Oreste Besson Rank and Certainty Factor for Digital Business Investment Decisions

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Abstract: This study analyzes investment decision making in digital business using the Oreste Besson Rank and Certainty Factor methods. A mixed qualitative and quantitative approach is used to understand the qualitative factors that influence investment decisions and measure the effectiveness of analytical methods. The results of the qualitative analysis of the in-depth interviews highlight key factors: brand reputation (42% response), technology adaptability (35% response), and long-term growth potential (23% response). Uncertainty of technology and market changes (75% of respondents) affects investment strategy. Quantitative analysis uses the Decision Support System (SPK) and Besson-Rank methods to generate investment alternatives. Digital Properties rank the best, with Besson-Rank weighting the criteria score for a more in-depth look. The Certainty Factor (CF) method assesses investment options based on available data, with E-commerce Growth having the highest score, indicating a higher priority. The internal noise test confirms the Oreste Besson Rank and Certainty Factor methods as reliable tools, providing investment ratings and risk assessments consistent with simulated data. The results of this study underscore the importance of reputation, technology adaptability, and growth potential in digital business investment decisions. The Oreste Besson Rank and Certainty Factor methods are effective in providing accurate guidance. This research provides deeper insight into investment decision making in a dynamic digital business and proposes recommendations for optimizing this analytical method in the face of market changes.

Keywords: Investment Decision Making; Digital Business; Oreste Besson Rank Method; Certainty Factor; Qualitative and Quantitative Analysis.

1. Introduction

In the era of technological transformation, investment decision making in digital business is a dominant topic. Digital business, from e-commerce to financial technology, is fundamentally changing the business landscape. The speed of technology and access to information creates investment opportunities, but also new challenges for intelligent decision making. This research explores methods to help decision makers evaluate profitable investments. Attention-grabbing methods, such as the Oreste Besson Rank and Certainty Factor, provide a systematic approach to analyzing investment options based on relevant factors. Oreste Besson Rank involves ranking based on certain criteria, while Certainty Factor assesses probability and uncertainty. The main objective of this research is to explain the application of the Oreste Besson Rank and Certainty Factor methods in making digital business investment decisions. This research also analyzes the effectiveness of this method in providing accurate guidance to decision makers who want to invest in digital business.

Various studies highlight investment decision making in the digital age. Wahyuni and Pramono (2021) examine the demographic and psychological factors of investors [1]. Stefanus, Ahzar, and Qurniawati (2023) identify digital investment decision makers [2]. Rahadi and Stevanus (2020) highlight millennial preferences for investment instruments [3]. Firmansyah (2022) and Susetyo (2022) emphasize financial and digital literacy in financial behavior [5][4]. Mithas, Tafti, and Mitchell (2013) examined the influence of the competitive environment and digital strategic position on digital business strategy [7]. Bharadwaj, El Sawy, Pavlou, and Venkatraman (2013) developed a forward view of digital business strategy [8]. Kazemargi and Spagnoletti (2020) investigated IT investment decisions in Industry 4.0 [9]. Obamuyi (2013) reveals the factors that influence investment decisions in the capital market. This research is expected to provide new insights about market factor analysis, technology risk, and growth opportunities in investment decision making [10]. The results provide practical guidance for entrepreneurs, investors, and managers in digital business. Using the Oreste Besson Rank and Certainty Factor methods, this research improves understanding of investment decision making in fast and dynamic digital business.

Making investment decisions in digital business is becoming increasingly important, given the opportunities and challenges it faces. In complex conditions, such as investment risk, risk reduction measures need to be considered. Pasman

et al. (2022) stated that after a risk assessment and review of risk reduction steps, a decision needs to be taken to choose the most appropriate safeguard or determine acceptable residual risk [12]. The Oreste Besson Rank and Certainty Factor methods are the relevant approaches in this situation. Sıcakyüz and Erdebilli (2023) apply the extended Oreste Besson Rank method in analyzing the factor of trust (e-trust) as a driver of sustainability in the Turkish e-commerce sector [11]. This method provides a systematic approach to making decisions involving complex factors. Liao and Wu (2020) developed the DNMA (Double Normalization-Based Multiple Aggregation) method which combines quantitative and qualitative criteria in multi-criteria decision making [13]. This method is also relevant in considering various factors in making investment decisions.

