

VRIO Analysis Framework in Project Management (PM) Comprehensive Approach

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Abstract

This research aims to provide a comprehensive approach to the VRIO analysis framework in project management, highlighting its importance and benefits in improving project outcomes. Despite the widespread recognition of the VRIO analysis framework as an effective tool in project management, there is a lack of comprehensive literature and practical guidance on its application. The objective of this research is to address this gap by exploring the practical application of VRIO in project management, focusing on its impact on various aspects of project planning, execution, and monitoring. A comprehensive framework for incorporating VRIO into key project management areas is presented, including scope, schedule, cost, quality, resource, communications, risk, procurement, stakeholder engagement, and agile management. By leveraging the insights gained from the VRIO analysis, project managers can create a competitive advantage and ensure that the project is feasible given the available resources. The practical application of VRIO in project management can lead to project success, increased efficiency, and improved outcomes. Overall, this research provides a valuable contribution to the field of project management by providing a comprehensive approach to the VRIO analysis framework.

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I. Introduction

The success of any organization depends heavily on effective project management, which involves the planning, execution, and monitoring of projects to achieve specific objectives. Project managers require a deep understanding of frameworks and tools to achieve success. The VRIO analysis framework helps project managers to determine a company's resources and capabilities' value, rarity, imitability, and organization, allowing them to identify competitive advantages and resource gaps. This approach enables project teams to focus on areas where they excel while investing additional resources to improve overall capabilities. Project managers can leverage insights gained from VRIO analysis to make informed decisions in key areas, including scope, schedule, cost, quality, resource, communications, risk, procurement, stakeholder engagement, and agile management, ultimately leading to improved project outcomes and organizational success. This research will provide a comprehensive framework for incorporating VRIO into key project management areas, addressing the lack of practical guidance on VRIO analysis in project management. With this framework, project managers can apply VRIO analysis effectively and practically, make informed decisions, and achieve project success.

Research Objectives:

The objective of this research is to provide a comprehensive approach to the VRIO analysis framework in project management, highlighting its importance and benefits in improving project outcomes. The research will focus on the practical application of VRIO in project management, exploring its impact on various aspects of project planning, execution, and monitoring.

Research Problem

The VRIO Analysis Framework in Project Management (PM) is a comprehensive approach that brings a new perspective to the field of project management. VRIO, which stands for value, rarity, imitability, and organization, provides a unique lens for evaluating the resources and capabilities of a project. This framework has never before been discussed in the context of project management, making it a novel and groundbreaking concept. By considering the value of a resource or capability, its rarity, its level of imitability, and the organization's ability to utilize it effectively, the VRIO framework provides a thorough evaluation of a project's strengths and weaknesses. The application of this framework can greatly improve project decision-making and increase the chances of success. The introduction of VRIO Analysis to the project management field has the potential to revolutionize how projects are approached and executed.

Research Questions:

1. What is the VRIO analysis framework and how does it work in project management?
2. How does the VRIO analysis framework help to identify and evaluate a company's resources and capabilities?
3. What are the key benefits and challenges of using VRIO analysis in project management?
4. How can the VRIO analysis framework be applied in practical terms in various aspects of project planning, execution, and monitoring?

Research Importance

The VRIO Analysis Framework has been widely used in the field of strategic management for evaluating a firm's resources and capabilities. However, its application in project management (PM) has been limited until now. This research is important because it fills a gap in the literature by introducing the VRIO Analysis Framework as a tool for project managers to assess the value, rarity, imitability, and organization of their project resources and capabilities.

The VRIO Analysis Framework can help project managers to identify the strengths and weaknesses of their project resources, and to develop strategies to exploit their advantages and overcome their limitations. This can lead to improved project performance, increased project value, and greater success in meeting project objectives.

Research Methods

The research methodology for this study will be based on a theoretical approach, which will involve a comprehensive review of existing literature and relevant studies on VRIO Analysis Framework in Project Management (PM). The sources of data will include academic articles, books, conference papers, and other relevant materials that have been published on the topic of VRIO Analysis in project management. These sources will be systematically searched using academic databases such as JSTOR, Google Scholar, and Project MUSE. The results will contribute to the existing body of knowledge on VRIO Analysis in Project Management (PM) and provide recommendations for future research in this area.

II. Litteratrice review

What is the meaning of VRIO Analysis?

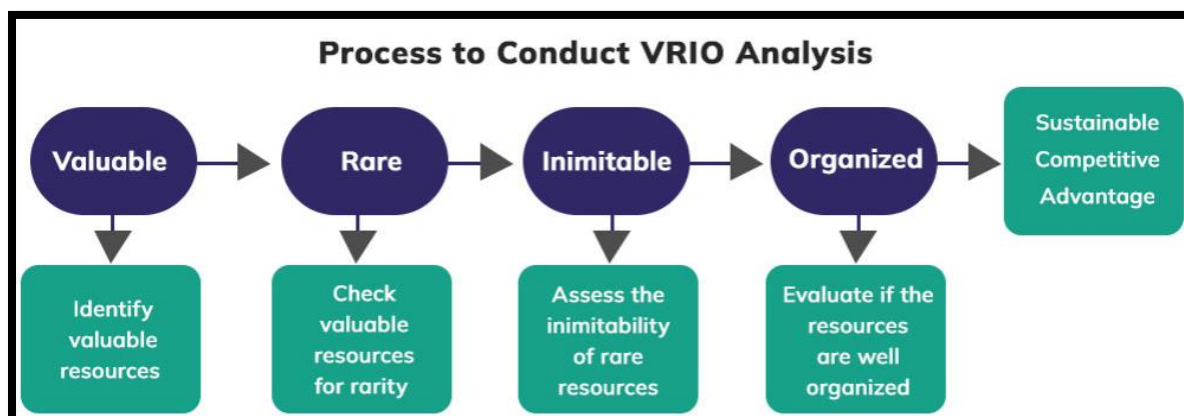
The VRIO analysis is a framework used to evaluate the internal resources and capabilities of a firm in order to determine its potential for sustained competitive advantage. The acronym VRIO stands for Value, Rarity, Imitability, and Organization, which are the key factors that determine the value of a resource or capability and its potential to provide a sustained competitive advantage (Knott, 2015a). VRIO Analysis is a framework used to assess the competitive advantage of a company's resources and capabilities. It stands for Value, Rarity, Imitability, and Organization. (Azevedo et al., 2022), (Murcia et al., 2022).

Value: The first element of VRIO Analysis is Value (Lopes et al., 2018). This refers to the extent to which a company's resources and capabilities are valuable to the company. This includes both tangible and intangible resources and capabilities. Tangible resources are physical assets such as buildings, equipment, and inventory. Intangible resources are non-physical assets such as intellectual property, brand recognition, and customer relationships. (Lin et al., 2012).

Rarity: The second element of VRIO Analysis is Rarity. This refers to the extent to which a company's resources and capabilities are rare. This means that the resources and capabilities are not widely available to other companies. This could include proprietary technology, unique processes, or specialized skills. (Murcia et al., 2022).

Imitability: The third element of VRIO Analysis is Imitability. This refers to the extent to which a company's resources and capabilities are difficult to imitate. This could include patents, trade secrets, or complex processes. (Murcia et al., 2022).

Organization: The fourth element of VRIO Analysis is Organization. This refers to the extent to which a company is able to effectively utilize its resources and capabilities. This includes the ability to coordinate activities, allocate resources, and manage operations. (Lopes et al., 2018).



Source: <https://crowjack.com/guide/vrio-analysis>

Overall, VRIO Analysis is a useful tool for assessing the competitive advantage of a company's resources and capabilities. It helps companies identify their strengths and weaknesses and develop strategies to capitalize on their strengths and address their weaknesses. (Azevedo et al., 2022).

