of market conditions, which creates the need to adjust the price. Pricing is done with the aim of maximizing profit, increasing market share, leading quality, extending life or increasing market price. Price is one of the four elements of marketing mix (product-price-sales-distribution).

The price determines what will be produced and who will demand it. The most important task of the marketer in pricing is to understand the relationship between price and demand. In normal conditions, for normal goods, price and demand have the opposite relationship. Another important factor in pricing is the supply of products and the prices of competitors. Today's very dynamic market environment, along with the product, market and competition changes over time, the company's marketing strategies must also change. The life cycle of the product can indicate the changes that the company applies to the movement of the product in its life cycle. Pricing strategies should also be coordinated with other company strategies, and managers should also know how to determine the appropriate price.

4 Research background

Based on the literature review, there have not been many researches in the field of pricing in the software as a service industry, especially in the country. In the following, some of these researches will be reviewed. Riley and Schweih's [11] have considered various factors that should be taken into account when choosing the asset valuation method. These factors are: "type, quality and quantity of data", "legal, judicial, contractual and management requirements and considerations", "type and nature of assets", "set of related laws and regulations", "professional judgment and technical expertise". "Access to information related to the organization's transactions", "decision maker's information needs", "Evaluation objective" and "Compliance with professional standards". A research by Sääksjärvi et al., [13] titled "evaluating software as a service: from personal processors to online sharing innovation" has been done. This study states that software as a service changes the relationship between the seller and the buyer from one to one to one to many. Also, this communication is online using the Internet. In this research, using the value creation model, the resulting values of software as a service are evaluated. Based on the results of this research, the sellers of this service should provide the necessary infrastructure for the development of this market and create and position the brand. Chou and Chou [3] in a research entitled "Software as a Service: An Outsourcing Method, Economic Evaluation" showed that companies that seek to use software as a service are actually companies that want to outsource their IT-related activities. Outsourcing has various economic reasons such as cost-benefit theory, optimal resource allocation theory, organizational change theory, competitive advantage theory, etc. The economic benefits of using software as a service (as an outsourcing method) are: cost savings, optimal allocation of resources, better access to information, scalability and the possibility of achieving global outsourcing. In his article, Smith [15] has proposed one or two pricing methods for each of the types of intellectual property by dividing them into 5 categories. Finally, based on his field study, he has concluded that the cost-oriented method is rarely used in special situations, the market-oriented method can only be useful if there is appropriate market information, and otherwise, the income-oriented method is more suitable for use. A research by Wu [19] titled "Searching for an exploratory model for using software as a service" has been conducted in Taiwan. The researcher has presented a model for using cloud services based on the technology acceptance model. It has also stated strategies to enter the market for software as a service provider companies. According to the results of this research, the ease of use perceived by the individual has a great impact on the acceptance of software as a service. In this research, information was collected through a questionnaire that was sent electronically to the managers. Also, the hypotheses were analyzed using the structural equation modeling method, and all 18 hypotheses were confirmed. Roomi et al. [12] in a research titled "Cloud computing pricing models" compared pricing models and examined the advantages and disadvantages of each of them. The models were compared based on three components of fairness, pricing method and exploitation period. The findings showed that most of the methods are theoretical and not implemented in the real world, although their simulation results were very promising. Huang [6] in a research titled "Pricing Strategy for Cloud Computing Services" identified key factors related to cloud computing pricing. This research examines several methods such as market survey, game theory modeling, simulation, experiment and econometric modeling to analyze the pricing strategies of cloud computing service providers. Baur et al. [1] in a research presented a framework for changing costs to valuation based on the price of software as a service.

Through a literature review and in-depth interviews with experts, the researchers developed a conceptual model for customer-oriented pricing of software-as-a-service, especially for smart business. The research model was approved by five top software experts in this field and created a strong foundation. Seyyed Vahid Tabatabaei Koljahi [10] in a research entitled “Providing the framework of pricing capability in telecom operators in Iran” investigated processes, skills, systems, or in other words, pricing capability as a strategic capability in organizations and to examine the current situation of the structure and pricing capability in Iran’s telecom companies and has presented a comprehensive model for pricing.

Hallberg [4] in a research entitled “Effective Components on Pricing Strategy in Industrial Markets” investigated the industrial pricing strategy in the European packaging industry and examined how different assets and methods affect the implementation of the pricing strategy. In particular, this study highlights the role of individual judgment, human capital, and experience for pricing strategy implementation in markets that are associated with a high level of uncertainty due to customization.

Gholam Heidi has stated in a research entitled “Pricing information resources and services in the cloud computing space” that pricing is based on basic concepts in economics and marketing and he examined the angles of the concept of pricing with regard to resources and services. The need to pay more attention to this section and especially the principles of pricing information resources and services, pricing goals, differences and similarities of pricing with other services, cost estimation and pricing strategies of information resources and services are among the other things that are mentioned in the above research. They have been paid. Ming Wei Wu [17] in the research entitled “Modeling and Optimization of Cloud Computing Services Price” has stated that currently, the number of cloud pricing plans provided by various CSP cloud service providers is very large. Many customers, especially business customers, find these pricing plans confusing and don’t know how to analyze them to develop their business case for migrating their legacy IT infrastructure to a cloud platform. This research examines the issues from both cloud customers’ and CSPs’ perspectives. It provides advanced solutions to solve the cloud price modeling and optimization problem. These proposed solutions include premium pricing for new cloud service features, cloud market segmentation, defining multiple customer services, and cloud base pricing. Andrey Salten and Kari Smolander [14] in a research entitled “Bridge to the most advanced method of software as a service pricing - a multifaceted literature review” considers pricing to be an essential element of software business strategy and tactics that states that informed pricing decision-making requires the participation of various stakeholders and comprehensive data analysis. At the same time, there is a lack of coherent software-as-a-service pricing knowledge and proven solutions to help software-as-a-service providers when designing and implementing pricing. He considers the purpose of the research to be the lack of integration between different research areas focused on the pricing of software as a service, and more importantly, between academia and industry. Currently, there is no clear background on the issue in the country, and the previous researches, as mentioned, mostly focus on providing models for pricing policy, pricing models for cloud computing services, or measuring and impacting prices. It depends on the customers or their behavior. In the current research, information technology has an impact on the industries and business of the country from two perspectives. Its impact on the IT industries and specifically in this research on the enterprise software industry and secondly its impact on the industries that use software products to improve their productivity, efficiency and revenue growth. Also, there will be an opportunity that the gap between production and supply of enterprise software will be minimized from the point of view of pricing, and it will cause the sellers of enterprise software to act with higher accuracy and quality regarding the pricing of software products, which is in line with the identification Pricing strategies and tactics for enterprise software as a service will be provided.

