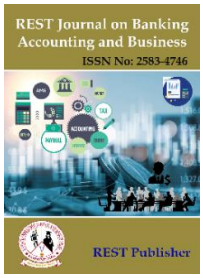
REST Journal on Banking, Accounting and Business
Vol: 4(1), March 2025
REST Publisher; ISSN: 2583 4746
Website: http://restpublisher.com/journals/jbab/
DOI: https://doi.org/10.46632/jbab/4/1/15



Risk Management Using the WASPAS Method: A Multi-Criteria Decision-Making Approach

***Anjali Swarnkar**
Maharaja Agrasen International Collage Raipur, Chhattisgarh, India.
*Corresponding author Email: anjswarnkar1188@gmail.com

Abstract: *The goal is to decrease both the likelihood and impact of unexpected events, ensuring stability and success. An effective risk management process follows a series of structured steps: identifying risks, assessing their potential impact, ranking them in order of importance, and applying strategies to minimize or avoid them. These strategies may include transferring risks through insurance, mitigating them with preventive actions, or accepting them when they are inevitable. By addressing risks proactively, organizations can safeguard resources, enhance decision-making, and build resilience against uncertainty, promoting long-term sustainability and growth. Research significance: Risk management plays a vital role in helping organizations detect, evaluate, and prioritize potential risks, reducing the impact of unforeseen events. A strong risk management strategy supports business continuity, improves decision-making, and protects assets by tackling uncertainties head-on. It helps organizations remain stable, comply with regulations, and preserve their reputation. By anticipating risks, companies can manage resources more effectively, limit financial losses, and approach opportunities with greater confidence. In fast-evolving environments, risk management enhances resilience, promoting sustainable growth and long-term success. It also strengthens stakeholder confidence, showing a dedication to responsible governance and strategic planning. Methodology: This approach usually involves several key steps: identifying risks (using methods like brainstorming and SWOT analysis), assessing them (by considering their probability and potential impact), mitigating risks (by creating strategies to manage them), and monitoring (by keeping an eye on risk factors over time). Strategies for handling risks can include avoiding, mitigating, sharing, or accepting them. Clear communication and regular updates are essential to ensure that the risk management plan evolves with new challenges, allowing the organization to meet its goals while minimizing possible adverse effects. Alternative: Risk Shield, Secure Guard, Safe Net, Protec Sure, Guard Maste. Evaluation preference: Implementation Cost, Maintenance Cost, System Downtime, Complexity of Use. Results: Protec Sure is getting first place of the table and Guard Master is getting last place of the table*

Keywords: *Risk Shield, Secure Guard, Safe Net, Protec Sure, Guard Master*

1. INTRODUCTION

It is a structured approach designed to reduce uncertainties and prevent adverse outcomes by anticipating and preparing for potential risks. Risk management applies across various industries, including finance, healthcare, construction, manufacturing, and IT. This process not only supports the efficient operation of an organization but also enhances resilience in dynamic environments, helping businesses achieve their strategic goals.[1] Risk management starts with a clear understanding of what constitutes a risk. Generally, a risk is the chance Of an adverse event that might impede an organization's capacity to achieve its objectives. These events might arise from internal or external sources and can have a range of effects, including financial losses, damage to reputation, operational interruptions, or legal consequences.[2] Risk management requires making well-informed decisions based on the probability and potential consequences of risks. Effective strategies allow organizations to identify risks early, prioritize them, and take the necessary actions to either reduce or eliminate them. These strategies are

typically aligned with the organization's broader goals and objectives, ensuring that risk management supports long-term success rather than obstructing progress.[3] Risk management is an ongoing and evolving process that involves several crucial steps, each of which must be systematically followed to ensure the organization is well-prepared to handle and reduce risks. The key steps in the risk management process include.[4] This assessment helps prioritize risks according to their severity and probability, ensuring that resources are directed where they are most needed. Risk assessment typically uses a mix of qualitative and quantitative approaches, including tools like risk matrices, statistical analysis, and scenario planning.[5] Once risks are assessed, organizations must evaluate their overall impact on the business. This evaluation helps identify which risks need urgent action and which can be observed over time. It also involves determining whether the current level of risk is acceptable or if additional mitigation measures are necessary.[6] By identifying, assessing, and addressing risks, businesses can navigate uncertainties and protect themselves from potential harm. Whether it's financial instability, operational challenges, legal compliance, or cyber security threats, managing risks helps businesses stay ahead of potential setbacks.[7] In a world marked by constant change, organizations that embrace risk management as a fundamental part of their operations Can strengthen their resilience, optimize decision-making, and secure long-term success.[8]

2. MATERIAL AND METHOD

Alternative:

1. **Risk Shield:** Risk Shield is a security solution designed to protect organizations from potential threats, including financial, operational, and cyber security risks. It offers a comprehensive approach to identifying, mitigating, and managing various risks.
2. **Secure Guard:** Secure Guard is a risk management solution focused on safeguarding businesses from cyber threats, operational disruptions, and compliance risks. It provides advanced protection and monitoring tools to ensure organizational security and continuity.
3. **Safe Net:** Safe Net is a robust security system designed to protect organizations from cyber security threats, data breaches, and operational risks. It offers real-time monitoring and proactive solutions to ensure business continuity and safety.
4. **Protec Sure:** ProtecSure is a comprehensive risk management system designed to enhance security by preventing operational disruptions, ensuring regulatory compliance, and mitigating financial risks. It provides robust protection and proactive monitoring for businesses.
5. **Guard Master:** Guard Master is a comprehensive security system designed to protect organizations from diverse risks, including cyber security threats, operational failures, and compliance issues, offering advanced monitoring, risk mitigation, and management solutions.

Evaluation preference:

1. **Implementation Cost:** Implementation Cost refers to the initial expenses required to set up a system or solution, excluding any direct benefits. It includes installation, setup, training, and integration costs.
2. **Maintenance Cost:** Maintenance cost refers to the ongoing expenses required to keep systems, equipment, or infrastructure running smoothly. This includes repair, upgrades, and routine servicing to ensure optimal performance and prevent downtime.
3. **System Downtime:** System downtime refers to periods when a system or service is unavailable due to failures, maintenance, or outages. It disrupts operations, leading to productivity loss and potential financial or reputational damage.
4. **Complexity of Use:** Complexity of Use refers to how difficult or user-friendly a system, product, or service is to operate. Higher complexity may require more training, while simpler systems are easier for users to manage.

WASPAS method: In decision-making processes, particularly in complex environments such as project management, resource allocation, and strategic planning, decision-makers often face multiple criteria that must be considered simultaneously. Traditional methods like WSM and WPM have their strengths but also limitations. WSM treats all criteria linearly and assumes independence among them, while WPM can sometimes be less intuitive for some decision-makers. The WASPAS method was developed to leverage the advantages of both approaches while mitigating their drawbacks. In MCDM problems, alternatives are assessed based on various criteria, each of

which may have different units of measurement and varying levels of importance. The WASPAS method facilitates this by assigning weights to each criterion, allowing for a more nuanced evaluation of alternatives. WASPAS has been successfully applied in various domains, such as project selection, supplier evaluation, environmental impact assessment, and resource allocation. Its adaptability to different contexts makes it a valuable tool for decision-makers facing complex scenarios with multiple competing criteria. In summary, the WASPAS method offers a systematic approach to multi-criteria decision-making, blending the strengths of both additive and multiplicative methods. By carefully weighing criteria and evaluating alternatives, it enables informed and effective decision-making across various fields. Its versatility makes it applicable across various fields, enabling decision-makers to make informed choices that consider both quantitative and qualitative factors. However, users should remain mindful of the method's limitations and strive for careful implementation to achieve optimal results.

3. RESULT AND DISCUSSION

TABLE 1. Risk Management

	Implementation Cost	Maintenance Cost	System Downtime	Complexity of Use
Risk Shield	150	30	12	5
Secure Guard	180	25	15	6
Safe Net	120	35	10	4
ProtecSure	200	40	8	6
Guard Master	140	28	20	7

The table shows the non-benefit costs and attributes of five security systems. Implementation Cost refers to the initial setup cost, Maintenance Cost is the ongoing expense to keep the system running, System Downtime represents the time the system is unavailable due to issues, and Complexity of Use indicates how difficult the system is to operate. For example, Risk Shield has the highest implementation cost (150), a moderate maintenance cost (30), a low downtime (12), and a relatively low complexity of use (5). Safe Net has the lowest implementation cost (120) but higher maintenance cost (35) and simpler operation (4).