In addition to these methods, the Certainty Factor method is also used in various studies. Amrizal et al. (2020) compared the Certainty Factor method with Dempster-Shafer and Bayesian probability in making expert systems to reduce damage due to the use of drones [15]. This method is used to minimize the negative impact in different situations. Adi and Isnanto (2020) developed an expert system for rice plant management using the forward chaining and Certainty Factor methods [16]. This research shows how this method can assist in decision making in various contexts. In making investment decisions in digital business, the Oreste Besson Rank and Certainty Factor methods can be effective tools in dealing with complexity and uncertainty. The references mentioned in each sentence have provided a strong and relevant basis for this study [11][12][13][14][15][16].

2. Research Method

This research will adopt a mixed approach that combines qualitative and quantitative elements to explore investment decision making in the context of digital business using the Oreste Besson Rank and Certainty Factor methods. This mixed approach will provide a comprehensive and in-depth understanding of the factors influencing investment decision making in a dynamic digital business environment.

1) Qualitative Data Collection
    This approach will involve an in-depth interview process with respondents who have expertise and experience in investment and digital business. Respondents will be selected based on relevant criteria, such as previous investment experience, in-depth knowledge of digital markets, and understanding of the factors influencing investment decision making. The interview process will be conducted using a structured question guide designed to gain an in-depth understanding of the investment decision-making process in digital business. The interview will be recorded with the respondent's permission to ensure the accuracy and integrity of the recorded data. Subsequently, the interview recordings will be transcribed in detail to allow for more in-depth analysis. Thematic analysis will be applied to interview transcripts. This approach involves identifying patterns, themes, and views that emerged from the interviews. Qualitative factors influencing investment decision making, such as perceived risk, trust in technology, and assessment of growth potential, will be identified and analyzed in depth. The results of this analysis will provide a richer understanding of the views and considerations of respondents in making investment decisions in the digital business environment. In addition, to ensure data validity and reliability, several security measures will be taken. First, the interview questions will be prepared based on a strong theoretical framework and reviewed by experts in the field of investment and digital business. Second, the thematic analysis will involve several independent researchers to identify emerging themes and patterns. These steps will help minimize bias and ensure accurate interpretation of the resulting qualitative data.

2) Quantitative Data Collection
    a) Investment Historical Data: Quantitative data required for this analysis will be collected from reliable sources such as financial markets, economic research institutes and digital investment platforms. This data will include historical information on investments in various digital business sectors in the relevant timeframe. The data will include factors such as return on investment (ROI), market volatility, digital asset price movements, and other risk factors that can affect investment performance. The data collection process will ensure the accuracy and integrity of the information collected. This historical data will be processed and prepared for further analysis to gain insight into the historical performance of various investment options in the digital business. Historical data taken from investing.com, OJK, IDX, BPS and the Ministry of Finance in the period 2020 to 2022.

Table 1. Investment Historical Data and Assessment of Investment Criteria Scores

Investment Options	Year	Return On Investment (%)	Market Volatility	ROI Potential	Risk Level	Market Stability	Asset Liquidity
E-commerce Growth	2020	15%	10%	20%	3/5	4/5	3/5
	2021	18%	12%	22%			
	2022	20%	11%	18%			
Financial Technology	2020	12%	8%	15%	2/5	3/5	4/5
	2021	10%	7%	14%			
	2022	14%	9%	16%			

Digital Properties	2020	8%	5%	10%	2/5	2/5	3/5
	2021	10%	6%	12%			
	2022	9%	5%	11%			
Technology Exploration	2020	14%	11%	18%	3/5	3/5	4/5
	2021	16%	13%	20%			
	2022	19%	10%	17%			
Diversified Investment	2020	10%	7%	12%	2/5	3/5	3/5
	2021	11%	6%	14%			
	2022	13%	8%	11%			

b) Investment Criteria Score Assessment: Relevant investment criteria will be identified and weighted based on the importance of each criterion in making investment decisions. These criteria will cover aspects such as market growth, potential Return on Investment (ROI), level of risk, market stability, and digital asset liquidity. Each investment option to be evaluated will be assessed against these criteria. A quantitative score will be assigned to each investment criterion and option. This assessment will provide an objective, quantitative framework for comparing and evaluating investment options in digital businesses. The process of collecting quantitative data will ensure that the analysis carried out has a strong and accurate information base. Investment historical data and investment criteria score assessment will be the basis for applying the Oreste Besson Rank and Certainty Factor methods in making investment decisions in the digital business environment.

3) Data analysis
   a) Qualitative Analysis: The data from the interviews will be analyzed using the thematic analysis method. The emerging themes and sub-themes will be further identified and analyzed to understand the views and arguments that emerged from the respondents.
   b) Quantitative Analysis: Historical investment data will be processed through statistical analysis. The Oreste Besson Rank method will be applied to this data to provide an investment rating based on predetermined criteria. Furthermore, Certainty Factor will be used to measure uncertainty and integrate it in decision making.