5 Research methodology

This research seeks to provide a hierarchical pricing framework for enterprise software as a service using a mixed research method (qualitative-quantitative). This research is considered to be of practical purpose. It is mostly used for managers and policy makers active in the field of organizational software. In the qualitative part, in order to understand, recognize and extract the variables, metacomposition and content analysis (theme) method has been used to reach the variable. Sandelowski and Barroso’s method is used to perform the metacombination method. Sandelowski and Barroso’s method is a practical method for hybrid research. The meta-composite method is one of the types of meta-study methods and is considered a qualitative research method. In fact, meta-synthesis is a type of qualitative study that uses the information of findings extracted from other studies in the field of a related topic. In the meta-combination method, the researcher combines the secondary data of the results of other studies to respond to the results of his study and obtains new results. In the other part of the qualitative part of the research, content analysis (theme) is used. Theme analysis is a method to determine, analyze and express the patterns (themes) in

the data. At a minimum, this method organizes the data and describes it in detail. But it can go beyond this and interpret different aspects of the research topic.

In the qualitative part of this research, the statistical population includes all valid domestic and foreign articles and researches since 2000. In the quantitative section, the Interpretive Structural Modeling (ISM) method was used to formulate the research model, and the data required to complete the self-interaction matrix were taken from the opinions of experts who are familiar with the Interpretive Structural Modeling method and the self-interaction matrix. Interpretive structure modeling is able to determine the relationship between indicators that are individually or collectively dependent on each other. The statistical population of this research in the section of completing the self-interaction matrix is purposefully selected from experts who are familiar with software pricing, who have complete organizational software pricing and also have a doctorate in one of the related fields. They have the scientific degree of associate professor and above and work experience of more than ten years and are available. Their number was 16. ISM MATLAB software was used for data analysis in the modeling section with ISM method.

6 Research findings

Several methods have been proposed to perform metasynthesis, of which the seven-step model of Sandelowski and Barroso is the most widely used.

First step: Setting research questions

The first step of synthesis is setting research questions. For this reason, Table 1 below is used to answer the research questions.

Table 1: Research characteristics and questions

Research questions	Characteristics
The main pricing indicators of enterprise software as a service	What is the work?
Various sources, including articles and dissertations on the pricing of enterprise software as a service	Study community (Who)
All sources available between 2000 and 2021 AD and its solar equivalent from 1380 to 1401	Time limit (When)
Thematic review of sources, extraction of codes, review and analysis of concepts, classification of concepts and creation of categories	How

Step two: Systematic review of texts

At this stage, the researcher systematically searched for articles published in foreign and domestic authoritative articles with the aim of determining valid, reliable and relevant documents in the appropriate time frame. After selecting related and different keywords, the following keywords that can be seen in table two were searched.

Table 2: Keywords of systematic search of articles

No	Keyword	English/Persian
1	Enterprise software pricing	Persian
2	Enterprise software as a service	Persian
3	Enterprise software pricing as a service	Persian
4	pricing for enterprise software	English
5	software as a service (SaaS)	English
6	pricing software as a service	English

Table 3 was used for systematic search of related texts. As can be seen, these keywords were used in databases to retrieve articles.

Step three: Search and review related articles

After identifying the key words of the research, the collection of articles containing the key words were identified. These articles were screened based on things such as title, abstract, content and research method in the mentioned database as shown in Figure 1 below and 63 final articles were extracted.

Table 3: Retrieved articles according to the databases used

Name of the base	Number of articles
PubMed	23
WOS	28
BMJ	12
Sage	9
Scopus	56
Wiley	23
Science Direct	79
ProQuest	11
Emerald	42
Springer	25
Total	308

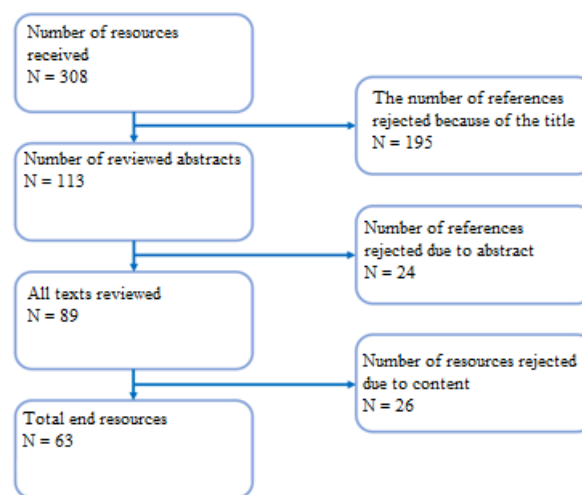


Figure 1: Steps and number of sources examined in metacomposition

The third step review process was done using the CASP program. The CASP Critical Appraisal Skills Program is a tool for assessing the quality of primary studies in qualitative research methodology. This tool is one of the methods of measuring the validity and reliability of qualitative research, and it is especially used to measure the validity and reliability in the meta-composite research method. At this stage, all the searched articles were examined in terms of title, abstract, article structure, content and other parts of the articles. In qualitative studies, the tool of the CASP critical assessment skills program is usually used, which includes 10 rubric criteria, which are: 1. appropriateness of objectives 2. method 3. research design 4. sampling method 5. quality of data collection 6. reflexivity 7. research ethics 8. Accuracy of data analysis 9. Clarity of expression of findings 10. Overall value of the research. In this tool, each article advances to the next stage based on the score or grade obtained. CASP scoring and grading based on poor (score 0 to 10), average (score 11 to 20), good (score 21 to 30), very good (score 31 to 40), excellent (score 41 to 50) is done Table one was used to score articles based on CASP criteria.