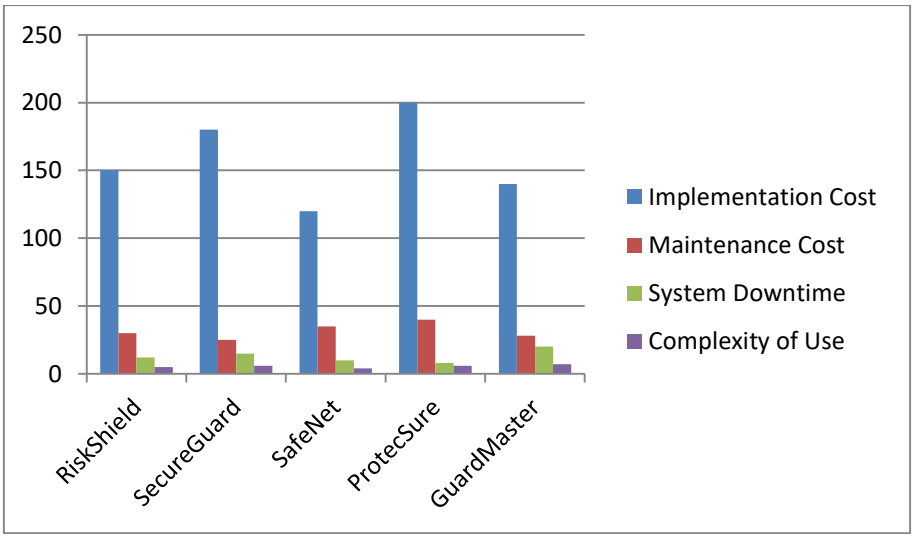


FIGURE 1. Risk Management

The bar chart shows the non-benefit costs and attributes of five security systems. Implementation Cost refers to the initial setup cost, Maintenance Cost is the ongoing expense to keep the system running, System Downtime represents the time the system is unavailable due to issues, and Complexity of Use indicates how difficult the system is to operate. For example, Risk Shield has the highest implementation cost (150), a moderate maintenance cost (30),

a low downtime (12), and a relatively low complexity of use (5). Safe Net has the lowest implementation cost (120) but higher maintenance cost (35) and simpler operation (4).

TABLE 2. Performance value

Performance value				
Risk Shield	0.75000	0.75000	0.66667	0.80000
Secure Guard	0.90000	0.62500	0.53333	0.66667
Safe Net	0.60000	0.87500	0.80000	1.00000
Protec Sure	1.00000	1.00000	1.00000	0.66667
Guard Master	0.70000	0.70000	0.40000	0.57143

The performance value table assesses five security products Risk Shield, Secure Guard, Safe Net, ProtecSure, and Guard Master across four criteria, with scores ranging from 0 to 1. ProtecSure excels with top scores of 1.000 in the first three criteria, indicating strong and consistent performance. Safe Net also performs well, especially in the fourth criterion, scoring 1.000. Risk Shield shows balanced scores, with a high of 0.800 in the fourth criterion. Secure Guard's performance varies, with lower values in some criteria, while Guard Master Scores lower overall, particularly in the third and fourth criteria, highlighting areas for improvement compared to competitors.

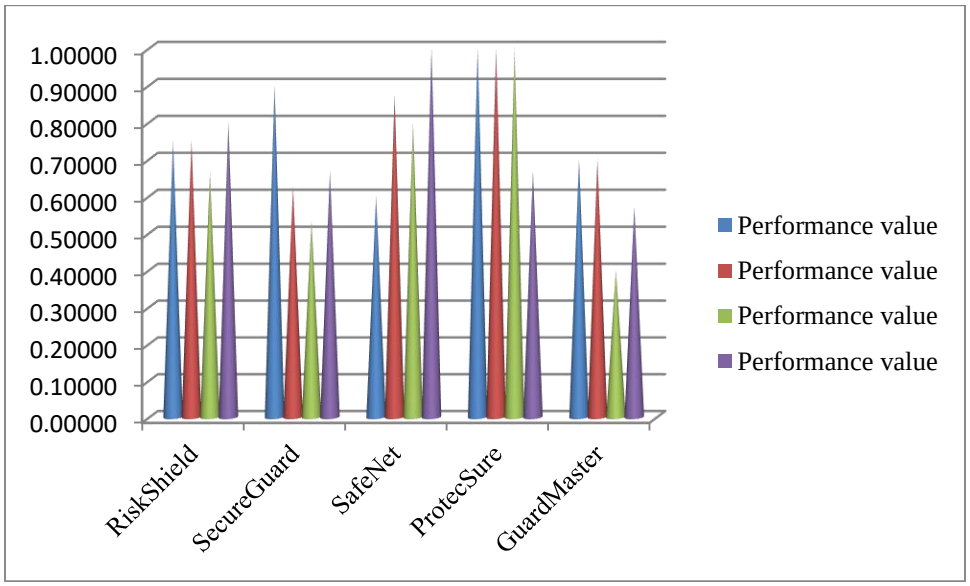


FIGURE 2. Performance value

The performance value table assesses five security products Risk Shield, Secure Guard, Safe Net, ProtecSure, and Guard Master across four criteria, with scores ranging from 0 to 1. ProtecSure excels with top scores of 1.000 in the first three criteria, indicating strong and consistent performance. Safe Net also performs well, especially in the fourth criterion, scoring 1.000. Risk Shield shows balanced scores, with a high of 0.800 in the fourth criterion. Secure Guard's performance varies, with lower values in some criteria, while Guard Master Scores lower overall, particularly in the third and fourth criteria, highlighting areas for improvement compared to competitors.