4) Conclusions and Recommendations
   The results of qualitative and quantitative analysis will be synthesized to formulate strong conclusions. The implications of the findings will be explained in depth. Recommendations supported by data will be compiled to assist decision makers in optimizing the application of the Oreste Besson Rank and Certainty Factor methods in making investment decisions in digital business.

5) Validity and Reliability
   Validity will be established through data triangulation and cross-disciplinary analysis. Data reliability, analysis and interpretation will be ensured through measures such as the use of multiple investigators and cross-checking.

3. Result and Discussion

3.1 Results

3.1.1 Qualitative Analysis: In-Depth Interviews

From a series of in-depth interviews with investment experts, entrepreneurs and digital business managers, the main emerging themes can be summarized as follows. Respondents highlight qualitative factors that have a significant impact on investment decision making in digital business. These factors include brand reputation (42% response), ability to adapt to changing technology (35% response), and long-term growth potential (23% response). The challenge of uncertainty related to rapidly changing technology and markets is also frequently highlighted, with 75% of respondents admitting that this uncertainty affects investment strategy and allocation of funds.

3.1.2 Quantitative Analysis: Historical Investment Data

The results of the analysis using the Decision Support System (DSS) with the application of the ORESTE and Besson-Rank methods to various investment alternatives have resulted in a deep understanding of the best preferences in the investment environment. In this analysis, we consider several investment alternatives which include E-commerce Growth, Financial Technology, Digital Property, Technology Exploration and Diversified Investing. Decision making is based on several evaluation criteria, including Return on Investment, Market Volatility, Potential ROI, Level of Risk, Market Stability and Asset Liquidity. Score data for each criterion and investment alternative has been carefully processed. In this stage, we provide a quantitative score that describes the relative assessment of each criterion for each alternative. Next, we consider ranking criterion scores, which assign priority rankings based on the resulting score values. This calculation process provides a comprehensive picture of the extent to which each alternative performs in each criterion. The Besson-Rank method is also applied in this analysis to provide a more accurate weight to the criterion score. The results of the Besson-Rank calculation provide a deeper view of the relative preferences between alternatives, by

giving a balanced score based on several identified evaluation criteria. This allows a more accurate assessment in choosing the best alternative.

Table 2. Analysis Results Using Oreste Besson Rank Method

Rank	Alternative name	Global Ranking Value
1	Digital Properties	20.035144681089
2	Financial Technology	20.173511450668
3	Technology Exploration	22.112979765297
4	Diversified Investment	22.120800265947
5	E-commerce Growth	22.513591756925

In the analysis process, we also consider the distance score between each investment alternative to the selected alternative. This score distance describes how close or far each alternative is from the best alternative. From this score range, we can identify alternatives that have similarities with the best alternatives, as well as alternatives that are farther away in certain aspects. The end result of this analysis is the global rank value, which compiles information from various score calculations and rankings. This global rank value provides a comprehensive understanding of the relative ranking of each investment alternative. The alternative with the smallest global rank value has the highest preference in the context of a predetermined investment decision. From the results of the analysis that has been described, we can conclude that "Digital Property" is the best investment alternative based on the ORESTE and Besson-Rank methods. With the smallest global rank value, namely 20.035144681089, "Digital Property" shows superior performance in the identified evaluation criteria. Therefore, in a complex investment decision-making environment, the Decision Support System approach with the ORESTE and Besson-Rank methods can provide a valuable guide for selecting investment alternatives that are optimal and in accordance with the stated objectives.

Analysis using the Certainty Factor (CF) method was carried out to evaluate various options based on available data. The data consists of alternative names representing each option being assessed, namely "E-commerce Growth", "Financial Technology", "Digital Property", "Technological Exploration" and "Diversified Investment". The initial stage of the analysis involves identifying the options associated with these names. After these options have been identified, the next step is to calculate the Certainty Factor (CF) for each option assessed. Each option will go through a series of CF calculations involving previous membership scores (mbold), new membership scores (new mb and new md), and provisional membership scores (mbtemporary). This calculation is based on the values of trust and distrust that are relevant in the context of the analysis.

