

**The VRIO Framework of Competitive Advantage:**  
**Preliminary Research Implications for Organizational Innovations**  
**as Drawn from a Project Management Study**

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**Abstract**

Inventions, innovations, and creativity are cornerstones of technology-based industries. Organizations working in technology-intensive industries must constantly balance creativity with order and innovation with efficiency. In this paper, I focus on organizational innovations as potential sources of competitive advantage. Strategic assets can be assessed with the VRIO framework. Strategic assets are “Valuable” (important), “Rare” (unique), “Inimitable” (hard to copy), and involve an “Organizational Focus” (VRIO). I am currently using the VRIO framework to assess project management as a source of competitive advantage. The approach I am using to assess project management can be applied to research on organizational innovations. The paper discusses the appropriate use of innovation dimensions, the use of innovation process performance as the dependent variable, and the selection of independent variables. The paper is relevant to innovation researchers interested in using the Resource Based View lens to study organizational innovations as a source of competitive advantage.

## **Introduction**

Innovation research is important, because it is the basis of a country's economic development [1]. And in the ever competitive marketplace, innovations are fundamental to entrepreneurship and shape business success because innovations can improve an organization's profit margin [2].

Innovation spans a vast and complex field in the academic literature and the body of literature on project management is evolving. Advances in project management research *may* be applicable to innovation and vice versa. By viewing organizational innovations as involving project management principles, researchers can begin to draw some comparisons and contrasts between the two fields. In addition, since both innovation and project management are young fields, researchers can apply well-developed management theories to help them advance conceptual thought in these two domains.

In this paper, I draw from the Resource Based View (RBV) of the organization, from a strategic perspective, to discuss organizational innovations as a source of competitive advantage. I begin this paper with a brief introduction to innovations and project management. Then, I introduce readers to the RBV and follow this with an overview of the conceptual framework I developed to study project management as a strategic asset. I then discuss the ways that researchers could apply this conceptual framework in assessing organizational innovations as strategic assets. I conclude with suggestions for further research on organizational innovations.

## **Innovations and Project Management**

A central concept of entrepreneurship involves entering markets with new or existing goods. Innovation, however, is a broader concept: it addresses implementing new ideas, products, or processes and may not always involve new markets [3]. Since business success has to do with competitive advantage, there is heightened interest in the role innovation plays in helping companies maintain their competitive advantages [2].

Innovation is defined broadly as:

Any action that either puts the organization into new strategic domains or significantly alters the way the organization attempts to serve existing customers or constituents...Examples of organizational innovation include the development or adoption of a new product or service, a new manufacturing process or technology or a revised strategic orientation [4, p. 117].

The above examples of organizational innovations closely reflect a basic definition of a project. *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* describes a project as “a temporary endeavor undertaken to create a unique product or service” [5, p. 5]. Project management encompasses the tools, techniques, and knowledge-based practices applied on projects to achieve organizational goals and deliver products or services. In some ways similar to the project management stages of initiation, planning, execution, and closeout, innovation involves a number of stages such as initiation, adoption, implementation, and diffusion. Whereas the initiation phase of

innovation connotes originality, inventiveness, and ingenuity, the implementation phase of innovation implies a linear and methodical approach based on careful planning, monitoring and controlling, and balancing the variables of time, cost, and scope. The implementation phase of innovations then reflects project management practices. These seemingly opposing ways of managing the phases of an innovation are also apparent in some of the theories of innovation.

The theoretical foundation of innovation evolved rapidly over the past four decades [6]. Back in the 1960s and 1970s, the literature on innovation focused on incremental changes within public sector organizations. In the 1980s and 1990s, the emphasis turned to radical change in private sector organizations, change that included flexible manufacturing, robotics, and automated materials handling [1]. Theories of innovation include those rooted in organizational behavior that view the organization as mechanistic or organic (with organic organizations considered the more innovative), the dual core model that examines administrative and technical innovations [7], and the ambidextrous model consisting of an initiation and implementation stage [8]. For example, [9] relate the mechanistic and organic forms of the organization to the initiation and implementation stages of innovation. They note that companies initiating innovations can be managed more organically because this phase involves greater uncertainty and creativity, whereas companies implementing innovations can be managed mechanistically because this phase relates more to execution and control.