TABLE 3. Weight

Weight				
Risk Shield	0.25	0.25	0.25	0.25
Secure Guard	0.25	0.25	0.25	0.25
Safe Net	0.25	0.25	0.25	0.25
ProtecSure	0.25	0.25	0.25	0.25
Guard Master	0.25	0.25	0.25	0.25

In this weighted decision matrix, each criterion is given equal importance, with a uniform weight of 0.25 for all products Risk Shield, Secure Guard, Safe Net, ProtecSure, and Guard Master. This implies that no single criterion is prioritized over others, and each aspect contributes equally to the overall evaluation of the products. The consistent weighting suggests a balanced approach, ensuring that each product is judged fairly without bias toward any particular factor. This method emphasizes a holistic assessment, where the performance in any single category has an equal impact on the final decision or comparison among the security products.

TABLE 4. Weighted normalized decision matrix

Weighted normalized decision matrix				
Risk Shield	0.18750	0.18750	0.16667	0.20000
Secure Guard	0.22500	0.15625	0.13333	0.16667
Safe Net	0.15000	0.21875	0.20000	0.25000
ProtecSure	0.25000	0.25000	0.25000	0.16667
Guard Master	0.17500	0.17500	0.10000	0.14286

The weighted normalized decision matrix evaluates five security products Risk Shield, Secure Guard, Safe Net, ProtecSure, and Guard Master based on four criteria, using a normalized scale. ProtecSure scores the highest overall, achieving 0.250 across three criteria, indicating consistently strong performance. Safe Net also performs well, particularly excelling in the fourth criterion with a score of 0.250. Risk Shield and Secure Guard show moderate performance, with values generally between 0.13333 and 0.22500. Guard Master scores lower, especially in the third and fourth criteria, with the lowest score of 0.100, indicating areas for improvement compared to its competitors.

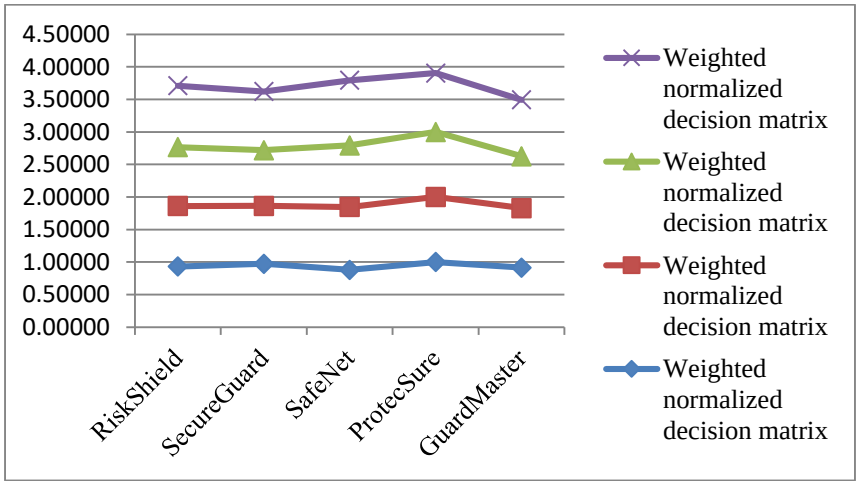


FIGURE 3. Weighted normalized decision matrix

The weighted normalized decision matrix evaluates five security products Risk Shield, Secure Guard, Safe Net,

ProtecSure, and Guard Master based on four criteria, using a normalized scale. ProtecSure scores the highest overall, achieving 0.250 across three criteria, indicating consistently strong performance. Safe Net also performs well, particularly excelling in the fourth criterion with a score of 0.250. Risk Shield and Secure Guard show moderate performance, with values generally between 0.13333 and 0.22500. Guard Master Scores lower, especially in the third and fourth criteria, with the lowest score of 0.100, indicating areas for improvement compared to its competitors.

TABLE 5. Weighted normalized decision matrix

Weighted normalized decision matrix				
Risk Shield	0.93060	0.93060	0.90360	0.94574
Secure Guard	0.97400	0.88914	0.85457	0.90360
Safe Net	0.88011	0.96717	0.94574	1.00000
ProtecSure	1.00000	1.00000	1.00000	0.90360
Guard Master	0.91469	0.91469	0.79527	0.86944

The weighted normalized decision matrix provides a comparative analysis of five security products Risk Shield, Secure Guard, Safe Net, ProtecSure, and Guard Master across four criteria. ProtecSure performs best, scoring a perfect 1.000 across the first three criteria, indicating top performance relative to other options. Safe Net also scores well, with a peak value of 1.000 in the final criterion and consistently high scores in the others. Risk Shield and Guard Master have similar performance, with scores generally in the 0.9 range. Secure Guard shows variability, performing well in some criteria but less consistently across the board, with scores ranging from 0.85457 to 0.97400.