At this stage, the content of the articles is carefully studied and the basic indicators are extracted. In fact, in this section, after identifying the research questions, identifying sources by selecting keywords and searching for these terms, and after confirming the documents based on the specified input criteria, data extraction is done using the coding method. The question of the meta-combination method in this research is: What are the components and dimensions of enterprise software pricing as a service? To answer this question, a search was conducted according to the keywords selected in the previous steps, and finally 63 sources out of 308 identified sources were selected for coding.

Step five: analysis and synthesis of qualitative findings

The most important part of a qualitative research in the meta-composite method is this step, which is done in this section. In this step, 63 articles are coded. In this section, initial coding is done first. At this stage, a title is given to all the key points of the content. Then all these titles are placed in the following tables. A number of primary codes extracted from each of the contents are given as examples in Table 5. All the extracted codes that were in the form

Table 4: CASP criteria for scoring accepted articles

No	Article	Research purposes	The logic of the method	Research plan	Sampling method	Collecting data	Reflectivity	Ethical considerations	Accuracy of data analysis	Clear statement of findings	Value of research	Achieved score	Final result
1	Pricing Strategy of Software Products Based on Cloud Accounting Resource Sharing Platform	5	5	5	5	5	4	5	5	5	5	49	Accepted
2	Product pricing strategy based on network externality and quality differentiation	5	5	5	5	5	4	5	5	5	5	49	Accepted
3	Research on pricing strategy of cloud accounting service under incomplete information	4	5	5	5	5	5	5	5	5	5	49	Accepted
4	Pricing and return strategy of customized products under Internet environment	5	5	5	4	5	5	5	5	4	5	48	Accepted
5	Pricing policies for a dual-channel retailer with cross-channel returns	5	5	5	5	4	4	5	5	5	5	48	Accepted
6	Research on the pricing behavior of omni-channel collaboration based on evolutionary game	5	4	5	5	5	5	5	4	5	5	48	Accepted
7	A Method for Estimating the Cost of Software Using Principle Components Analysis and Data Mining	5	5	4	5	5	4	5	4	5	5	47	Accepted
8	Comparative study of software cost estimation techniques	5	5	4	5	5	4	5	5	5	4	47	Accepted
9	Negative result for software estimation	4	5	5	5	5	4	5	4	5	5	47	Accepted
10	Artificial intelligence, algorithmic pricing and collusion	5	5	5	5	4	4	5	4	5	5	47	Accepted
11	An Empirical Analysis of Algorithmic Pricing on Amazon Marketplace.	5	5	4	4	5	4	5	5	5	5	47	Accepted
12	Dynamic pricing based on asymmetric multiagent reinforcement learning.	5	5	5	5	4	4	5	5	4	5	47	Accepted
13	The Economics of Algorithmic Pricing: Is collusion really inevitable?	5	5	4	5	4	4	5	5	5	4	46	Accepted
14	Price dynamics and collusion under short-run price commitments	4	5	5	4	5	4	5	4	5	5	46	Accepted
15	Price Competition, Kinked Demand Curves, and Edgeworth Cycles.	4	5	5	4	4	4	5	5	5	5	46	Accepted
16	Price and quantity competition in a differentiated duopoly.	4	5	5	5	4	4	5	5	5	4	46	Accepted
17	Pricing Strategies of Software Vendors	5	5	4	4	4	5	5	4	4	5	45	Accepted
18	The optimal pricing of computer software and other products with high switching costs	5	5	5	5	5	4	4	4	4	4	45	Accepted
19	Bundling information goods: pricing, profits and efficiency	5	5	5	5	5	4	4	4	4	4	45	Accepted
20	The evolution of software pricing: from box licenses to application service provider models.	5	5	4	4	4	5	5	4	4	5	45	Accepted
21	The changing labyrinth of software pricing	5	5	4	4	4	4	5	4	5	5	45	Accepted
22	Competitive pricing of information goods: subscription pricing versus pay-per-use	5	5	4	4	4	4	5	4	4	5	44	Accepted
23	Value-based pricing for new software products: strategy in sights for developers.	4	5	4	4	4	4	5	4	5	5	44	Accepted
24	Calculating the cost of SaaS	5	5	4	5	4	4	5	4	4	4	44	Accepted
25	Key trends in software pricing and licensing: a survey of software industry executives and their enterprise customers	4	4	4	4	4	4	5	4	5	5	43	Accepted
26	Nonlinear pricing of information goods	5	5	4	4	4	4	5	4	4	4	43	Accepted
27	"The impact of affective and cognitive trust on knowledge sharing and organizational learning	5	5	4	4	4	4	4	4	4	5	43	Accepted
28	Optimal customized bundle pricing for information goods	5	4	4	4	4	4	5	4	4	5	43	Accepted