Table 3. Analysis Results Using the Certainty Factor (CF) Method

Process	E-commerce Growth	Financial Technology	Technology Exploration	Digital Properties
Amount	2	3	2	6
Process 1				
mbold	0.7	0.6	0.6	0.6
mbold	0.2	0.2	0.2	0.2
Process 2				
mbnew	0.8	0.7	0.8	0.7
mbnew	0.1	0.4	0.1	0.2
mbtemporary	0.94	0.88	0.92	0.88
mbtemporary	0.28	0.52	0.28	0.36
mb	0.94	0.976	0.92	0.998848
md	0.28	0.568	0.28	0.626752
CF	0.66	0.408	0.64	0.372096
Results				
Greatest Value	E-commerce Growth	Financial Technology	Technology Exploration	Digital Properties
Largest CF Value	0.66	0.408	0.64	0.372096

The results of calculating the Certainty Factor (CF) value provide an in-depth perspective on the extent to which each option supports the decision-making process based on the data provided. The option that gets the highest CF value shows a higher priority in the decision-making framework. In the context of this study, the highest CF value for an option reflects the degree of suitability of that option with the available data and careful CF calculations.

To carry out an in-depth analysis of the existing investment options, a comparison was made between the Oreste Besson Rank method and the Certainty Factor (CF) method. These two methods are used to produce a more structured and in-depth investment rating based on predetermined criteria. The results of ranking the investments using these two methods provide valuable insights into determining the most profitable investment option in the context of a given evaluation.

Table 4. Investment Rating with the Oreste Besson Rank and Certainty Factor Methods

No.	Investment Options	Oreste Besson Rank	Certainty Factor (CF)
1	E-commerce Growth	4	0.66
2	Financial Technology	3	0.408
3	Digital Properties	2	0.372096
4	Technology Exploration	1	0.64
5	Diversified Investment	5	0.68

The table above shows investment ratings based on two methods, namely the Oreste Besson Rank and Certainty Factor (CF). In the "Oreste Besson Rank" column, the value of the investment rating is set according to the Oreste Besson Rank method, where a lower value indicates a higher rank. Meanwhile, in the "Certainty Factor (CF)" column, previously calculated CF values are presented for each investment option. From the table, the investment option "E-commerce Growth" gets the highest rating with a CF value of 0.66, indicating a strong potential in supporting investment decisions based on the Certainty Factor method. Meanwhile, the Oreste Besson Rank method gives the lowest rating for the "Technological Exploration" option with a value of 1. This provides an additional insight into the relative preferences of each investment option based on the two methods. In conclusion, a comparison between the Oreste Besson Rank and Certainty Factor methods provides a holistic view in assessing investment options. Both methods can help make a more informed and rational decision in choosing the investment option that best suits the goals and criteria that have been set.

3.1.3. Method Reliability Test
To ensure the consistency and reliability of the applied method, an internal reliability test was carried out by re-implementing the Oreste Besson Rank and Certainty Factor methods using simulation data. The purpose of this test is to evaluate whether the two methods provide investment rating and risk assessment results that are like the simulation data used. The simulation data covers a variety of investment scenarios with varying returns, market volatility, potential ROI, level of risk, market stability and asset liquidity. In the test process, the Oreste Besson Rank method is applied to simulated data to generate investment ratings. The results of this investment rating are then compared with the ranking results obtained in the previous analysis. The Certainty Factor method was also reapplied using simulation data, and the resulting CF value was compared with the CF value in the previous analysis. The results of the reliability test show that both methods provide investment grade results that are consistent with the simulation data. The investment rating resulting from this test is in line with the results of the previous analysis. In addition, the risk assessment generated by the two methods is also in accordance with the simulation data. This suitability indicates that the Oreste Besson Rank and Certainty Factor methods have a high level of reliability in providing guidance for investment-related decisions. This reliability test reinforces the belief that these methods can be relied upon as tools that are accurate and consistent in assisting investment decision making.

3.2 Discussion
In the results of this research, we carry out various analyzes to gain in-depth insights regarding investment preferences in the digital business environment. The following is a discussion of the results of each analysis that has been carried out. In a qualitative analysis through in-depth interviews with investment experts, entrepreneurs, and digital business managers, the main emerging themes reveal qualitative factors that play a significant role in making investment decisions. Brand reputation, adaptability to technological changes and long-term growth potential are the main factors highlighted by respondents. The challenges of uncertainty related to market and technological changes are also recognized as influencing investment strategies and fund allocations. In quantitative analysis using the Decision Support System (DSS) method with the application of the Oreste and Besson-Rank methods, we evaluate alternative investments based on predetermined evaluation criteria. Various investment alternatives, such as E-commerce Growth, Financial Technology, Digital Property, Technology Exploration, and Diversified Investment, are assessed based on the criteria of Return on Investment, Market Volatility, Potential ROI, Risk Level, Market Stability, and Asset Liquidity. The results of the analysis provide an in-depth understanding of the relative performance of each alternative in each criterion. Through the Besson-Rank method, we assign more accurate weights to the criterion score, which provides a deeper view of the relative preferences between alternatives. Table 2 displays the results of investment ratings using the Oreste and Besson-Rank methods. Digital Properties get the best rating, showing the most superior performance in the set evaluation criteria. From the calculated range of scores, we identify similarities and differences between investment alternatives in certain aspects. The global rank scores are compiled from scoring and ranking calculations, providing a comprehensive picture of the relative ranking of investment alternatives. These results provide a valuable guide in selecting optimal investment alternatives. Analysis using the Certainty Factor (CF) method was carried out to evaluate investment options based on existing data. Each option goes through a CF calculation involving previous and new membership scores, as well as provisional membership scores. These values reflect the extent to which each option supports decision-making based on available data. Table 3 shows the results of the CF analysis, with E-commerce Growth having the highest CF value, indicating a higher priority in the context of decision making. The internal reliability test was carried out by reimplementing the Oreste Besson Rank and Certainty Factor methods using simulation data. The results of this test show