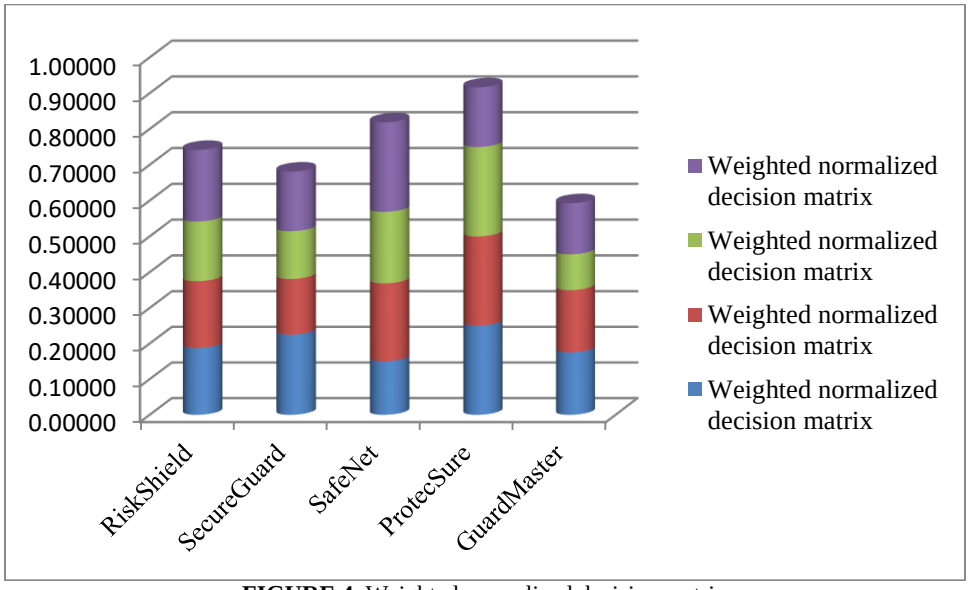


FIGURE 4. Weighted normalized decision matrix

The weighted normalized decision matrix provides a comparative analysis of five security products Risk Shield, Secure Guard, Safe Net, ProtecSure, and Guard Master across four criteria. ProtecSure performs best, scoring a perfect 1.000 across the first three criteria, indicating top performance relative to other options. Safe Net also scores well, with a peak value of 1.000 in the final criterion and consistently high scores in the others. Risk Shield and Guard Master have similar performance, with scores generally in the 0.9 range. Secure Guard shows variability, performing well in some criteria but less consistently across the board, with scores ranging from 0.85457 to 0.97400.

TABLE 6. Preference Score

	Preference Score	Preference Score	
			lambda
Risk Shield	0.74167	0.74008	0.5
Secure Guard	0.68125	0.66874	
Safe Net	0.81875	0.80503	
ProtecSure	0.91667	0.90360	
Guard Master	0.59286	0.57850	

The data compares "Preference Score" and "Preference Score lambda" for five security products. Risk Shield has a "Preference Score" of 0.74167 and a slightly lower lambda score of 0.74008. Secure Guard scores 0.68125, with a slightly lower lambda of 0.66874. Safe Net has a higher "Preference Score" of 0.81875, with a lambda of 0.80503. ProtecSure leads with the highest "Preference Score" of 0.91667 and a lambda of 0.90360. Guard Master ranks lowest, with a "Preference Score" of 0.59286 and a lambda of 0.57850. Only Risk Shield has a lambda value of 0.5, indicating a unique reference point.

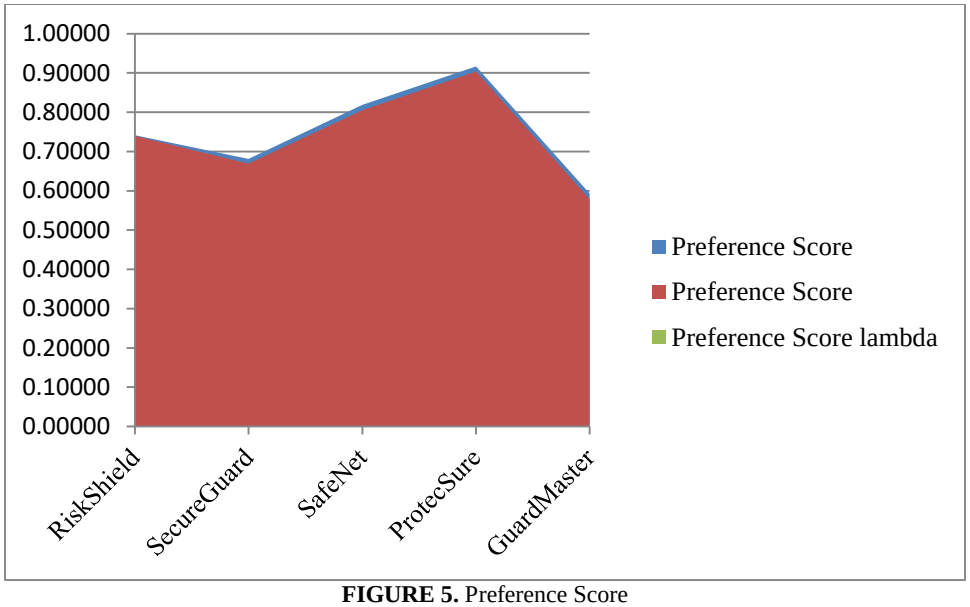


FIGURE 5. Preference Score

The chart compares the "Preference Score" for five security products: Risk Shield, Secure Guard, Safe Net, ProtecSure, and Guard Master. Three different data series are present, indicated by colors: blue (Preference Score), red (Preference Score), and green (Preference Score lambda). The scores are plotted on a scale from 0.0 to 1.0, indicating how each product performs relative to user preferences. ProtecSure has the highest score, while Guard Master is the lowest among them. The overlapping scores suggest potential redundancy or a need to clarify the distinction between "Preference Score" and "Preference Score lambda." The axis labels are rotated for easier readability.