The result is that innovations can contribute to business success. In the next section I introduce the RBV of the organization, a perspective from strategy that discusses sources of competitive advantage as originating from within the organization.

### **Resource Based View (RBV) of the Organization**

Singular innovations rarely sustain advantages. Singular innovations can readily be copied by competitors, particularly when competitors use one off innovation to pursue other innovations [10]. As such, a company must be on constant alert, adapting to its environment and capitalizing on its assets to create new innovations. Since innovations can be viewed of as tangible and intangible assets stemming from within the organization, the RBV of the organization is a useful perspective to consider when engaging in innovation research.

According to the RBV literature, a competitive advantage is rooted in developing key resources that are different. The RBV explains organizational existence based on internal assets that are valuable, rare, inimitable, and have an organizational focus (VRIO) [11-16]. Resources that meet the VRIO criteria contribute to an organization's competitive advantage [17-19].

Most companies have many resources (both tangible and intangible) but few that are strategic in nature. Most strategic assets tend to be knowledge-based and are intangible. Although tangible resources enable a company to execute business processes, it is the intangible ones that are more likely to serve as sources for competitive advantage [14, 20]. Strategic assets involve a mix of explicit and tacit knowledge embedded in a

company's unique internal skills, knowledge, and resources [21, 22]. Such strengths are difficult to purchase, let alone copy; as a result, these can contribute to an organization's ability to move beyond competitive convergence toward a competitive advantage.

Examples of strategic assets include quality, reputation, managerial skills, brand recognition, patents, culture, technological capability, customer focus, and superior managerial skills [16, 23-26]. Thus the key to creating innovative products/services is thru tacit knowledge as explicit knowledge alone is unlikely to lead to innovations [27].

In the RBV context, strategic assets can be assessed using the VRIO framework [11].

Reference [11] proposes four questions that can be used to assess resources as potential sources of competitive advantage. These questions are equally applicable to innovations.

**Valuable:** Reference [11] suggests that the research question regarding value is: "Do a firm's resources and capabilities enable the firm to respond to environmental threats or opportunities?" Valuable resources contribute to an organization's efficiency and effectiveness [28]. A resource has value when it exploits opportunities and neutralizes threats in the environment [13]. In the RBV context, valuable resources are defined in economic terms, that is, these generate above normal returns [11].

**Rare:** Reference [11], p. 160 proposes the following question about rarity: "Is a resource currently controlled by only a small number of competing firms?" Resources present in other organizations are common; those resources not widely held by other organization are rare. Common or generic resources are not sources of competitive advantage. At best, these are a source of competitive convergence or parity. However, rare resources can

offer temporary competitive advantages and are sources of strength [29]. Rareness, then, is necessary but not the only characteristic of a competitive advantage [12].

***Inimitable:*** If resources can be easily copied, an organization stands to only achieve competitive parity through value and rareness. Reference [11] says the question of inimitability that researchers should focus on is: “Do firms without a resource face a cost disadvantage in obtaining or developing it?” Inimitability means organizations protect their resources so that competitors cannot easily copy them.

***Organizational Focus:*** Finally, in terms of the key questions to ask about the VRIO framework, [11], p. 160 suggests that researchers also examine the organization: “Are a firm’s other policies and procedures organized to support the exploitation of its valuable, rare, and costly to imitate resources?” Organizational focus, then, refers to integrated and aligned managerial practices, routines, and processes. It also connotes managerial leadership and decisions that support key assets in terms of how these assets are developed and sustained. An organization’s formal processes and production functions are the backbones that support strategic assets; organizations protect their assets through business practices.

Within the VRIO framework, if a resource is only valuable, it leads to competitive parity. Both value and rarity are required for a temporary competitive advantage. Value, rarity, and inimitability are required for a sustained competitive advantage [12] and an organizational focus is necessary to both develop a competitive advantage and sustain it [12].

Since the RBV addresses intangible, knowledge-based assets as sources of competitive advantage, the next section briefly discusses the concepts of absorptive capacity and knowledge sharing.