29	Customized bundle pricing for information goods: a nonlinear mixed-integer programming approach	4	4	4	5	5	4	5	4	4	4	43	Accepted
30	A Model for Software Development Cost Estimation with System Dynamic Approach	4	4	5	4	3	5	4	5	4	5	42	Accepted
31	Factors Influencing Software Development Productivity—State-of-the-Art and Industrial Experiences	5	4	5	4	4	4	5	4	3	4	42	Accepted
32	Software Cost Estimation, Benchmarking, and Risk Assessment	5	3	4	4	5	4	5	4	4	4	42	Accepted
33	Comparative Analysis of Software Cost and Effort Estimation Methods: A Review	5	4	3	4	5	4	5	3	5	4	42	Accepted
34	How effort is estimated in agile software development projects? Fifth workshop on software quality analysis	5	3	4	3	4	5	5	4	3	4	41	Accepted
35	Software estimation best practices, tools & techniques: A complete guide for software project estimators	4	5	5	5	5	3	4	3	3	4	41	Accepted
36	Impacts of knowledge sharing: a review and directions for future Research	4	4	4	5	5	5	4	3	4	3	41	Accepted
37	Right Scaling for Right Pricing: A Case Study on Total Cost of Ownership Measurement for Cloud Migration	5	3	5	4	4	3	4	5	4	4	41	Accepted
38	Evaluation in software engineering pricing	4	2	5	4	4	5	4	4	4	4	40	Accepted
39	A preliminary indication of the Information Technology costs of Locational Marginal Pricing	5	4	5	4	4	4	4	3	4	4	42	Accepted
40	Does Locational Marginal Pricing Impact Generation Investment Location Decisions? An Analysis of Texas's software Market.	4	4	4	5	5	4	5	4	3	4	42	Accepted
41	Cloud Computing Pricing Models: A Survey	5	5	4	4	5	3	5	3	3	4	41	Accepted
42	Economic models for cloud service markets: Pricing and Capacity planning.	3	4	5	5	3	4	5	4	4	4	41	Accepted
43	Autonomic Metered Pricing for a Utility Computing Service,	5	5	3	3	4	3	5	5	4	4	41	Accepted
44	Review of Pricing Models for Grid & Cloud Computing	4	5	3	4	4	5	5	4	3	4	41	Accepted
45	Distributed Systems Meet Economics: Pricing in the Cloud, In proceedings, HotCloud	4	2	4	5	5	4	5	4	5	4	42	Accepted
46	A Flexible Accounting Model for Cloud Computing	5	5	3	4	4	4	5	4	3	3	41	Accepted
47	Pricing Strategy for software	4	4	4	5	5	4	3	5	4	4	42	Accepted
48	The dual influences of proximity on knowledge sharing	3	4	5	5	4	4	3	5	5	3	41	Accepted
49	Current dynamics of software price determination	4	4	3	3	5	4	5	5	4	4	41	Accepted
50	“Rational pricing of business software systems based on functional size measurement: A case study from Poland	5	3	5	4	3	4	4	3	5	4	40	Accepted
51	purchase to pirate software: An empirical study	3	4	5	4	4	5	5	4	3	3	40	Accepted
52	The changing labyrinth of software pricing	4	4	5	3	3	4	5	4	5	4	41	Accepted
53	The Science of Software Pricing	5	5	5	4	3	3	4	3	4	5	41	Accepted
54	Software product management and pricing	4	4	3	5	5	4	3	5	5	4	42	Accepted
55	Pricing strategies of software vendors	4	4	3	4	5	3	5	4	4	4	40	Accepted
56	The Future of Software Pricing Excellence	5	5	4	4	3	5	4	4	3	4	41	Accepted
57	systematic review of software development cost estimation studies	4	5	5	5	4	4	3	4	3	5	42	Accepted
58	Analysis of Attributes Relating to Custom Software Price	5	4	5	3	4	5	4	3	4	3	40	Accepted
59	why pricing is important for SaaS and beyond.	3	3	3	5	4	4	5	5	5	4	42	Accepted
60	Software dynamic pricing by an optimization deterministic model in a monopolistic market	4	5	4	4	4	4	4	3	4	4	40	Accepted
61	pricing Strategies of Software Vendors	5	5	3	4	4	5	5	4	3	3	41	Accepted
62	The Optimal Software Licensing Policy under quality uncertainty pricing	4	4	4	5	4	4	4	3	4	5	41	Accepted
63	The Ultimate Guide to software Pricing Strategies	5	4	5	4	4	5	4	4	4	3	42	Accepted

Step four: extracting information from the articles

of expressions are shown in the table below, and their score obtained from the CASP table is also given.

After the initial coding, it is now time to code the content, and examples of this coding are given in Table 6.

Step six: reliability and validity of the model (quality control)

In qualitative research, validity means concepts including defensibility, believability, verifiability and even reflectivity of the results. One of the reliability indicators of qualitative research is the evaluation of two or more documents in terms of reference to a specific indicator. Reliability can be evaluated by calculating the Kappa index. Because the meaning of validity is that the scale and content of the questions accurately measure the variables and the subject of the research. Kappa is the most suitable and reliable method for checking and estimating the agreement between observations. Validity criterion is used to measure and evaluate the questionnaire or any measurement tool, if it has this criterion; it means that the amount or percentage of the researcher's mistake in measuring the desired criteria and

Table 5: Primary coding

No	Page	Code	Basic coding	Type of re- search	Score re- ceived	Rank
1	2	C:1-001	Ability of analysts and designers	Qualitative	49	1
2	1	C:2-001	The level of expertise of the program design team	Qualitative	49	1
3	3	C:3-001	Modern planning practices	Mixed	49	1
4	5	C:4-001	Tools available in the software	Mixed	48	2
5	2	C:5-001	Volume of virtual machine tests	Qualitative	48	2
6	6	C:6-001	Main memory limit	Quantity	48	2
7	8	C:7-001	Database size	Qualitative	47	3
8	11	C:8-001	Data and information turnaround time	Quantity	47	3
9	2	C:9-001	Complexity of processes in software	Quantity	47	3
10	6	C:10-001	Software reliability	Quantity	47	3
11	16	C:11-001	Discretization of software action space	Quantity	47	3
12	15	C:13-001	Software convergence level	Qualitative	46	4
13	3	C:14-001	Software market structure	Mixed	46	4
14	5	C:15-001	Level of user satisfaction	Quantity	46	4
15	16	C:16-001	The effectiveness of the organization	Quantity	46	4
16	7	C:17-001	Ability to upgrade the software according to organizational needs	Quantity	45	5
17	3	C:18-001	Type of software pricing strategy	Qualitative	45	5
18	9	C:19-001	Costing system used	Quantity	45	5
19	21	C:20-001	Diversity in software application	Qualitative	45	5
20	2	C:21-001	Ease of software maintenance	Qualitative	45	5
21	1	C:22-001	The level of competence and expertise of the producer	Quantity	44	6
22	5	C:23-001	Quality and quantity of employees	Qualitative	44	6
23	8	C:24-001	Experience and expertise of project managers	Quantity	44	6
24	12	C:25-001	The amount of documents required	Quantity	43	7
25	14	C:26-001	Reusability of the software	Quantity	43	7
26	16	C:27-001	Storage status	Quantity	43	7
27	2	C:28-001	Software life cycle	Mixed	43	7
28	4	C:29-001	Economic factors such as inflation, salary increase rate, etc.	Mixed	43	7
29	1	C:30-001	Customer involvement level	Qualitative	42	8
30	8	C:31-001	Performance level relative to cost	Qualitative	42	8