TABLE 7. WASPAS Coefficient

WASPAS Coefficient	
Risk Shield	0.74087
Secure Guard	0.67500
Safe Net	0.81189
ProtecSure	0.91013
Guard Master	0.58568

The WASPAS coefficients measure the performance of five options, with higher values indicating better outcomes. ProtecSure has the highest coefficient of 0.91013, suggesting it is the top-performing option. Safe Net follows with a coefficient of 0.81189, indicating strong performance as well. Risk Shield has a moderate coefficient of 0.74087, while Secure Guard is slightly lower at 0.67500. Guard Master has the lowest coefficient at 0.58568, implying it is the weakest performer. These coefficients, derived from the WASPAS method, combine weighted sum and product approaches to assess and rank options, highlighting ProtecSure as the best and Guard Master as the least favorable choice.

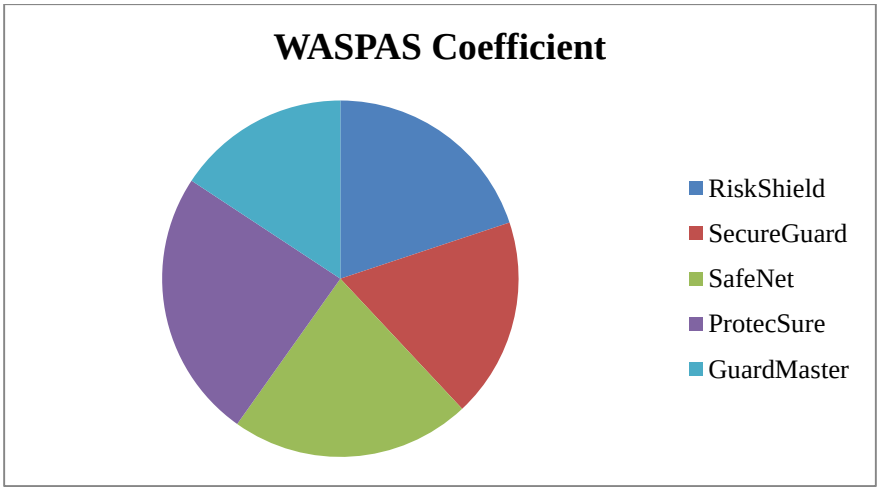


FIGURE 6. WASPAS Coefficient

The pie chart titled "WASPAS Coefficient" represents the distribution of coefficients for five options: Risk Shield, Secure Guard, Safe Net, ProtecSure, and Guard Master. Each section of the pie chart corresponds to one option, indicating its share or influence in the overall analysis based on the WASPAS method (a decision-making approach combining weighted sum and product methods). The chart's segments are color-coded for easy identification: Risk Shield in blue, Secure Guard in red, Safe Net in green, ProtecSure in purple, and Guard Master in light blue. The size of each segment suggests the relative importance or performance of each option according to the WASPAS coefficient calculation.

TABLE 8. RANK

RANK	
Risk Shield	3
Secure Guard	4
Safe Net	2
ProtecSure	1
Guard Master	5

The ranking data compares five products based on their performance, with lower numbers indicating better ranks. ProtecSure holds the top position with a rank of 1, indicating the best performance among the options. Safe Net follows with a rank of 2, making it the second-best. Risk Shield is in the middle with a rank of 3, while Secure Guard is slightly lower at 4. Guard Master has the lowest rank of 5, suggesting it performed the least favorably. This ranking allows for a quick comparison, highlighting ProtecSure and Safe Net as the top performers and Guard Master as the weakest.