The relationship between VRIO Analysis and Strategic Management

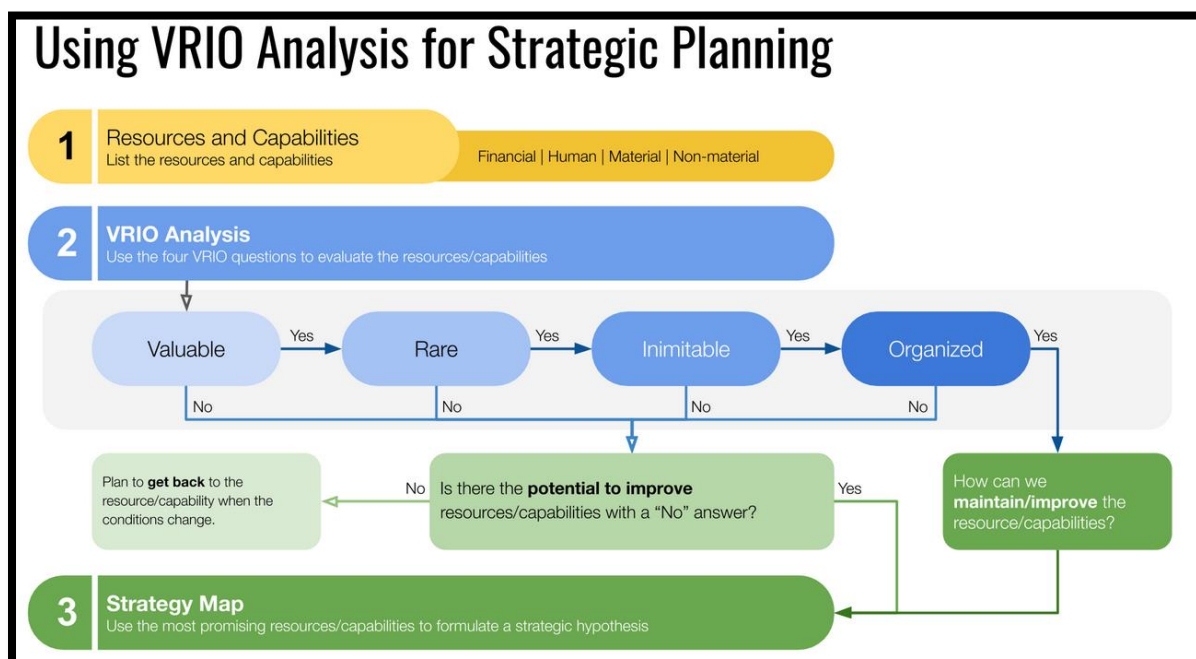
The VRIO analysis is a tool used in strategic management to evaluate the internal resources and capabilities of a firm and determine its potential for sustained competitive advantage. The acronym VRIO stands for Value, Rarity, Imitability, and Organization, which are the key factors that determine the value of a resource or capability and its potential to provide a sustained competitive advantage. (Azevedo et al., 2022). The value of a resource or capability is evaluated by examining its ability to create value for customers, increase revenue, and generate profits. Rarity refers to the uniqueness of a resource or capability, as well as its scarcity. A resource or capability is considered rare if it is not easily available to competitors and can provide a significant source of advantage. Imitability refers to the difficulty of copying or duplicating a resource or capability. If a resource or capability is not easily imitable, then it can provide a sustained advantage. Finally, the organization refers to the ability of a firm to effectively utilize and manage its resources and capabilities to achieve its strategic objectives. By evaluating the value, rarity, imitability, and organization of a firm's resources and capabilities, the VRIO analysis can help a firm determine its potential for sustained competitive advantage and inform its strategic decisions (Ul-Durar et al., 2023). Ultimately, the VRIO analysis is a crucial component of the strategic management process and provides valuable insights into a firm's internal strengths and weaknesses. Additionally, the VRIO analysis can also help a firm identify areas for improvement and the actions it needs to take in order to maximize the value of its resources and capabilities. (Azevedo et al., 2022). For example, if a resource or capability is valuable but not rare, the firm may need to invest in improving its uniqueness and rarity. If a resource or capability is rare but not easily imitable, the firm may need to invest in protecting its intellectual property or finding ways to make it more difficult for competitors to imitate. Similarly, if a resource or capability is valuable, rare, and difficult to imitate, but the organization is not effectively utilizing or managing it, the firm may need to invest in improving its organizational structure and processes. (Yan et al., 2021).

Moreover, the VRIO analysis is not limited to just one aspect of a firm's operations, but can be applied to multiple levels, including the firm as a whole, business units, and even individual products and services. This helps a firm gain a comprehensive understanding of its internal resources and capabilities, and enables it to make informed strategic decisions. For example, a firm may use the VRIO analysis to evaluate its overall competitiveness, as well as the competitiveness of each of its business units and products. The VRIO analysis fits into the three stages of the strategic management process: strategy formulation, strategy implementation, and strategy evaluation.



Source: Devid model (www.slideshare.net)

During strategy formulation, a firm can use the VRIO analysis to evaluate its internal resources and capabilities and determine its potential for sustained competitive advantage. During strategy implementation, the firm can use the VRIO analysis to guide its investments in improving the value, rarity, imitability, and organization of its resources and capabilities. Finally, during strategy evaluation, the VRIO analysis can be used to assess the effectiveness of the firm's previous strategic decisions and to identify areas for improvement. Thus, the VRIO analysis is a valuable tool throughout the entire strategic management process, from the initial evaluation of a firm's resources and capabilities to the ongoing evaluation of its strategic performance. (Chatzoglou et al., 2018).



Source: <https://bscdesigner.com/vrio-analysis.htm>

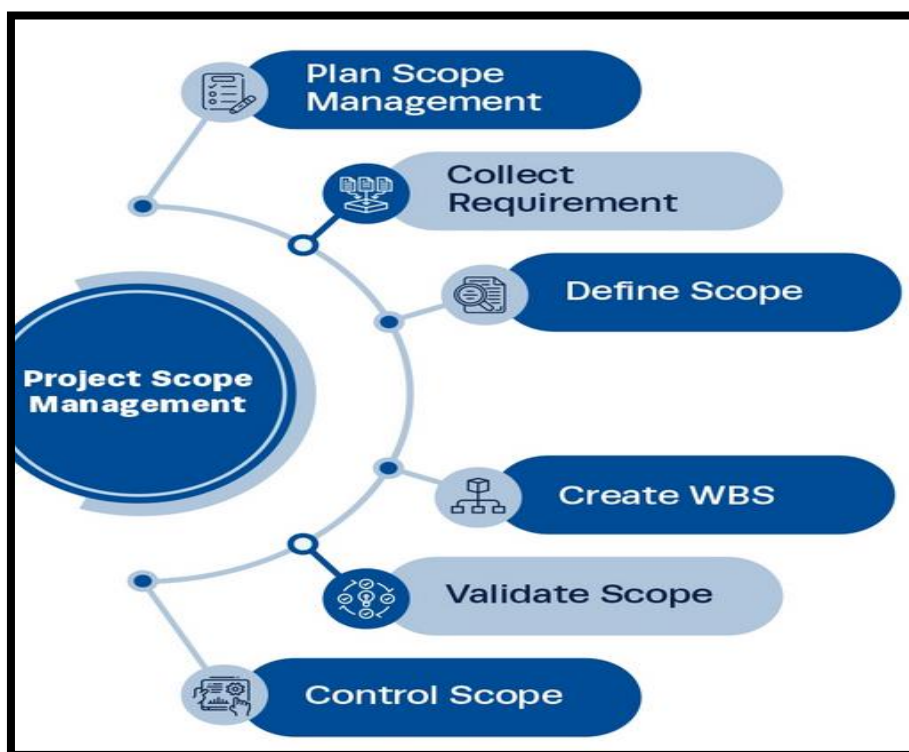
The relationship between VRIO Analysis and Project Management