### ***Absorptive Capacity and Knowledge Sharing***

The concept of absorptive capacity is rooted in RBV[30]. Absorptive capacity shows an organization's capability to exploit the value of new, external information, assimilate it, and apply it for commercial purposes. Absorptive capacity functions as an organization's prior knowledge and criticizes an organization's innovative capabilities. It is a capacity to innovate that enables organizations to successfully adopt or implement a new idea, process, or product [3].

Organizations have a certain capacity to absorb new knowledge the way sponges absorb liquids [31]. The capability of such a capacity is demonstrated by the way an organization generates outcomes. Organizational outcomes are limited by the amount and nature of what organizations have absorbed. What researchers wring out from their research depends on how they *squeeze the sponge*—showing how much and how continuously the organization absorbed material. Fiol points out that the stream of literature that focuses on *filling the sponge* is analogous to knowledge diffusion. This stream draws from organizational change, learning theories, and institutional theories. Literature on *squeeze the sponge* may be called the new product/process development literature; its focus is efficiency and effectiveness. This literature looks at relationships between innovation and specialization, functional differentiation, professionalism, participatory work environments, administrative intensity, and slack resources [8]. These studies tend to

ignore the accumulation of organizational knowledge that provides the source of the capability. The fields of innovation diffusion and absorption have been relatively separated from the field of organizational determinants of effective new product development [31]. It could be argued that this idea also applies to project management: the literature predominantly emphasizes *squeezing the sponge*, in terms of project management efficiency and effectiveness, but not on filling the sponge (knowledge accumulation), in terms of organizational change and learning.

Absorptive capacity, more specifically, connotes the concept of knowledge sharing in its various forms—explicit and tacit knowledge. The literature shows that knowledge is an intangible asset that is difficult to capture using traditional accounting or financial metrics [32]. Knowledge is a unique commodity that increases in value with use [32]. The common thread between knowledge, data, and information is that these all involve a personal dimension [33]. A useful way of looking at knowledge is with the iceberg analogy [27, 33]. The tip of this iceberg represents the explicit or visible body of knowledge, such as the knowledge developed and shared through the tangible project management practices. Explicit knowledge is more formal, codified, and transmitted systematically [34]: it is the *know-what* that researchers can document. What is ignored, however, is the larger part of the iceberg, the part that is submerged and tacit.

Tacit knowledge involves the ability to innovate. This knowledge assumes significance when considering innovation as a source of competitive advantage [35]. Tacit knowledge is personal, experiential, context-specific, and rooted in action [34]. Reference [27] divides tacit knowledge into a technical and cognitive dimension. This technical

dimension covers informal personal skills and crafts and could be called *know-how*, and it involves beliefs, ideals, values, and mental models. Stories allow people to relate new concepts with those already known [36]. Such tacit knowledge is shared through socialization [37]. More specifically, project teams share what they know through communities of practice.

Communities of practice have social capital underpinnings. This social capital is based on making connections with others, promoting durable networks, enabling trust, and fostering cooperation [38]. Reference [39] discusses four modes of knowledge conversion in the dynamic knowledge spiral. Knowledge can be converted from tacit to tacit (through shared experiences), explicit to explicit (through information processing), explicit to tacit (often called internalizing learning), and tacit to explicit (through meaningful dialogue to draw out tacit knowledge).

I found that the RBV is relevant to project management because project management is a knowledge-based practice that emphasizes human and organizational assets based on explicit and tacit knowledge.

### **VRIO Instrument**

In an earlier study, I applied the VRIO framework to project management using a qualitative case study approach. During my textual data analysis of 67 interview transcripts from four organizations within the telecommunications, manufacturing, financial, and utility sectors, I discovered that the concept of knowledge sharing emerged

as a strong theme. The following summarizes the key concepts from the qualitative study that helped develop the items for the VRIO framework project.