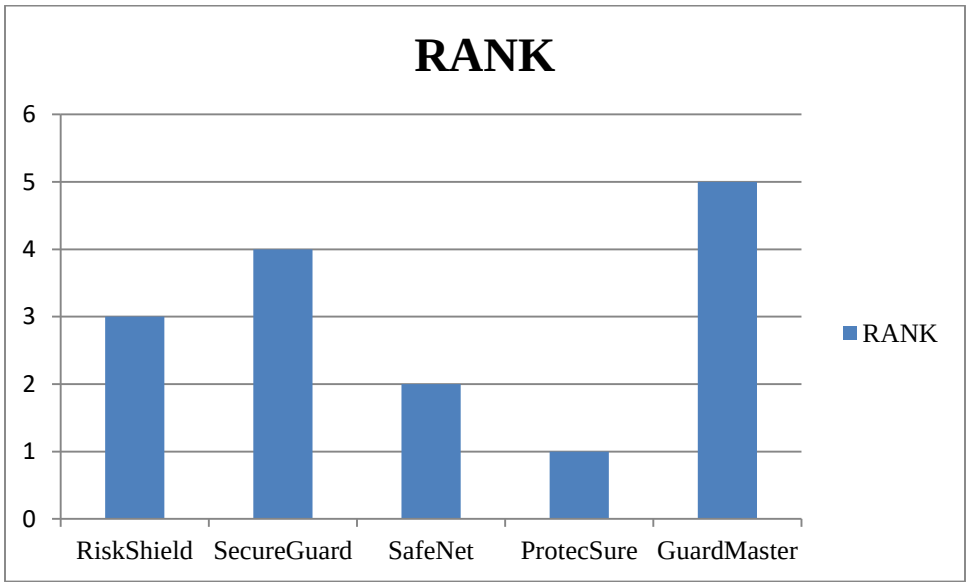


FIGURE 7. RANK

The bar chart titled "RANK" illustrates the rankings of five different products or services: Risk Shield, Secure Guard, Safe Net, ProtecSure, and Guard Master. The ranking scale appears to go from 1 (highest or best rank) to 5 (lowest or worst rank). Risk Shield is ranked at 3, Secure Guard at 4, Safe Net at 2, ProtecSure at 1, and Guard Master at 5. ProtecSure holds the best rank (1), while Guard Master has the lowest performance (5). The chart uses a simple vertical bar format to visualize each product's rank, allowing for an easy comparison of performance among the listed options.

4. CONCLUSION

This step is crucial as it helps an organization determine which risks warrant immediate attention and which can be monitored over time. It also helps in the allocation of resources to address high-priority risks while managing the less significant ones effectively.[9] Risk mitigation is about finding ways to reduce or eliminate risks, or at least reduce their impact to an acceptable level. There are several strategies organizations can adopt for this purpose.[10] Internal communication should be supported by training, awareness programs, and regular updates on risk statuses. Externally, organizations should ensure that regulatory bodies, investors, and other relevant parties are informed about the steps taken to manage risks.[11] Risk management is a critical aspect of corporate governance, ensuring that organizational leaders make informed decisions consistent with the company's risk tolerance and strategic goals. By identifying and managing risks, companies can minimize potential disruptions and align their resources effectively to achieve long-term goals.[12] In strategic planning, risk management helps decision-makers identify potential pitfalls in their strategies and allows them to develop contingency plans. This ensures that if risks do materialize, the organization can respond swiftly and effectively, minimizing damage to its reputation and operations. Financial Management.[13] In the realm of finance, risk management is vital for protecting assets and ensuring stability. Financial risks, such as market fluctuations, credit risks, and liquidity risks, can significantly impact the organization's financial health. Effective risk management tools, such as hedging and diversification, can help mitigate these risks and protect the bottom line.[14] A robust financial risk management strategy also ensures compliance with regulations and helps organizations avoid legal and regulatory penalties. By having a clear view of their risk exposure, financial managers can make informed decisions that maximize value while minimizing

risk.[15] Project Management: Risk management is crucial in project management, where unforeseen challenges can delay projects, increase costs, or cause failures. Identifying and managing risks proactively ensures that projects remain on track, within budget, and meet their objectives. This requires thorough risk assessment at the planning stage and continual monitoring throughout the project lifecycle.[16] Risks in project management can come from resource allocation, scheduling, changes in scope, or external factors such as political or environmental issues. Mitigating these risks early can prevent major disruptions and increase the likelihood of project success.[17] Operational Risk Management: Operational risks, including equipment failures, supply chain disruptions, and human errors, are significant concerns for many organizations.[18] The goal of operational risk management is to identify potential weaknesses in processes and systems and put in place controls that ensure operations run smoothly. This includes regular audits, the implementation of quality control measures, and the use of technology to track and manage operational risks.[19] Operational risks are often difficult to predict but can have immediate and severe consequences. Therefore, organizations must be proactive in developing response plans and maintaining operational resilience.[20] Crisis and Emergency Management In the face of a crisis, effective risk management can mean the difference between survival and failure. Crisis management involves preparing for unexpected events like natural disasters, cyber-attacks, or other major disruptions. Risk management in this context focuses on ensuring that organizations have the necessary resources, plans, and trained personnel to respond to crises quickly and efficiently.[21]

REFERENCES

[1]. Previtali, Pietro, Andrea Zatti, and Danila Scarozza. "Public owned enterprises in Italy: A hybrid nature for a hybrid regime of over-compliance." African Journal of Business Management 12, no. 6 (2018): 140-153.