VRIO analysis is an important tool for evaluating the internal resources and capabilities of a firm to determine its sustained competitive advantage. It is used to assess whether a particular resource or capability is valuable, rare, inimitable, and well-organized. The VRIO framework can be applied to individual projects within an organization to identify the key resources and capabilities required to successfully manage and deliver the project. In project management, VRIO analysis helps to determine whether the project's resources and capabilities align with the organization's overall competitive strategy. For instance, if a project requires a unique and valuable resource that is difficult to imitate, it may be an opportunity for the organization to establish a competitive

advantage. On the other hand, if a project requires a resource that is easily imitated, it may not be a good fit for the organization's competitive strategy. By using VRIO analysis, project managers can assess the strengths and weaknesses of their project's resources and capabilities, and make informed decisions about how to allocate resources, manage risks, and achieve their goals. (Jugdev et al., 2019). Furthermore, VRIO analysis can also be used to identify areas for improvement in the organization's overall project management practices, such as building up unique and valuable resources or improving the organization's ability to manage its resources effectively. In conclusion, VRIO analysis is a valuable tool for project managers as it provides a systematic approach to evaluate the resources and capabilities required to successfully manage projects and achieve sustained competitive advantage. (Wells, 2023).

The relationship between VRIO Analysis and Scope Management

VRIO analysis and scope management are two interrelated concepts in project management. VRIO analysis helps to determine the value, rarity, imitability, and organization of a project's resources and capabilities, while scope management focuses on defining and controlling the project's scope to ensure that it is completed within time, budget, and quality constraints. The Work Breakdown Structure (WBS) is a key component of scope management, as it breaks down the project into smaller, manageable tasks and helps to ensure that all project requirements are accounted for (M. M. Ajmal et al., 2021). The project scope statement, which outlines the project's goals, deliverables, and constraints, is also a critical component of scope management and can be informed by the VRIO analysis. For example, if the VRIO analysis reveals that a particular resource is valuable and rare, it may be necessary to include specific requirements in the project scope statement to ensure that this resource is effectively managed and utilized. Scope verification is another important aspect of scope management and can also benefit from VRIO analysis. By verifying that the project's scope aligns with the organization's overall competitive strategy and resources, project managers can ensure that the project is well-positioned to achieve its goals and deliver value to the organization.



Source: /www.projectmanagement.ie

Requirement's documentation is another key component of scope management, and VRIO analysis can help project managers to ensure that the requirements are consistent with the project's resources and capabilities. For example, if a project requires a unique and valuable resource that is difficult to imitate, it may be necessary to specify specific requirements in the requirements documentation to ensure that this resource is effectively utilized. (Murcia et al., 2022).

The relationship between VRIO Analysis and Quality Management

VRIO Analysis and quality management are two important concepts in business management that are often used to evaluate the performance of organizations and identify areas for improvement. (Jurevicius, 2021).

Quality assurance, which is a key aspect of quality management, involves implementing systems and procedures to prevent defects from occurring in the first place. Quality control, on the other hand, is a set of activities that ensure that products and services meet specified requirements and standards (Cassoli et al., 2022). Quality metrics, such as defect rate and customer satisfaction score, are used to measure the effectiveness of quality control efforts. Root cause analysis is a problem-solving approach that identifies the underlying cause of a problem in order to prevent it from occurring in the future. The cost of quality refers to the resources spent on preventing, detecting, and correcting defects. Scatter diagrams, also known as scatter plots, are graphical representations of data that help identify patterns and relationships between variables. Quality audits are systematic evaluations of a firm's quality management system, while quality reports summarize the results of quality control activities. Inspection, which involves examining products and services to determine if they meet specified requirements, is an important quality control technique that can be used to identify defects early in the production process. (Acquah et al., 2022).

The components of quality management and VRIO Analysis can be linked as follows:

Value: Quality management aims to provide products and services that have value to customers. VRIO Analysis assesses whether a firm's internal resources and capabilities have value, which can contribute to a firm's competitiveness and sustained success. (Wells, 2023).

Rarity: Quality management aims to provide unique and innovative products and services that stand out from competitors (Tebar Betegon et al., 2021). VRIO Analysis assesses whether a firm's internal resources and capabilities are rare and difficult for competitors to imitate, which can contribute to a firm's competitiveness and sustained success. (Kim et al., 2015).

Imitability: Quality management aims to provide products and services that are difficult for competitors to imitate. VRIO Analysis assesses whether a firm's internal resources and capabilities are difficult to imitate, which can contribute to a firm's competitiveness and sustained success. For example, a firm's strong brand reputation, which is difficult to imitate, would be considered a valuable, rare, and inimitable resource in the VRIO Analysis framework. (Tebar Betegon et al., 2021), (Jurevicius, 2021).

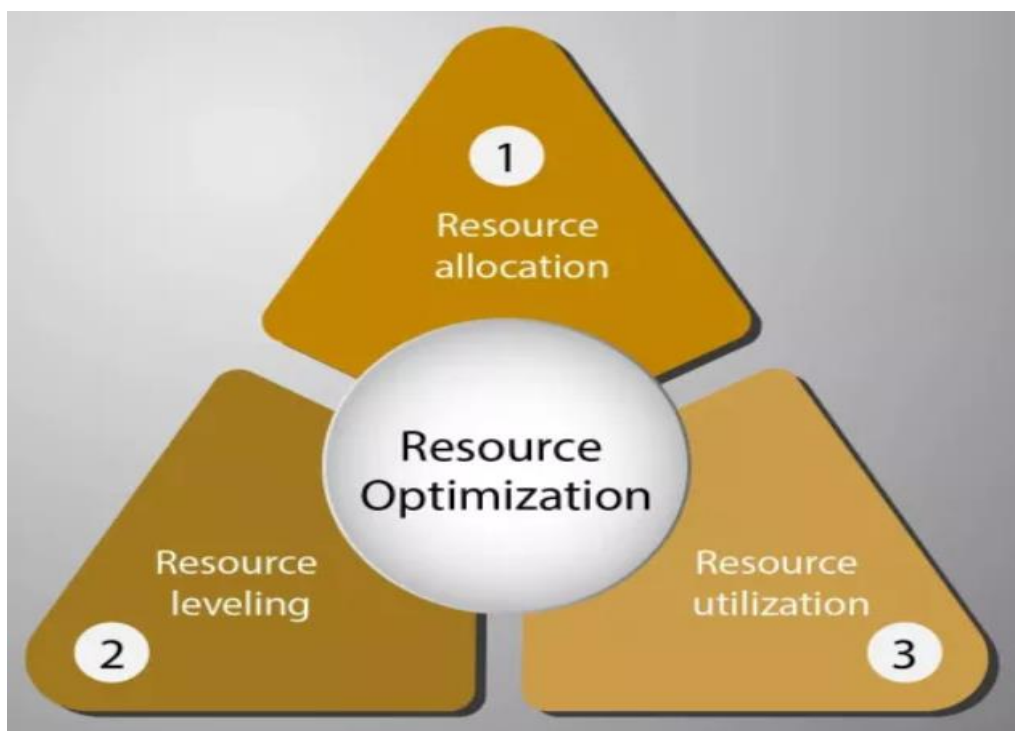
Organization: Quality management aims to have well-structured and organized processes and systems in place to ensure consistent quality of products and services. VRIO Analysis assesses whether a firm is organized in such a way that it can effectively utilize its internal resources and capabilities to achieve sustained success. For example, a firm with strong management systems in place would be considered well-organized in the VRIO Analysis framework. (Tebar Betegon et al., 2021).