1. *Leadership*: Managerial attention, commitment, and support for project management. One of the organizations in the study, the Financial Institute provided constant and ongoing support in terms of resources, funding, and leadership on project management committees.
2. *History*: Project management evolves over the years. It takes time to embed practices and make them unique. The Telecom and the Financial Institute developed their project management programs 20 years ago and went *from strength-to-strength*.
3. *Periods of stabilization*: Durations during which major changes do not occur to allow practices to gel as organizational routines. The Financial Institute allowed for a few years after introducing new project initiatives where no further changes were made.
4. *Link organizational and project management culture*: The study showed alignment between the firm's culture and its project management culture. The Telecom's culture was described as open, relaxed, and multi-cultural, as was its project management culture.
5. *Organization-wide project management program*: The Telecom and the Financial Institute had organization-wide project, program, and portfolio management practices, thus reflecting the organization's view of valuing the discipline and its wide-scale use of the discipline for other practices.
6. *Trade-offs and integration points*: Managerial decisions weigh the pros and cons of actions and consider the implications of each. When the Telecom scaled back its project management office, it was aware of the negative implications to its business units.
7. *Social networking and knowledge-sharing practices*: Only the Financial Institute seemed aware of the benefits of these practices and made a conscious effort to try them.

8. *Link project management to business outcomes*: Project management metrics go beyond time, cost, and scope, and involve benefits realization. In benefits realization, the project value is related to the advantages the business unit gains from the initiative.
9. *Causal ambiguity*: Most of the individuals interviewed acknowledged that their codified project management practices were easy to copy; they said, however, that the informal, tacit practices they used to exchange project management knowledge were not. They also indicated that tacit knowledge was not valued or invested in.
10. *Social complexity*: A firm's culture, relationships, and reputation are rooted in social capital and involve tacit knowledge. To various degrees, all four firms used informal social exchange practices; each was unaware of its value.
11. *Continuous improvement*: Strong elements of quality improvement and benchmarking metrics are in place and integrated with project management.
12. *Staff embraces project management*: There is steadfast, historical support for project management at all levels of the firm. Project management is embraced and there is an excitement for it. "It's our bible," noted one Telecom manager.
13. *Methodology*: A scalable, flexible project management methodology is in place and integrated with program, portfolio, and knowledge management practices.
14. *Alignment*: Alignment is a theme that is interwoven throughout the 14 elements.

These organizational elements refer to processes and practices that help organizations develop and sustain project management as a strategic asset. The elements also reflect a combination of organizational practices and resource characteristics.

This led me to further examine the literature on knowledge management and explicit and tacit knowledge. Although the case studies provided rich in-depth details on project management processes and practices, I found that the results of my study could not be

generalized to larger populations. I used the case study findings and concepts from the RBV, especially the VRIO—as well as project management and knowledge management—to develop a survey. I pre-tested the survey in 2004 and launched it electronically in February 2005 to 2,000 randomly selected North American members of the Project Management Institute (PMI)<sup>1</sup>. I am presently—during the summer of 2005—analyzing the survey responses.

As I developed the instrument, and read some literature on innovation, I began to see that researchers could apply strategic asset concepts to innovations because innovations involve considerable tacit knowledge and contribute to an organization's competitive advantage position [10]. In the next section, I present my theoretical framework and then discuss it in relation to organizational innovations.