[2]. Stulz, René M. "Rethinking risk management." In Corporate risk management, pp. 87-120. Columbia University Press, 2008.

[3]. Mihret, Dessalegn Getie, and Dr Ashfaq Khan. "The role of internal auditing in risk management." In Seventh APIRA Conference (Paper No. K224), Kobe, Japan. 2013.

[4]. Oldfield, George S., and Anthony M. Santomero. The place of risk management in financial institutions. Vol. 39. Wharton School, University of Pennsylvania, 1995.

[5]. Scholes, Myron S. "Crisis and risk management." American Economic Review 90, no. 2 (2000): 17-21.

[6]. Mikes, Anette. "Risk management and calculative cultures." Management Accounting Research 20, no. 1 (2009): 18-40.

[7]. Sitnikov, Cătălina Soriana, and Claudiu George Bocean. "The role of risk management in ISO 9001: 2015." In Proceedings of 9th International Management Conference: Management and Innovation for Competitive Advantage. Bucharest, Romania. 2015.

[8]. Gray, Rob. "The social accounting project and Accounting Organizations and Society Privileging engagement, imaginings, new accountings and pragmatism over critique?." Accounting, organizations and society 27, no. 7 (2002): 687-708.

[9]. Dionne, Georges. "Risk management: History, definition, and critique." Risk management and insurance review 16, no. 2 (2013): 147-166.

[10]. Rasmussen, Jens. "Risk management in a dynamic society: a modelling problem." Safety science 27, no. 2-3 (1997): 183-213.

[11]. Soin, Kim, and Paul Collier. "Risk and risk management in management accounting and control." Management Accounting Research 24, no. 2 (2013): 82-87.

[12]. Weber, Elke. "The role of risk perception in risk management decisions: Who's afraid of a poor old-age?" Pension design and structure: New lessons from behavioral finance: Part I. Research on decision-making under uncertainty (2004): 53-66.

[13]. Stone burner, Gary, Alice Goguen, and Alexis Feringa. "Risk management guide for information technology systems." Nist special publication 800, no. 30 (2002): 800-30.

[14]. Rasmussen, Jens, and Inge Suedung. Proactive risk management in a dynamic society. Swedish Rescue Services Agency, 2000.

[15]. Dicuonzo, Grazia, Graziana Galeone, Erika Zappimbulso, and Vittorio Dell'Atti. "Risk management 4.0: The role of big data analytics in the bank sector." International Journal of Economics and Financial Issues 9, no. 6 (2019): 40-47.

[16]. Dwivedi, Pankaj PRASAD, and Dilip KUMAR Sharma. "Assessment of Appropriate Renewable Energy

Resources for India using Entropy and WASPAS Techniques." Renewable Energy Research and Applications 5, no. 1 (2024): 51-61.

[17]. Mardani, Abbas, Mehrbakhsh Nilashi, Norhayati Zakuan, Nanthakumar Loganathan, Somayeh Soheilirad, Muhamad Zameri Mat Saman, and Othman Ibrahim. "A systematic review and meta-Analysis of SWARA and WASPAS methods: Theory and applications with recent fuzzy developments." Applied soft computing 57 (2017): 265-292.

[18]. Zavadskas, Edmundas Kazimieras, Shankar Chakraborty, Orchi Bhattacharyya, and Jurgita Antucheviciene. "Application of WASPAS method as an optimization tool in non-traditional machining processes." Information Technology and Control 44, no. 1 (2015): 77-88.

[19]. Ghorabaee, Mehdi Keshavarz, Edmundas Kazimieras Zavadskas, Maghsoud Amiri, and Ahmad Esmaeili. "Multi-criteria evaluation of green suppliers using an extended WASPAS method with interval type-2 fuzzy sets." Journal of Cleaner Production 137 (2016): 213-229.

[20]. Prajapati, Himanshu, Ravi Kant, and Ravi Shankar. "Prioritizing the solutions of reverse logistics implementation to mitigate its barriers: A hybrid modified SWARA and WASPAS approach." Journal of Cleaner Production 240 (2019): 118219.

[21]. Stanujkić, Dragiša, and Darjan Karabašević. "An extension of the WASPAS method for decision-making problems with intuitionistic fuzzy numbers: a case of website evaluation." Operational Research in Engineering Sciences: Theory and Applications 1, no. 1 (2018): 29-39.

[22]. Karabašević, Darjan, Dragiša Stanujkić, Snežana Urošević, and Mlađan Maksimović. "An approach to personnel selection based on SWARA and WASPAS methods." Bizinfo (Blace) 7, no. 1 (2016): 1-11.

[23]. Zavadskas, Edmundas Kazimieras, Jurgita Antuchevičienė, Jonas Šaparauskas, and Zenonas Turskis. "MCDM methods WASPAS and MULTIMOORA: Verification of robustness of methods when assessing alternative solutions." (2013).