The relationship between VRIO Analysis and Schedule Management

VRIO Analysis and Schedule Management are two important frameworks that can help organizations to identify their competitive advantages and optimize their project management processes. The value component of VRIO Analysis identifies whether a company's activities or resources are valuable in achieving the company's objectives. For example, a company may have a unique technology that provides a competitive advantage over its competitors. In terms of Schedule Management, the Define Activities component identifies the specific activities that need to be performed to achieve a project's objectives. By identifying these activities and ensuring they are valuable, a company can optimize its project management processes and achieve its objectives more efficiently. (Shah & Chandragade, 2022).

The imitability component of VRIO Analysis assesses the level of difficulty in replicating a company's activities or resources. For example, a company may have a highly skilled team that cannot be easily replicated. In terms of Schedule Management, the Estimate Activity Durations component identifies the amount of time required to perform each activity. By accurately estimating the time required for rare and difficult-to-replicate activities, a company can ensure that it is effectively leveraging its competitive advantage and optimizing project success. (Wang et al., 2017).

Integrating VRIO analytics into schedule management can help project managers better manage their projects and optimize resource utilization. By analyzing project objectives and assessing the resources available to the project, project managers can identify potential risks and develop strategies to optimize the use of resources. This helps ensure that projects are completed on time and within budget, and reduces the risk of unexpected delays or cost overruns. In addition, resource leveling can be used to identify conflicts between tasks and resources and prioritize tasks to ensure that the most important tasks are completed first. By understanding the specific risks associated with each project and using resource balancing, project managers can better plan for contingencies and take proactive steps to mitigate potential risks.



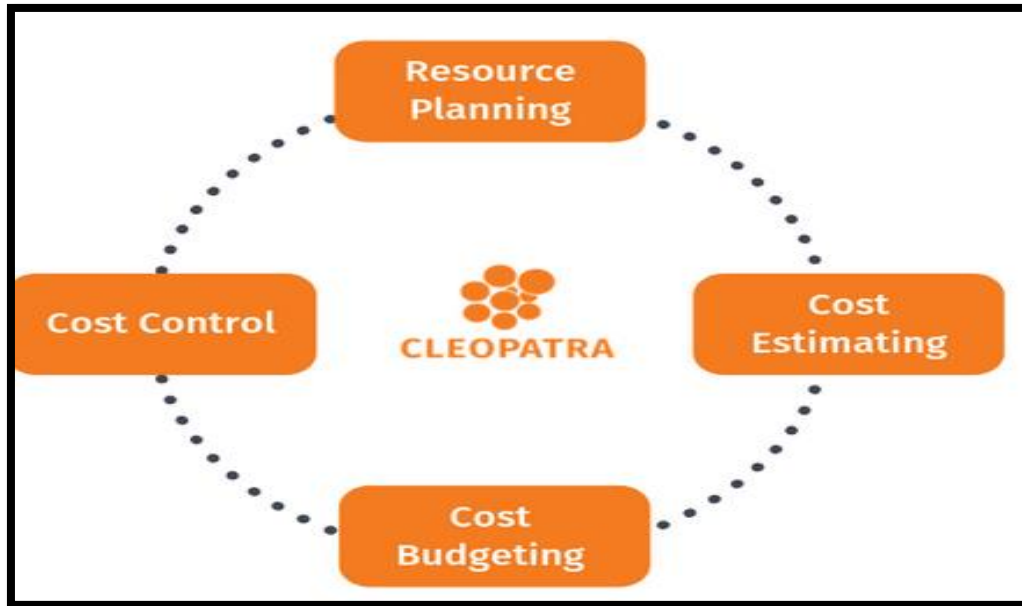
Source: www.sprintzeal.com

The relationship between VRIO Analysis and Cost Management

VRIO Analysis and Cost Management plan components are two important tools for businesses to optimize their operations and achieve a competitive advantage. In terms of value, the VRIO Analysis identifies the resources and capabilities that provide the most value to the organization (Ariyani et al., 2018). This could include things like proprietary technology, brand reputation, or a talented workforce. These valuable resources can be leveraged to create a cost management plan that focuses on controlling costs related to their development and maintenance. For example, a company with a valuable proprietary technology may choose to invest in research and development to continually improve the technology, while simultaneously managing the costs associated with development, testing, and implementation. (Ding et al., 2022).

Rarity is another important aspect of the VRIO Analysis, as it highlights resources or capabilities that are unique to the organization and difficult for competitors to imitate. This can provide a strong competitive advantage, but it also requires careful cost management. For instance, a company with a rare and valuable resource may need to invest more heavily in securing and protecting that resource to prevent competitors from gaining access to it. This could mean investing in security measures, intellectual property protection, or even legal services to defend against infringement. (Qiu & Xiao, 2020).

Imitability is another important factor in the VRIO Analysis, as it identifies the resources and capabilities that competitors can easily copy or imitate. These resources can still provide value, but they require careful cost management to remain competitive. For example, a company with a valuable but easily imitated capability may need to invest in training and development to continually improve and innovate that capability, while also managing costs related to training, equipment, and other necessary resources. (Qiu & Xiao, 2020), (Manu et al., 2021).



Source: (Cost Management for Project Managers Enterprises, n.d.)

Finally, organization is the last component of the VRIO Analysis, and it refers to the way in which resources and capabilities are managed and coordinated within the organization. Effective organization is critical for ensuring that resources and capabilities are leveraged to their full potential and that cost management is optimized. For instance, a company with a well-organized workforce may be able to achieve greater efficiency and productivity, which can help to control costs related to labor and production. (Qiu & Xiao, 2020). (Ariyani et al., 2018).

When it comes to the Cost Management plan components, there are several key strategies that can be used to support the VRIO Analysis. Control thresholds can be established to identify when costs are exceeding budgeted amounts, allowing for prompt corrective action to be taken. Estimate costs can help to ensure that budgets are accurate and realistic, while Determine budget can establish a clear framework for allocating resources and managing costs. Finally, Earned Value Management can provide a comprehensive system for measuring and reporting project progress and cost performance, which can help to ensure that cost management is aligned with the goals and objectives of the organization.(Liu & Cao, 2021).(Qiu & Xiao, 2020).

In conclusion, the VRIO Analysis and Cost Management plan components are closely linked and can be used together to optimize resource utilization, reduce costs, and achieve competitive advantage. By understanding the value, rarity, imitability, and organization of resources and capabilities, businesses can develop effective cost management plans that align with their strategic goals and objectives.(Ariyani et al., 2018).

The relationship between VRIO Analysis and Communications Management

VRIO Analysis and Communications Management Plan are two important frameworks that can help organizations to effectively manage their resources and communicate with stakeholders. The value of a resource or capability in VRIO Analysis corresponds to the stakeholder communication requirements in Communications Management Plan. (Galli, 2020).Stakeholder communication requirements refer to the specific needs and expectations of stakeholders with respect to communication. For example, in a project to develop a new product, the marketing department may need regular updates on the project's progress, while investors may need detailed financial reports. (Zulch, 2014),(Subramaniam et al., 2022).

The VRIO Analysis (rarity) can be used to identify the communication requirements of stakeholders in a communications management plan. By assessing the rarity of a firm's resources, a business can determine which stakeholders will be most likely to benefit from these resources, and also identify what type of communication will be most effective in engaging them. For example, if a firm has access to rare resources such as specialized or proprietary information, or unique products or services, then it may be best to focus its communication efforts on those stakeholders who are most likely to be interested in or benefit from these resources. Additionally, the communications should be tailored to the rarity of the resources in order to ensure that the stakeholders understand and appreciate the value of these resources. By using the VRIO Analysis to identify the communication requirements of stakeholders, businesses can ensure that their communication efforts are effective and that their resources are used in the most efficient way possible. (van Ruler, 2021),(Galli, 2020).