Table 6: Conceptual coding (index)

No	Open coding	Concept (index)
1	Ability of analysts and designers	Competence of the design and production team
2	The level of expertise of the program design team	
3	The level of competence and expertise of the producer	
4	Quality and quantity of employees	
5	Experience and expertise of project managers	
6	Productivity level of the design and production team	
7	Modern planning practices	Level of planning and technology
8	Software coding level	
9	Programming language	
10	Technology used	
11	Tools available in the software	Software capability
12	The amount of documents required	
13	Storage status	
14	Loading speed	
15	Additional modules	
16	Status of using components	
17	Features such as online chat, sending SMS, connecting to Wi-Fi and...	
18	The ability to perform various calculations	Software confidence level
19	Volume of virtual machine tests	
20	Reusability of the software	
21	Data and information turnaround time	Data management
22	Database size	
23	The type and complexity of the required database and the level of data security in the software	
24	Main memory limit	Software features
25	Search capability	
26	Unique features of the software	
27	The ability to add special organizational services	

28	Complexity of processes in software	Process management system
29	Complexity of organizational service processes	
30	Software reliability	Reliability in conditions of uncertainty
31	Software optimization level	
32	Discretization of software action space	
33	Software convergence level	
34	Software flexibility	
35	Software performance risk	
36	Software market structure	Market conditions
37	Barriers to enter the organizations' markets	
38	Features of the software market	
39	Level of user satisfaction	Customer satisfaction
40	Customer behavior in the market	
41	The brand value of the software company with the customer	
42	Values desired by customers	
43	The price of similar software in the market	Pricing policy and strateg
44	Type of software pricing strategy	
45	Pricing mechanism	
46	Competitors' pricing system	
47	Proportion of price with market realities	
48	Price elasticity in software sales	
49	Software pricing model	
50	The degree of freedom of pricing in the software market	

factors has been minimized. The reliability of the meta-composite part of the research was re-coded with 4 professors of this field and was done with the help of Cohen's kappa. Cohen's kappa coefficient was calculated and equal to 0.89, which shows the appropriate validity of the metacombination method.

$$K = \frac{PO - Pe}{1 - Pe}$$

where *PO* represents the agreed units and *Pe* the units where there is a possibility of random agreement.

Step Seven: Extracting the information of the articles

In this step, the findings from the previous steps are presented. The criteria extracted for the pricing of enterprise software as a service from the metacombination method are 28 criteria, which are shown in Table 7 below.

Table 7: The criteria extracted from the hybrid method

Code	Criterion	Code	Criterion
N1	Competence of the design and production team	N15	Customer satisfaction
N2	Level of planning and technology	N16	Pricing policy and strategy
N3	Software capability	N17	Organizational effectiveness
N4	Software confidence level	N18	Ability to update and improve
N5	Data management	N19	Costing system
N6	Software features	N20	Maintenance and performance
N7	Process management system	N21	Position in the life cycle
N8	Reliability in conditions of uncertainty	N22	Economic Analysis
N9	Market conditions	N23	Order and value compatibility
N10	Distribution and sales system	N24	Level of after sales support
N11	Software performance quality	N25	The attractiveness of the software
N12	Conditions of buying organizations	N26	Report management
N13	User level and access	N27	Flexible settings and ease of work
N14	The economic position of the software	N28	The total cost of the software

Now, in the quantitative part of the research, using the Interpretive Structural Modeling (ISM) method and with the help of the ISM MATLAB software, the levels and influence of the factors are evaluated. In the first step, the structural self-interaction matrix of the research is formed using the opinions of the respondents who are experts in the quantitative part of the research. To form the structural self-interaction matrix, the experts consider the criteria in pairs and based on the spectrum V: the factor of row *i* cause the factor of column *j* to be realized. A: The factor of column *j* causes the factor of row *i* to be realized. X: both row and column factors make each other happen (factor *i* and *j* have a two-way relationship) and O: there is no relationship between the row and column factors. They respond to pairwise comparisons. The self-interaction matrix is given in table eight.

Then, based on table nine, the primary achievement matrix is formed based on the numbers zero and one, and then relationships are created and the final achievement matrix is formed, which is given in table number nine. All

Table 8: Structural self-interaction matrix

Table with 28 columns (N1 to N28) and 28 rows (N1 to N28). Each cell contains a character representing a relationship: 'A' for activation, 'V' for vertical, 'O' for oval, 'X' for cross, and '*' for multiplication. The matrix is upper triangular with 'A' on the diagonal.

the fields that are *1 in this table have zero value in the initial matrix.

Table 9: Final achievement matrix

Table with 28 columns (N1 to N28) and 28 rows (N1 to N28). Each cell contains a binary value (0 or 1) representing the achievement of a criterion.

Next, to determine the power of penetration and the degree of dependence, which plays an important role in the leveling of indicators, the adapted primary achievement matrix is used. This matrix is shown in Table 10 below.

In this step, the set of input (prerequisite) and output (achievement) criteria are calculated for each criterion, and then the common factors are also determined. After identifying this variable or variables, their rows and columns are removed from the table and the operation is repeated on other criteria. The outputs and inputs are extracted from the adapted primary achievement matrix (Table 10). For this purpose, the number of 1's in each row represents the output, and the number of 1's in the column is equal to the input, which to determine the first level, the results It is given in Table 11.

In Table 11, level one criterion has been extracted, which include criteria N2-N3-N4-N6-N13-N15-N21-N25-N26-N27. Now, to determine the criteria of the second level, it is enough to remove the row and column of these 10 criteria from the adapted primary achievement matrix (Table 9) and perform the calculations to determine the output and input again. The results are given in Table 12.