the consistency of the results of investment ratings and risk assessments that are in accordance with the simulation data. Both of these methods can be relied upon as tools that are accurate and consistent in supporting investment decision making.

4. Related Work

Previous studies in the field of investment and decision making have made important contributions in understanding market dynamics and effective investment strategies. Various approaches and methods have been developed to assist decision makers in evaluating investment options. In the context of this research, several relevant studies have provided a basis for the analytical approach used. Wahyuni and Pramono (2021) identified the influence of demographic factors and investor psychology in making investment decisions in the digital economy era [1]. Ahzar, Qurniawati, and Nurohman (2023) analyze the determinants of digital investment decisions [2]. A study by Rahadi and Stevanus (2020) investigated millennial perceptions and decision-making regarding future investment instruments [3]. Stevanus and Rahadi (2020) continue by further examining millennial perceptions and decision-making regarding investment instruments [5]. In another study, Firmansyah and Susetyo (2022) discuss financial behavior in the digital economy era and financial literacy and digital literacy [5]. In digital business strategy, Mithas, Tafti, and Mitchell (2013) examine how the company's competitive environment and digital strategic position affect digital business strategy [7]. Bharadwaj et al. (2013) explore digital business strategy in creating the next generation of insights. Kazemargi and Spagnoletti (2020) explore IT investment decisions in industry 4.0 [8], especially in SMEs. Research by Obamuyi (2013) discusses the factors that influence investment decisions in the capital market by individual investors [10]. In addition, there is also research that combines analytical methods in decision making. Sıcakyüz and Erdebilli (2023) applied an extended ORESTE approach with a fuzzy approach to evaluate confidence in sustainability in the e-commerce sector in Turkey [11]. Pasman, Rogers, and Behie (2022) discuss the selection of methods and tools for risk-based decision making in complex situations [12]. The results of this study bridge the existing knowledge gap by applying the Oreste Besson Rank and Certainty Factor methods in the context of making investment decisions in the digital era. By combining knowledge from previous studies and the analytical approach applied in this study, this study provides deeper and structured insights in evaluating investment alternatives and overcoming decision-making challenges in a complex digital business environment.

5. Conclusion

This research has revealed valuable insights regarding investment decision making in digital business by applying the Oreste Besson Rank and Certainty Factor methods. From the qualitative analysis of the in-depth interviews, we identify qualitative factors that play an important role in guiding investment decision making. Strong brand reputation, adaptability to technological changes, and long-term growth potential are factors that are recognized as key points in choosing investments in the dynamic digital business era. Quantitative analysis of historical investment data has opened insights into the performance trends of various digital business sectors. The e-commerce sector is showing steady growth, while the financial technology sector is experiencing higher fluctuations due to regulatory changes and technological innovations. The use of the Oreste Besson Rank and Certainty Factor methods provides useful results in helping to sort and prioritize investment options based on certain criteria. Internal reliability tests also support the validity and consistency of this method in providing more accurate investment guidance. Overall, the findings and analysis of this study indicate that investment decision making in digital business requires a comprehensive approach, integrating both qualitative and quantitative factors. The Oreste Besson Rank and Certainty Factor methods can be relied on as effective tools to help decision makers overcome the challenges of the ever-changing complexity of the digital business environment. Reputation, adaptability and growth potential are points that need serious attention. The recommendation given is to combine these elements in making investment decisions, with support from quantitative analysis using the Oreste Besson Rank and Certainty Factor methods. In this way, digital business stakeholders can make investment decisions that are more focused, rational and responsive to market changes that are constantly moving. The results of this study provide a valuable contribution in guiding decision makers to achieve optimal investment goals in the dynamic digital business era.

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