The imitability of a resource or capability in VRIO Analysis corresponds to the Communication Flowchart in Communications Management Plan. The Communication Flowchart is a visual representation of how communication will flow within the organization, including who is responsible for what communication, when communication will occur, and how it will be delivered. For example, if a competitor could easily imitate the project's marketing strategy, the Communication Flowchart may show that marketing communications will be closely monitored and adjusted as needed to stay ahead of the competition. (Van Ruler, 2021),(Galli, 2020),(Wells, 2023).

Finally, the organization of a resource or capability in VRIO Analysis corresponds to the overall effectiveness of the Communications Management Plan. If the organization has a strong communication culture and clear communication processes, it is more likely to effectively communicate with stakeholders and achieve project goals. For example, if the project team is well-organized and has a clear understanding of their roles and responsibilities, they are more likely to communicate effectively with each other and with stakeholders. (Subramaniam et al., 2022),(Jurevicius, 2021).

In summary, VRIO Analysis and Communications Management Plan are complementary frameworks that can help organizations effectively manage resources and communicate with stakeholders. By evaluating resources and capabilities in terms of their value, rarity, imitability, and organization, and developing a robust Communications Management Plan that addresses stakeholder communication requirements, communication matrix, and communication flowchart, organizations can increase their chances of success and achieve their project goals. (Subramaniam et al., 2022).

The relationship between VRIO Analysis and Procurement Management

Procurement management is the methodology of sourcing and receiving goods and services from external suppliers. It involves supplier selection, negotiation, contracting, and ongoing supplier relationship management. Effective procurement management can help a company secure its resources at the best possible price and quality. (Ebekozen et al., 2022).

Procurement management is typically divided into three main processes: project procurement management, conduct procurements, and control procurements. Here is a brief explanation of each process:



Source: www.edureka.co

Project Procurement Management: This process involves identifying and documenting the procurement requirements for a particular project. It includes defining the scope of work, identifying potential suppliers, developing a procurement plan, and establishing selection criteria. (Manu et al., 2021),(Changalima et al., 2022).

Conduct Procurements: This process involves obtaining seller responses, selecting a seller, and awarding a contract. It includes activities such as issuing requests for proposals (RFPs), evaluating proposals, negotiating contracts, and selecting a supplier.(Buzetto et al., n.d.).

Control Procurements: This process involves managing the procurement relationships and monitoring supplier performance throughout the project. It includes activities such as monitoring supplier progress, managing contract changes, and resolving any procurement-related issues that may arise. (Yeow & Edler, 2012).

By breaking down procurement management into these three processes, organizations can more effectively manage their procurement activities and ensure that they are acquiring the necessary goods and services in a timely and cost-effective manner. Additionally, by implementing a systematic approach to procurement management, organizations can reduce the risk of procurement-related issues, such as delays, cost overruns, and quality problems. (Hong et al., 2018).

The VRIO analysis can be linked to various components of the procurement management plan, as it helps to identify and evaluate the resources and capabilities of the organization. For instance, the value component of

VRIO analysis can be linked to the procurement statement of work and business documents (Wei et al., 2021). This is because these documents define the requirements and specifications for the procurement, and they can add value to the organization if they are well-defined and aligned with the organization's goals. The rarity component of VRIO analysis can be linked to the type of agreement, and source selection, as unique or rare procurement opportunities may require a different approach to sourcing and contract management. The imitability component of VRIO analysis can be linked to the types of contracts, such as firm fixed price or cost-reimbursable agreements, as these determine the level of risk and control the organization can exercise over the procurement. Finally, the organization component of VRIO analysis can be linked to the procurement strategy and control procurements, as these define the processes and structures the organization will use to manage the procurement and ensure that it delivers the desired value. All in all, VRIO Analysis and procurement management go hand in hand. By using the VRIO framework, businesses can better understand the goods or services they are looking to acquire, as well as assess the potential value and impact they would have on their organization. This allows businesses to make more informed decisions, which allows them to obtain the best possible goods and services for their company at the most cost-effective rate. (Wei et al., 2021).

The relationship between VRIO Analysis and Risk Management

Risk management is an essential process in project management that involves identifying, assessing, and controlling potential risks that could impact a project's success. The risk management plan outlines how the project team will identify, assess, and manage potential risks. The following are the six processes involved in developing a risk management plan: (Jia & Bradbury, 2020), (Mthiyane et al., 2022).

1. **Risk Management Planning:** This process involves defining the approach, roles, and responsibilities for risk management, as well as establishing the criteria for evaluating and prioritizing risks. It also includes developing the risk management plan document, which outlines the risk management approach for the project.
2. **Risk Identification:** This process involves identifying potential risks that could impact the project, including internal and external factors that could affect the project's success. This process also includes defining the risk categories and the risk breakdown structure for the project. (Lopes et al., 2018).
3. **Risk Assessment:** This process involves evaluating the identified risks and assessing their potential impact on the project. The project team assesses the likelihood of each risk occurring, as well as the potential impact if the risk does occur.
4. **Risk Quantification:** This process involves assigning a value or score to each identified risk based on its likelihood and potential impact. The project team then prioritizes the risks based on their scores, which helps to determine which risks should be addressed first. (Aven, 2016).
5. **Risk Response Planning:** This process involves developing strategies to address the identified risks, including contingency plans, risk mitigation plans, and risk avoidance plans. The project team develops these plans to minimize the potential impact of the identified risks on the project. (Mthiyane et al., 2022).
6. **Risk Monitoring and Control:** This process involves continuously monitoring the identified risks and their associated plans to ensure they remain effective and relevant. The project team tracks the progress of the risk management plan and adjusts it as necessary to address any new risks that may arise. (Mthiyane et al., 2022), (Aven, 2016).

By following these six processes, project teams can effectively manage potential risks and increase the likelihood of project success. The risk management plan is a living document that should be updated and refined throughout the project lifecycle to ensure it remains relevant and effective in addressing potential risks. (Ferdosi et al., 2020).



Source: <https://rolandwanner.com/project-risk-management>

The VRIO analysis is useful for identifying and evaluating the resources and capabilities of an organization, and this can be linked to various components of a risk management plan the value component of VRIO Analysis can be linked to the Identify Risks component of the Risk Management plan, as risks that can impact the value of the organization and its capabilities should be identified and assessed. For example, if a company's primary value proposition is its customer service, a risk to that value might be a sudden increase in customer complaints due to a change in service policies. The rarity component of VRIO Analysis can be linked to the Risk Register component of the Risk Management plan, as rare or unique risks may require special handling and monitoring. For example, a company that operates in a highly regulated industry might face the risk of sudden changes in regulations, which would require close monitoring and quick response. The imitability component of VRIO Analysis can be linked to the Qualitative and Quantitative Risk Analysis components of the Risk Management plan, as the organization's ability to imitate or replicate its resources and capabilities can impact the level of risk associated with various factors. For example, a company that relies heavily on its intellectual property might face the risk of its competitors developing similar technology, which would impact the value of its resources. The organization component of VRIO Analysis can be linked to the Risk Response and Monitor Risk components of the Risk Management plan, as the organization's processes and structures will impact its ability to respond to risks and monitor them over time. For example, a company with a decentralized decision-making structure might face the risk of inconsistent risk responses across different departments or business units, which would require a coordinated monitoring and reporting process. (Ferdosi et al., 2020), (Murcia et al., 2022).