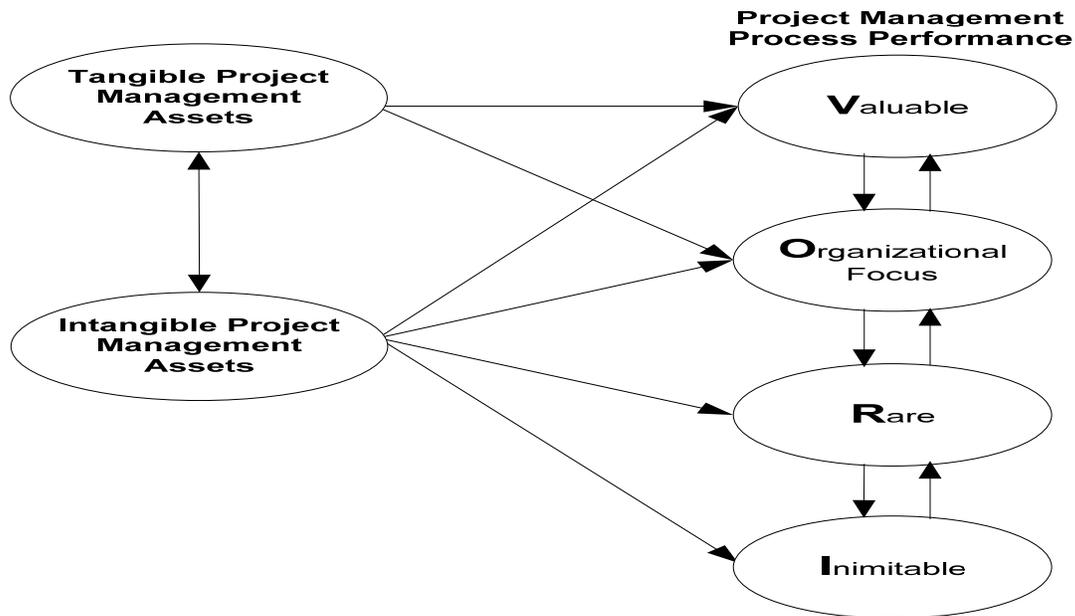
### ***Theoretical Framework***

I developed my theoretical framework by examining the project management and RBV literature. My primary research question asks: *What is the relationship between the tangible and intangible assets in project management and the performance of the project management process?*

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<sup>1</sup> A copy of the instrument is available upon request to the author.

Figure 1: Theoretical Model



In this model, tangible and intangible assets constitute independent variables that are correlated. Key examples of tangible assets include methodologies, bodies of knowledge, software, project management offices, and tools and techniques. Examples of intangible assets include knowledge sharing practices (e.g., communities of practice and Nonaka’s four modes of knowledge conversion [39]). I focus on the relationships between these variables as the interconnections contribute to a stronger VRIO profile for the project management process.

Projects are conducted in complex, dynamic environments and involve a strong knowledge-based component. In order to assess project management as a strategic asset, researchers should also examine the intangible assets of the discipline, such as knowledge-sharing, tacit knowledge, and social capital practices. In contrast to tangible assets in project management that enhance the “Valuable” (V) and “Organizational

Focus” (O) dimensions, I posit that an investment in the intangible project management assets enhances the “Valuable” (V), “Rare” (R), “Inimitable” (I), and the “Organizational Focus” (O) dimensions. I suggest that companies do not appreciate the importance of intangible assets in the project management context. For example, companies tend to codify this knowledge at the best of times rather than allow it to remain a fluid way of exchanging ideas. People learn from informal exchanges, and they tend to learn more from negative experiences than good ones [40].

Several studies have examined performance at the business process level [41, 42].

Similarly, my dependent variable is the performance of the project management process as assessed with the VRIO criteria. I use an intermediate variable (project management process performance) rather than a highly aggregate one (organizational performance) because results from using highly aggregate variables can mislead for several reasons [14]. First, multiple business processes can affect an organization’s performance.

Companies can have a competitive advantage in some business activities but may lack such advantages in other activities. Looking at the relationship between resources associated with different processes within the same company may lead to misleading conclusions on whether these contribute to the organization’s performance [14]. Second, different stakeholders may appropriate profits before the organization can realize them [14]. Third, using business processes, such as project management, as a dependent variable shows that “resources are not valuable in and of themselves, but they are valuable because they allow organizations to perform activities...business processes are the source of competitive advantage” [19, p. 108]. Nonetheless, I do ask questions about

organizational performance so that I can assess the independent and dependent variables in relation to the aggregate dependent variable of organizational performance.

Based on the aforementioned theoretical model and overview of the independent and dependent variables, I developed a number of propositions for testing, two of which follow as these reflect the main relationships in the theoretical model:

*Proposition 1: An investment in tangible project management assets will primarily enhances the “Valuable” (V) and the “Organizational Focus” (O) dimensions of the VRIO framework.*

*Proposition 2: An investment in intangible project management assets will enhance the “Rare” (R) and “Inimitable” (I) dimensions of the VRIO framework.*

In the next section, the paper draws from the VRIO framework and relates some research concepts to organizational innovations. The section is relevant to those interested in applying the VRIO framework I used for project management towards organizational innovations.

### **Relating the VRIO Framework to Innovation Research**

This section covers several topics related to the VRIO framework in relation to innovation research. I selected these topics based on my experiences with the VRIO framework for project management as well as on the basis of methodological issues that may help researchers develop VRIO instruments specific to organizational innovations.