In table 12, level 2 criteria have been extracted, which includes criteria N1-N7-N9-N10-N17-N18-N20-N22-N24-N28. Now, to determine the criteria of the third level, the rows and columns of these 10 criteria should be removed from the matrix. Removed the initial adapted acquisition (Table 9) and re-calculated the input and output determination. The results are given in Table 13.

Table 10: Adapted primary achievement matrix

	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	N14	N15	N16	N17	N18	N19	N20	N21	N22	N23	N24	N25	N26	N27	N28	N29	
N1	1	*1	1	1	1	1	1	1	1	*1	*1	1	1	1	*1	1	1	1	*1	1	1	1	1	1	1	*1	*1	28		
N2	1	1	1	1	1	1	*1	*1	1	1	0	*1	1	*1	*1	1	*1	*1	*1	1	1	1	*1	*1	1	1	*1	*1	27	
N3	*1	*1	1	1	0	1	*1	*1	*1	1	0	*1	*1	0	1	*1	1	1	1	1	*1	1	0	*1	1	1	*1	0	23	
N4	0	*1	*1	1	0	*1	*1	0	0	*1	0	0	1	0	1	*1	*1	*1	0	*1	1	*1	0	*1	*1	*1	*1	*1	19	
N5	*1	*1	1	1	1	1	1	*1	1	1	0	*1	1	0	1	*1	1	1	1	1	1	1	0	*1	1	1	1	*1	25	
N6	*1	*1	*1	1	0	1	0	0	0	0	0	0	1	0	*1	0	0	*1	0	0	*1	0	0	*1	*1	0	*1	1	*1	15
N7	*1	1	1	1	*1	1	1	0	*1	*1	0	0	1	0	*1	0	*1	*1	*1	*1	*1	*1	0	*1	1	1	1	*1	22	
N8	*1	1	1	1	1	1	1	1	1	1	1	1	1	*1	1	*1	1	1	1	*1	1	1	0	*1	1	1	1	*1	27	
N9	*1	1	1	1	*1	1	1	0	1	1	0	0	1	0	1	*1	1	*1	*1	*1	*1	1	1	0	*1	1	*1	1	*1	23
N10	*1	*1	1	1	0	1	1	*1	*1	1	0	*1	1	0	*1	*1	*1	*1	*1	1	1	*1	0	*1	1	1	1	*1	24	
N11	1	1	1	1	*1	1	1	*1	1	1	1	*1	1	*1	1	*1	1	1	1	1	1	1	*1	1	1	1	1	*1	28	
N12	1	1	*1	1	1	1	1	*1	1	1	1	1	1	1	1	*1	1	*1	1	*1	1	*1	*1	*1	1	1	1	*1	28	
N13	*1	*1	1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	1	1	1	1	1	27	
N14	*1	1	*1	1	1	1	1	*1	*1	*1	0	*1	1	1	1	*1	1	1	1	1	1	1	0	*1	1	1	1	*1	26	
N15	*1	1	*1	*1	*1	1	1	*1	*1	1	*1	1	1	*1	1	*1	1	*1	*1	*1	*1	1	1	0	1	1	1	1	*1	27
N16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	*1	*1	*1	*1	*1	*1	*1	*1	*1	1	1	1	1	28	
N17	*1	*1	*1	1	*1	1	1	*1	*1	1	*1	*1	1	*1	*1	1	1	1	1	0	*1	1	*1	0	*1	1	1	1	*1	26
N18	*1	1	1	1	*1	1	1	*1	1	1	*1	1	1	*1	1	1	1	1	1	1	1	1	0	*1	1	1	1	*1	27	
N19	*1	1	*1	1	*1	1	1	*1	1	1	*1	*1	1	1	1	*1	1	1	*1	1	*1	1	0	*1	1	1	1	*1	27	
N20	1	*1	*1	1	*1	1	1	1	1	*1	*1	1	1	*1	*1	1	1	*1	1	1	1	1	*1	*1	1	1	1	*1	28	
N21	*1	*1	1	*1	*1	1	1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	0	0	*1	*1	*1	*1	26	
N22	*1	*1	*1	1	0	1	*1	0	*1	1	0	0	1	0	*1	*1	1	*1	0	*1	1	1	0	*1	1	1	1	*1	21	
N23	*1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	28	
N24	*1	1	1	1	1	1	1	1	1	1	1	1	1	*1	1	*1	1	1	1	1	1	1	0	1	1	1	1	1	27	
N25	*1	*1	*1	1	0	*1	*1	0	*1	0	0	0	*1	0	*1	*1	0	0	0	0	0	1	0	0	0	1	1	0	14	
N26	*1	*1	*1	1	0	1	*1	0	1	*1	0	0	*1	0	*1	*1	*1	0	0	0	0	*1	0	0	*1	1	1	0	17	
N27	1	1	1	1	*1	*1	*1	*1	*1	*1	0	0	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	1	0	25
N28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	*1	*1	1	1	1	1	1	*1	*1	*1	1	1	1	28	
Level dependency	27	28	28	28	21	28	27	21	26	26	15	20	28	18	28	26	26	26	22	25	28	27	9	25	28	28	28	24		

In Table 13, the level 3 criteria have been extracted, which includes criteria N5-N8-N12-N16-N19. Now, to determine the criteria of the fourth level, the rows and columns of these 5 criteria should be adapted from the primary achievement matrix (Table 14) removed and re-calculated the output and input. The results are given in Table 14.

After determining the levels of each index and considering the final achievement matrix, the interpretive structural model of the research is drawn. The final model can be seen in figure two. This model consists of five levels. The first level is the most effective level and the fifth level is the most effective level.