The relationship between VRIO Analysis and stakeholders' engagement

There is a clear link between the VRIO Analysis and the components of a risk stakeholders' engagement plan. For example, the value component of the VRIO Analysis can be linked to Stakeholder Analysis, as the analysis aims to identify stakeholders who can impact the value of an organization's resources and capabilities. By conducting a thorough stakeholder analysis, the organization can identify key stakeholders who may have a significant impact on the value of its resources and capabilities. (Cost Control | PMI, n.d.).

The rarity component of the VRIO Analysis can be linked to the Stakeholder Register component of the Stakeholder Engagement Plan. This is because rare or unique stakeholders may require special handling and monitoring. For example, a high-profile stakeholder such as a major shareholder may require more frequent and

personalized communication. By including these stakeholders in the Stakeholder Register, the organization can better manage their needs and expectations. The imitability component of the VRIO Analysis can be linked to the Stakeholder Engagement Matrix, as an organization's ability to imitate or replicate its resources and capabilities can impact the level of stakeholder engagement required. For example, if a company has a unique technology that sets it apart from its competitors, it may require more engagement with stakeholders to protect its intellectual property. By creating a Stakeholder Engagement Matrix that takes into account the imitability of its resources and capabilities, the organization can better tailor its engagement strategies. The organization component of the VRIO Analysis can be linked to the Power/Interest Grid, as it helps to identify the most important stakeholders based on their power and interest in the organization. For example, stakeholders with high power and high interest, such as regulatory bodies, may require more attention and engagement compared to stakeholders with low power and low interest. By using the Power/Interest Grid, the organization can better prioritize its stakeholder engagement efforts. (Bezerra et al., 2023).

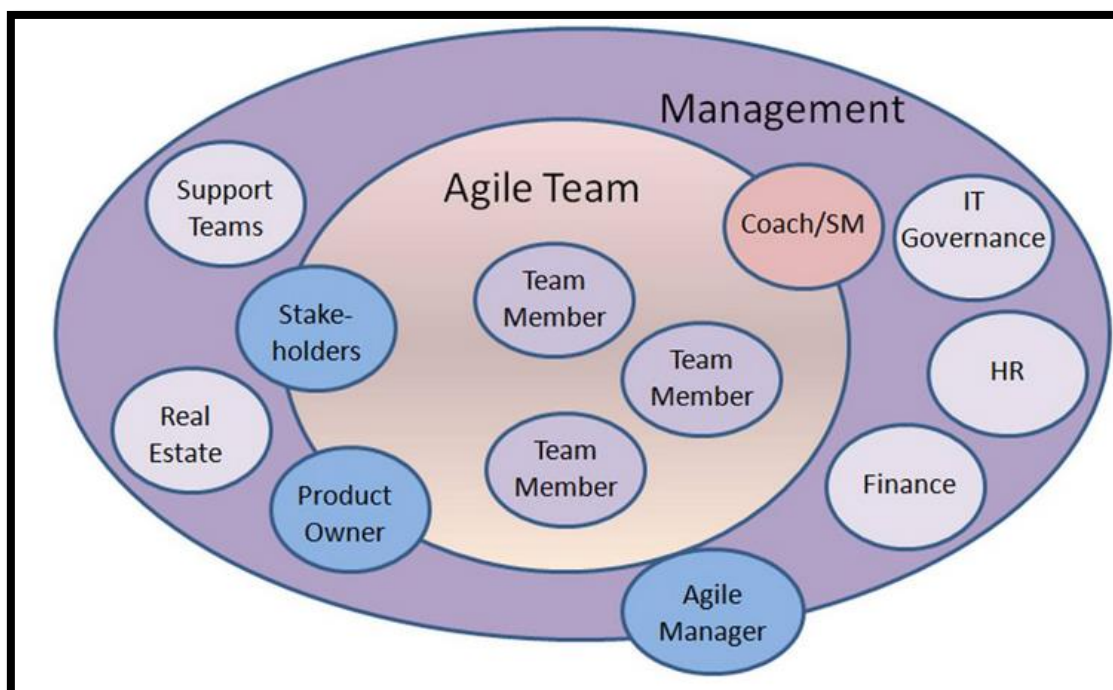


Source: www.solitaireconsulting.com

Overall, the VRIO Analysis and the risk stakeholders' engagement plan components are interconnected and can help organizations develop a more effective risk management and stakeholder engagement strategy. By linking the two, organizations can better understand their resources and capabilities, the risks associated with them, and the stakeholders who can impact them. This can help them to develop more targeted and effective engagement strategies to manage risks and protect their competitive advantage. (Morehouse & Saffer, 2023).

The relationship between VRIO Analysis and Agile Management

VRIO analysis and Agile management are two key frameworks that can help organizations succeed in today's competitive and rapidly changing business environment. VRIO analysis is a tool that helps companies determine whether they have a competitive advantage in the market by evaluating the value, rarity, imitability, and organization of their resources and capabilities. On the other hand, Agile management is an iterative and flexible approach to project management that enables teams to adapt to changing circumstances and deliver value quickly (Sarhadi et al., 2022). The link between VRIO analysis and Agile management lies in their focus on value creation and delivery. By conducting a VRIO analysis, companies can identify their key strengths and weaknesses and focus their resources on the areas where they can create the most value. Meanwhile, Agile management helps teams to deliver value quickly by breaking down complex projects into smaller, manageable chunks and iterating on them based on customer feedback. (Denning, 2016).



Source: <https://resources.scrumalliance.org/Article/managers-role-agile>

For example, a software company may conduct a VRIO analysis and identify that their proprietary technology is both valuable and rare in the market. They can then use Agile management to quickly develop and launch new features that leverage this technology, while continuously gathering feedback from customers to improve their product. This approach allows the company to stay ahead of competitors who may try to imitate their technology and build a loyal customer base by consistently delivering value. (Marnada et al., 2022).

The comprehensive framework in incorporating the VRIO Analysis in project management

Incorporating VRIO analysis into project management can significantly improve the effectiveness of key project management areas such as scope, schedule, cost, quality, resource, communications, risk, procurement, stakeholder engagement, and agile management. By utilizing a VRIO analysis, project managers can identify and address potential problems before they arise, optimize the use of resources, and identify opportunities to improve the project's success. This framework outlines the steps necessary to integrate VRIO analysis into each of these areas: first, identify the objectives of the project and analyze the project environment; then, assess the resources available to the project, their value, and the risks associated with them; and finally, develop strategies to optimize the use of resources. By applying this framework to each area of project management, project managers will be better equipped to make informed decisions and ensure the successful completion of their projects. The following is a comprehensive framework that outlines how to integrate VRIO analysis into each of these areas:

1. **Scope Management:** Conduct a VRIO analysis to identify the resources and capabilities required to meet project objectives. Use this analysis to refine the project scope and ensure that the project is feasible given the available resources. (M. Ajmal et al., 2019)
2. **Schedule Management:** Use the VRIO analysis to identify critical resources required to meet project milestones. Ensure that these resources are available in a timely manner to prevent delays and maintain the project schedule. (Shah & Chandragade, 2022),
3. **Cost Management:** Evaluate the value and rarity of resources and capabilities required for the project to determine the cost of acquisition. Consider the imitability and organization factors when estimating the cost of maintaining these resources to ensure that the project remains within budget. (Acquah et al., 2022).
4. **Quality Management:** Identify the resources and capabilities required to maintain high-quality standards. Conduct a VRIO analysis to ensure that the identified resources are rare, valuable, and difficult to imitate. Develop quality metrics to monitor the effectiveness of the identified resources and capabilities. (Tebar Betegon et al., 2021).
5. **Resource Management:** Use the VRIO analysis to identify the critical resources required to complete the project. Develop a plan to acquire and allocate resources based on the analysis, taking into account the imitability and organization factors to ensure effective resource management. (Knott, 2015b).

6. Communications Management: Leverage the VRIO analysis to identify key resources and capabilities required for effective communication. Develop a communication plan that incorporates the identified resources and capabilities to ensure that communication is clear, timely, and effective. (Zulch, 2014),(Subramaniam et al., 2022)
 7. Risk Management: Evaluate the impact of identified risks on critical resources and capabilities required for the project. Use the VRIO analysis to identify and prioritize risks based on the rarity and value of resources and capabilities. Develop a risk mitigation plan that leverages the identified resources and capabilities to reduce the impact of risks. (Mthiyane et al., 2022), (Aven, 2016).
 8. Procurement Management: Conduct a VRIO analysis to identify critical resources and capabilities required for procurement. Develop a procurement plan that ensures the availability of these resources and capabilities in a timely and cost-effective manner. (Manu et al., 2021),(Changalima et al., 2022).
 9. Stakeholder Engagement: Use the VRIO analysis to identify key resources and capabilities required for effective stakeholder engagement. Develop a stakeholder engagement plan that leverages the identified resources and capabilities to ensure that stakeholders are engaged and informed throughout the project lifecycle. (Zulch, 2014),(Subramaniam et al., 2022).
 10. Agile Management: Use the VRIO analysis to identify critical resources and capabilities required for agile management. Develop an agile management plan that leverages the identified resources and capabilities to ensure that the project is delivered with speed, flexibility, and adaptability. (Sarhadi et al., 2022).
- In conclusion, incorporating the VRIO analysis into project management can enhance project success by ensuring that key resources and capabilities are identified, acquired, and allocated effectively. The framework outlined above provides a comprehensive approach to incorporating the VRIO analysis into key project management areas, thereby enhancing project effectiveness and delivering value to stakeholders.(Wells, 2023).

III. Conclusion

The VRIO analysis framework in project management is an important tool that can improve project outcomes. This research aimed to address the lack of comprehensive literature and practical guidance on the application of VRIO in project management by providing a comprehensive approach to the framework. By focusing on key resources and capabilities, project managers can create a competitive advantage and ensure that the project is feasible given the available resources. This research has highlighted the importance and benefits of incorporating the VRIO analysis framework into project management, exploring its impact on various aspects of project planning, execution, and monitoring. The practical application of VRIO in project management can lead to project success, increased efficiency, and improved outcomes. Overall, this research has provided a valuable contribution to the field of project management by providing a comprehensive approach to the VRIO analysis framework.

References

- [1]. Acquah, I. S. K., Quaicoo, J., & Arhin, M. (2022). How to invest in total quality management practices for enhanced operational performance: Findings from PLS-SEM and fsQCA. *The TQM Journal*, ahead-of-print(ahead-of-print). <https://doi.org/10.1108/TQM-05-2022-0161>
- [2]. Ajmal, M., Khan, M., & Al-Yafei, H. (2019). Exploring factors behind project scope creep – stakeholders’ perspective. *International Journal of Managing Projects in Business*, 13(3), 483–504. <https://doi.org/10.1108/IJMPB-10-2018-0228>
- [3]. Ajmal, M. M., Khan, M., Gunasekaran, A., & Helo, P. T. (2021). Managing project scope creep in construction industry. *Engineering, Construction and Architectural Management*, 29(7), 2786–2809. <https://doi.org/10.1108/ECAM-07-2020-0568>
- [4]. Ariyani, W., Daryanto, A., & Sahara. (2018). Operationalization of Internal Analysis Using the VRIO Framework: Development of Scale for Resource and Capabilities Organization (Case Study: XYZ Company Animal Feed Business Unit). *Asian Business Research Journal*, 3(1), 9–14.
- [5]. Aven, T. (2016). Risk assessment and risk management: Review of recent advances on their foundation. *European Journal of Operational Research*, 253(1), 1–13. <https://doi.org/10.1016/j.ejor.2015.12.023>
- [6]. Azevedo, A., Jugdev, K., & Mathur, G. (2022). The impact of organizational support for the project management process on project and firm performance. *International Journal of Managing Projects in Business*, 15(7), 1013–1031. <https://doi.org/10.1108/IJMPB-05-2022-0114>
- [7]. Bezerra, M. O., Vollmer, D., Souter, N. J., Shaad, K., Hauck, S., Marques, M. C., Mtshali, S., Acero, N., Zhang, Y., & Mendoza, E. (2023). Stakeholder engagement and knowledge co-production for better watershed management with the Freshwater Health Index. *Current Research in Environmental Sustainability*, 5, 100206. <https://doi.org/10.1016/j.crsust.2022.100206>
- [8]. Buzzetto, R. R., Bauli, M. R., & Carvalho, M. M. de. (n.d.). The key aspects of procurement in project management: Investigating the effects of selection criteria, supplier integration and dynamics of acquisitions. *Production*, 30. Retrieved February 17, 2023, from <https://www.redalyc.org/journal/3967/396762077002/html/>
- [9]. Cassoli, B. B., Jourdan, N., Nguyen, P. H., Sen, S., Garcia-Ceja, E., & Metternich, J. (2022). Frameworks for data-driven quality management in cyber-physical systems for manufacturing: A systematic review. *Procedia CIRP*, 112, 567–572. <https://doi.org/10.1016/j.procir.2022.09.062>
- [10]. Changalima, I. A., Ismail, I. J., & Mwiseje, S. S. (2022). Obtaining the best value for money through procurement planning: Can procurement regulatory compliance intervene? *Journal of Money and Business*, 2(2), 133–148. <https://doi.org/10.1108/JMB-11-2021-0056>