7 Discussion and Conclusion

This research was conducted with the aim of providing a hierarchical pricing framework for enterprise software as a service. The result of this research was a model consisting of 28 indicators in five lines. The fifth level of this model is the compatibility of the order and the value and quality of the software performance, the most influential variable of this model. Therefore, the managers of these companies should pay very serious attention in the discussion of focusing on the quality of software performance, and they should also note that there should be a good balance between the order of organizational software and the value created for the customer. In other words, the customer should get a suitable value for the cost he incurs. As shown, these two criteria affect the economic position of the software, which is an important factor for pricing and sales. The third and second level criteria all play a role as interfaces in the model. Level one criterion is also the most effective criteria in the model, which are influenced by other model criteria. These criteria are: customer satisfaction, position in the product life cycle, attractiveness of the software, report management, flexible settings and ease of work, planning level and technology, software capability, software reliability level, software features and application level and accessibility.

The current research has differences and commonalities with previous researches, the most important of which are mentioned here. Chou and Chou [3] examined software as a service from the perspective of outsourcing and with the help of economic evaluation. This research showed that companies that seek to use software as a service are actually companies that want to outsource their IT-related activities. The current research has tried to look beyond the economic view of software as a service. There has been an economic attitude in the research model. In addition, Chucho’s research has been only a small research. However, the current research is a mixed research. Benlian and Hess obtained the opportunities and risks of using software as a service from information technology managers and then investigated the advantages and disadvantages of using this technology in German industries [2]. According to the results of this research, information security is the most important factor that managers have raised as a risk. As can be seen, this research is limited to showing the opportunities and risks of using software as a service. In addition, it is based only on the opinions of technology and information managers. This research relies on many valid scientific articles and researches from different aspects with a hybrid approach. Also, the current research considered 28 criteria for pricing and presented a model, while the research of Benlian and Hess did not provide a model [1]. Rumi et al. [12] conducted cloud computing pricing models by comparing pricing models and examining the advantages and disadvantages of each of them. These models were compared based on three components of fairness, pricing

Table 11: Level 1 criteria

Criterion	Output	Entrance	Subscription	Level
N1	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	
N2	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	1
N3	N1-N2-N3-N4-N6-N7-N8-N9-N10-N12-N13-N15-N16-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N6-N7-N8-N9-N10-N12-N13-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-	1
N4	N2-N3-N4-N6-N7-N10-N13-N15-N16-N17-N18-N20-N21-N22-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N2-N3-N4-N6-N7-N10-N13-N15-N16-N17-N18-N20-N21-N22-N24-N25-N26-N27-N28-	1
N5	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N12-N13-N15-N16-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-N28-	N1-N2-N5-N7-N8-N9-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N23-N24-N27-N28-	N1-N2-N5-N7-N8-N9-N12-N13-N15-N16-N17-N18-N19-N20-N21-N24-N27-N28-	
N6	N1-N2-N3-N4-N6-N13-N15-N18-N21-N22-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N6-N13-N15-N18-N21-N22-N24-N25-N26-N27-N28-	1
N7	N1-N2-N3-N4-N5-N6-N7-N9-N10-N13-N15-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N7-N9-N10-N13-N15-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-N28-	
N8	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-N28-	N1-N2-N3-N5-N8-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N23-N24-N27-N28-	N1-N2-N3-N5-N8-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N24-N27-N28-	
N9	N1-N2-N3-N4-N5-N6-N7-N9-N10-N13-N15-N16-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-N28-	N1-N2-N3-N5-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N5-N7-N9-N10-N13-N15-N16-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-N28-	
N10	N1-N2-N3-N4-N6-N7-N8-N9-N10-N12-N13-N15-N16-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N26-N27-N28-	N1-N2-N3-N4-N7-N8-N9-N10-N12-N13-N15-N16-N17-N18-N19-N20-N21-N22-N24-N26-N27-N28-	
N11	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N8-N11-N12-N13-N15-N16-N17-N18-N19-N20-N21-N23-N24-N28-	N1-N8-N11-N12-N13-N15-N16-N17-N18-N19-N20-N21-N23-N24-N28-	
N12	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N5-N8-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N23-N24-N28-	N1-N2-N3-N5-N8-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N23-N24-N28-	
N13	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-N28-	1
N14	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-N28-	N1-N2-N8-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N23-N24-N27-N28-	N1-N2-N8-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N24-N27-N28-	
N15	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-N28-	1
N16	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	

N17	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N20-N21-N22-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N26-N27-N28-	N1-N2-N3-N4-N5-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N20-N21-N22-N24-N26-N27-N28-	
N18	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N24-N27-N28-	
N19	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-N28-	N1-N2-N3-N5-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N18-N19-N20-N21-N23-N24-N27-N28-	N1-N2-N3-N5-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N18-N19-N20-N21-N24-N27-N28-	
N20	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N27-N28-	N1-N2-N3-N4-N5-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N27-N28-	
N21	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N25-N26-N27-N28-	1
N22	N1-N2-N3-N4-N6-N7-N9-N10-N13-N15-N16-N17-N18-N20-N21-N22-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N26-N27-N28-	N1-N2-N3-N4-N6-N7-N9-N10-N13-N15-N16-N17-N18-N20-N21-N22-N24-N26-N27-N28-	
N23	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N11-N12-N16-N20-N23-N27-N28-	N1-N2-N11-N12-N16-N20-N23-N27-N28-	
N24	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N22-N23-N24-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N22-N24-N27-N28-	
N25	N1-N2-N3-N4-N6-N7-N9-N13-N15-N16-N21-N25-N26-N27-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N6-N7-N9-N13-N15-N16-N21-N25-N26-N27-	1
N26	N1-N2-N3-N4-N6-N7-N9-N10-N13-N15-N16-N17-N21-N22-N25-N26-N27-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N6-N7-N9-N10-N13-N15-N16-N17-N21-N22-N25-N26-N27-	1
N27	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-	1
N28	N1-N2-N3-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N25-N26-N27-N28-	N1-N2-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N28-	N1-N2-N4-N5-N6-N7-N8-N9-N10-N11-N12-N13-N14-N15-N16-N17-N18-N19-N20-N21-N22-N23-N24-N28-	