- [11]. Chatzoglou, P., Chatzoudes, D., Sarigiannidis, L., & Theriou, G. (2018). The role of firm-specific factors in the strategy-performance relationship: Revisiting the resource-based view of the firm and the VRIO framework. *Management Research Review*, 41(1), 46–73. <https://doi.org/10.1108/MRR-10-2016-0243>
- [12]. Cost Control | PMI. (n.d.). Retrieved February 16, 2023, from <https://www.pmi.org/learning/featured-topics/cost-management>
- [13]. Cost management for project managers enterprises. (n.d.). Retrieved February 16, 2023, from <https://www.pmi.org/learning/library/cost-management-project-managers-enterprises-7722>
- [14]. Denning, S. (2016). How to make the whole organization “Agile.” *Strategy & Leadership*, 44(4), 10–17. <https://doi.org/10.1108/SL-06-2016-0043>
- [15]. Ding, Y., Chen, K., Wei, X., & Yang, Y. (2022). A novel cost-management system for container terminals using a time-driven Activity-Based Costing approach. *Ocean & Coastal Management*, 217, 106011. <https://doi.org/10.1016/j.ocecoaman.2021.106011>
- [16]. Ebekozien, A., Samsurijan, M. S., Aigbavboa, C., Awe, E. O., Amadi, G. C., & Emuchay, F. E. (2022). Unravelling the encumbrances in procurement management of Nigeria’s infrastructure development: Pitfalls and prospects of projects. *Property Management*, 41(1), 20–40. <https://doi.org/10.1108/PM-11-2021-0103>
- [17]. Ferdosi, M., Rezayatmand, R., & Molavi Taleghani, Y. (2020). Risk Management in Executive Levels of Healthcare Organizations: Insights from a Scoping Review (2018). *Risk Management and Healthcare Policy*, 13, 215–243. <https://doi.org/10.2147/RMHP.S231712>
- [18]. Galli, B. J. (2020). Effective Strategies for Communication Management in a Project Management Environment. *International Journal of Applied Logistics*, 10(2), 86–92. <https://doi.org/10.4018/IJAL.2020070105>
- [19]. Hong, Z., Lee, C. K. M., & Zhang, L. (2018). Procurement risk management under uncertainty: A review. *Industrial Management & Data Systems*, 118(7), 1547–1574. <https://doi.org/10.1108/IMDS-10-2017-0469>
- [20]. Jia, J., & Bradbury, M. E. (2020). Complying with best practice risk management committee guidance and performance. *Journal of Contemporary Accounting & Economics*, 16(3), 100225. <https://doi.org/10.1016/j.jcae.2020.100225>
- [21]. Jugdev, K., Mathur, G., & Fung, T. (2019). Mediated effect of project management asset characteristics on firm performance. *International Journal of Managing Projects in Business*, 13(7), 1442–1464. <https://doi.org/10.1108/IJMPB-12-2018-0284>
- [22]. Jurevicius, O. (2021, October 7). VRIO Framework Explained—SM Insight. *Strategic Management Insight*. <https://strategicmanagementinsight.com/tools/vrio/>
- [23]. Kim, S.-C., Lee, J., & Shin, K. (2015). The impact of project management assets on the VRIO characteristics of PM process for competitive advantage. *International Journal of Productivity and Quality Management*, 15, 153. <https://doi.org/10.1504/IJPMQ.2015.067760>
- [24]. Knott, P. J. (2015a). Does VRIO help managers evaluate a firm’s resources? *Management Decision*, 53(8), 1806–1822. <https://doi.org/10.1108/MD-08-2014-0525>
- [25]. Knott, P. J. (2015b). Does VRIO help managers evaluate a firm’s resources? *Management Decision*, 53(8), 1806–1822. <https://doi.org/10.1108/MD-08-2014-0525>
- [26]. Lin, C., Tsai, H., Wu, Y., & Kiang, M. (2012). A fuzzy quantitative VRIO-based framework for evaluating organizational activities. *Management Decision*, 50(8), 1396–1411. <https://doi.org/10.1108/00251741211261999>
- [27]. Liu, Q., & Cao, J. (2021). Application Research on Engineering Cost Management Based on BIM. *Procedia Computer Science*, 183, 720–723. <https://doi.org/10.1016/j.procs.2021.02.120>
- [28]. Lopes, J., Farinha, L., Ferreira, J. J., & Silveira, P. (2018). Does regional VRIO model help policy-makers to assess the resources of a region? A stakeholder perception approach. *Land Use Policy*, 79, 659–670. <https://doi.org/10.1016/j.landusepol.2018.07.040>
- [29]. Manu, P., Asiedu, R. O., Mahamadu, A.-M., Olomolaiye, P. O., Booth, C., Manu, E., Ajayi, S., & Agyekum, K. (2021). Contribution of procurement capacity of public agencies to attainment of procurement objectives in infrastructure procurement. *Engineering, Construction and Architectural Management*, 28(10), 3322–3345. <https://doi.org/10.1108/ECAM-05-2020-0375>
- [30]. Marnada, P., Raharjo, T., Hardian, B., & Prasetyo, A. (2022). Agile project management challenge in handling scope and change: A systematic literature review. *Procedia Computer Science*, 197, 290–300. <https://doi.org/10.1016/j.procs.2021.12.143>
- [31]. Morehouse, J., & Saffer, A. J. (2023). Putting stakeholders’ engagement in the equation: Proposing the integrated network engagement model. *Public Relations Review*, 49(1), 102291. <https://doi.org/10.1016/j.pubrev.2023.102291>
- [32]. Mthiyane, Z. Z. F., van der Poll, H. M., & Tshela, M. F. (2022). A Framework for Risk Management in Small Medium Enterprises in Developing Countries. *Risks*, 10(9), Article 9. <https://doi.org/10.3390/risks10090173>
- [33]. Murcia, N. N. S., Ferreira, F. A. F., & Ferreira, J. J. M. (2022). Enhancing strategic management using a “quantified VRIO”: Adding value with the MCDA approach. *Technological Forecasting and Social Change*, 174, 121251. <https://doi.org/10.1016/j.techfore.2021.121251>
- [34]. Qiu, Y. L., & Xiao, G. F. (2020). Research on Cost Management Optimization of Financial Sharing Center Based on RPA. *Procedia Computer Science*, 166, 115–119. <https://doi.org/10.1016/j.procs.2020.02.031>
- [35]. Sarhadi, P., Naeem, W., Fraser, K., & Wilson, D. (2022). On the Application of Agile Project Management Techniques, V-Model and Recent Software Tools in Postgraduate Theses Supervision. *IFAC-PapersOnLine*, 55(17), 109–114. <https://doi.org/10.1016/j.ifacol.2022.09.233>
- [36]. Shah, P., & Chandragade, A. A. (2022). Application of project management tool in construction for Planning, Scheduling and Optimization. *Materials Today: Proceedings*. <https://doi.org/10.1016/j.matpr.2022.11.446>
- [37]. Subramaniam, C., Ismail, S., Rani, W. N. M. W. M., & Mahdiyar, A. (2022). Improving Project Communications Management Practices in the Construction Sector during the COVID-19 Pandemic: A Malaysian Scenario. *Buildings*, 12(9), Article 9. <https://doi.org/10.3390/buildings12091291>
- [38]. Tebar Betegon, M. A., Baladrón González, V., Bejarano Ramírez, N., Martínez Arce, A., Rodríguez De Guzmán, J., & Redondo Calvo, F. J. (2021). Quality Management System Implementation Based on Lean Principles and ISO 9001:2015 Standard in an Advanced Simulation Centre. *Clinical Simulation in Nursing*, 51, 28–37. <https://doi.org/10.1016/j.ecns.2020.11.002>
- [39]. Ul-Durar, S., Awan, U., Varma, A., Memon, S., & Mention, A.-L. (2023). Integrating knowledge management and orientation dynamics for organization transition from eco-innovation to circular economy. *Journal of Knowledge Management*, ahead-of-print(ahead-of-print). <https://doi.org/10.1108/JKM-05-2022-0424>
- [40]. van Ruler, B. (2021). Communication Planning: Agility is a Game Changer in Strategy Development. *International Journal of Strategic Communication*, 15(2), 113–125. <https://doi.org/10.1080/1553118X.2021.1898117>
- [41]. Wang, C., Li, B., Li, B., & Baldwin, A. (2017). Case study of “project controlling” on a large HOPSCA project in China. *Engineering, Construction and Architectural Management*, 24(6), 862–874. <https://doi.org/10.1108/ECAM-07-2015-0118>
- [42]. Wei, X., Prybutok, V., & Sauser, B. (2021). Review of supply chain management within project management. *Project Leadership and Society*, 2, 100013. <https://doi.org/10.1016/j.plas.2021.100013>

- [43]. Wells, M. (2023, February 2). Analysis Project Management as Examined Through the VRIO Lens—Concepts and Methodologies. Grist Project Management. <https://www.gristprojectmanagement.us/concepts-methodologies/analysis-project-management-as-examined-through-the-vrio-lens.html>
- [44]. Yan, M.-R., Hong, L.-Y., & Warren, K. (2021). Integrated knowledge visualization and the enterprise digital twin system for supporting strategic management decision. *Management Decision*, 60(4), 1095–1115. <https://doi.org/10.1108/MD-02-2021-0182>
- [45]. Yeow, J., & Edler, J. (2012). Innovation procurement as projects. *Journal of Public Procurement*, 12(4), 472–504. <https://doi.org/10.1108/JOPP-12-04-2012-B002>
- [46]. Zulch, B. (2014). Communication: The Foundation of Project Management. *Procedia Technology*, 16, 1000–1009. <https://doi.org/10.1016/j.protcy.2014.10.054>.

Eng. Waleed Akhtar M Sultan. “VRIO Analysis Framework in Project Management (PM) Comprehensive Approach.” *International Journal of Business and Management Invention (IJBMI)*, vol. 12(4), 2023, pp. 49-64. Journal DOI- 10.35629/8028