method and exploitation period. However, the current research model has five levels and is compiled based on 28 criteria. Of course, the research model is derived from the qualitative part and is not obtained from the comparison of previous repetitive models. Huang [6] identified key factors related to cloud computing pricing in terms of pricing strategies. This research used several methods such as market survey, game theory modeling, simulation, experiment and econometric modeling to analyze the pricing strategies of cloud computing service providers. The difference between the current research and Huang’s research is that Huang’s research was purely qualitative, and it was enough to identify only a series of key factors. However, the current research is a mixed research (qualitative-quantitative) and in addition to identifying the criteria needed in the pricing of software as a service, in the quantitative part of the research, a model has also been developed that shows the most effective to the most effective criteria in pricing. Hinterhaber and Liuzzo [5] conducted the micro-bases of valuation by examining the effect of individual characteristics on valuation activities at the organizational level. However, the current research did not investigate the impact or effect of a specific variable and sought to create a complete and comprehensive approach to the pricing of software as a service. In fact, this research has avoided a one-dimensional approach to software pricing and has tried to avoid quantification and has much more credibility by combining qualitative and quantitative methods. Ming Wei Wu [17] modeled and optimized the price of cloud computing services by studying the number of cloud pricing plans offered by different CSP cloud service providers. This research highlighted that many customers, especially business customers,

Table 12: Level 2 criteria

Criterion	Output	Entrance	Subscription	Level
N1	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	1
N5	N1-N5-N7-N8-N9-N10-N12-N16-N17-N18-N19-N20-N22-N24-N28-	N1-N5-N7-N8-N9-N11-N12-N14-N16-N17-N18-N19-N20-N23-N24-N28-	N1-N5-N7-N8-N9-N12-N16-N17-N18-N19-N20-N24-N28-	
N7	N1-N5-N7-N9-N10-N17-N18-N19-N20-N22-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N5-N7-N9-N10-N17-N18-N19-N20-N22-N24-N28-	1
N8	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N24-N28-	N1-N5-N8-N10-N11-N12-N14-N16-N17-N18-N19-N20-N23-N24-N28-	N1-N5-N8-N10-N11-N12-N14-N16-N17-N18-N19-N20-N24-N28-	
N9	N1-N5-N7-N9-N10-N16-N17-N18-N19-N20-N22-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N5-N7-N9-N10-N16-N17-N18-N19-N20-N22-N24-N28-	1
N10	N1-N7-N8-N9-N10-N12-N16-N17-N18-N19-N20-N22-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N7-N8-N9-N10-N12-N16-N17-N18-N19-N20-N22-N24-N28-	1
N11	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N8-N11-N12-N16-N17-N18-N19-N20-N23-N24-N28-	N1-N8-N11-N12-N16-N17-N18-N19-N20-N23-N24-N28-	
N12	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N5-N8-N10-N11-N12-N14-N16-N17-N18-N19-N20-N23-N24-N28-	N1-N5-N8-N10-N11-N12-N14-N16-N17-N18-N19-N20-N23-N24-N28-	
N14	N1-N5-N7-N8-N9-N10-N12-N14-N16-N17-N18-N19-N20-N22-N24-N28-	N1-N8-N11-N12-N14-N16-N17-N18-N19-N20-N23-N24-N28-	N1-N8-N12-N14-N16-N17-N18-N19-N20-N24-N28-	
N16	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N5-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N5-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	
N17	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N20-N22-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N20-N22-N24-N28-	1
N18	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N24-N28-	1
N19	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N18-N19-N20-N23-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N18-N19-N20-N24-N28-	
N20	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	1
N22	N1-N7-N9-N10-N16-N17-N18-N20-N22-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N7-N9-N10-N16-N17-N18-N20-N22-N24-N28-	1
N23	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N11-N12-N16-N20-N23-N28-	N1-N11-N12-N16-N20-N23-N28-	
N24	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N24-N28-	1
N28	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	N1-N5-N7-N8-N9-N10-N11-N12-N14-N16-N17-N18-N19-N20-N22-N23-N24-N28-	1

find these pricing schemes confusing and do not know how to analyze them to develop their business case for migrating their legacy IT infrastructure to a single platform become a cloud. However, the current research using interpretive structural modeling has shown the path of software pricing simply and transparently. The model of the current research has easily identified the starting point of pricing and its ending point and summarized it in five levels. In other words, the ease of the model and its understanding is the obvious difference between the current research and Ming Wei Wu's research.

Table 13: Level 3 criteria

Criterion	Output	Entrance	Subscription	Level
N5	N5-N8-N12-N16-N19-	N5-N8-N11-N12-N14-N16-N19-N23-	N5-N8-N12-N16-N19-	3
N8	N5-N8-N11-N12-N14-N16-N19-	N5-N8-N11-N12-N14-N16-N19-N23-	N5-N8-N11-N12-N14-N16-N19-	3
N11	N5-N8-N11-N12-N14-N16-N19-N23-	N8-N11-N12-N16-N19-N23-	N8-N11-N12-N16-N19-N23-	
N12	N5-N8-N11-N12-N14-N16-N19-N23-	N5-N8-N11-N12-N14-N16-N19-N23-	N5-N8-N11-N12-N14-N16-N19-N23-	3
N14	N5-N8-N12-N14-N16-N19-	N8-N11-N12-N14-N16-N19-N23-	N8-N12-N14-N16-N19-	
N16	N5-N8-N11-N12-N14-N16-N19-N23-	N5-N8-N11-N12-N14-N16-N19-N23-	N5-N8-N11-N12-N14-N16-N19-N23-	3
N19	N5-N8-N11-N12-N14-N16-N19-	N5-N8-N11-N12-N14-N16-N19-N23-	N5-N8-N11-N12-N14-N16-N19-	3
N23	N5-N8-N11-N12-N14-N16-N19-N23-	N11-N12-N16-N23-	N11-N12-N16-N23-	

Table 14: level 4 and 5 criteria

Criterion	Output	Entrance	Subscription	Level
N11	N11-N14-N23	N11-N23	N11-N23	5
N14	N14	N11-N14-N23	N14	4
N23	N11-N14-N23	N11-N23	N11-N23	5

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