### *Appropriate Use of Innovation Dimensions*

Although innovation typologies abound, the lack of a coherent, agreed to typology for classifying innovations consistently makes it hard for researchers to compare studies or build on the works of others [43]. For example, [43], describe the innovation process as involving radical, incremental, really new, discontinuous, imitative, architectural, modular, improving, and evolutionary innovations. Reference [2] groups the vast literature on innovation research as publications that focus on the individual, the relationship of the organization to the environment, political context of innovation, and systems of innovations. As such, an innovation can be described by distinguishing product complexity (number of subsystems involved), locus of innovation in a product's hierarchy (core or peripheral to the business), different types of innovation (generational, architectural) and the innovation's characteristics (incremental, radical) [44].

The innovation literature involves four dimensions [45]:

1. The stage of the innovation process (does the organization generate the innovation or adopt it)
2. The level of analysis (industry, organization, strategic business units, or innovation)
3. Type of innovation (technical or administrative innovation, product or process innovation, radical or incremental innovations)
4. Scope of innovation.

These examples reflect the many ways in which researchers can study innovations. A consistent typology would help advance the field of innovation research as it would allow researchers to focus on the same concepts and hence operationalize them in more consistent ways. The breadth of the literature appears to be captured with the four dimensions [45]. Researchers assessing innovations as sources of competitive advantage using the VRIO framework should be clear on the dimension(s) they are investigating.

Although researchers have studied innovations as singular innovations or the diffusion of an innovation, most studies examine innovations as multi-dimensional concepts across multiple industries as well as the rate of innovation [1]. This means that researchers can use these findings to further develop the theoretical foundation of the field because studies that span multiple organizations or industries are more generalizable as opposed to singular studies. The VRIO framework can be used to gather information at the organizational level so it lends itself to studies that could be generalizable.

### ***Innovation Process Performance as the Dependent Variable***

The project management literature on project success focuses on time, cost, and speed—as well as the criteria of a successful project. Other than a few noteworthy publications, such as the works by Belasssi & Tukul, Pinto & Slevin, and Shenhar, Levy, & Dvir, the project management literature is sketchy on empirical works based on well-developed conceptual models [46-48]. For these reasons, I did not try to use project management frameworks to assess the project management process as the dependent variable. Instead, I used the RBV VRIO concepts to gauge—using both subjective and objective measures—the effectiveness of the project management process. For corroborative

purposes, I included questions on project management success. Future studies on innovation management could take a similar approach: Researchers could develop a construct for gauging the effectiveness of innovation-focused projects and processes that shows both subjective and objective measures. However, with the breadth of concepts discussed in the literature on this topic, developing such a construct may prove challenging.

The effectiveness of implementing innovation refers to the consistency and quality of the organization's use of an innovation in terms of the benefits it derives, benefits that can include improved profitability, productivity, customer service, and employee morale [49]. Reference [50] identified four categories of variables that determine the success of an innovation:

1. Business, strategic, and organizational
2. Research and development (R&D) and production
3. Marketing
4. Market and environmental.

Similar to project effectiveness, innovation effectiveness involves both a subjective and objective dimension. The literature considers how much better an innovation is relative to other innovations, innovation compatibility, how consistent the innovation is with values, past experiences and the needs of adopters, innovation complexity, trialability, and observability [50]. Innovation researchers could consider combining questions from the VRIO framework with questions from Frambach's categories of innovation success [50].

In addition, just as not all projects improve organizational performance, neither do all innovations improve organizational performance [4]. For a sample study of North American insurance companies, Reference [14] convincingly used an intermediate dependent variable to study the factors determining the effectiveness of the customer service business process in the insurance industry. I followed their logic in my use of the VRIO framework for project management. Rather than relating my independent variables to organizational performance (because organizational performance is a highly aggregate variable), I assessed the relationships between my independent variables and intermediate dependent variable—the project management process performance [14]. Researchers who are considering using the VRIO framework to study innovations may want to consider using this approach.

### ***Selecting Independent Variables***

The literature indicates that many independent variables have been used as organizational level determinants of innovations. These variables include specialization, functional differentiation, professionalization, formalization, centralization, management attitude to change, managerial tenure, technical knowledge resources, administrative intensity, slack resources, external communication, internal communication, and vertical differentiation [8]. My brief review of the innovation literature generated many questions about innovation and competitive advantage.

Reference [51] discuss how the antecedents to *innovation speed* contribute to project success. These authors developed a conceptual model on *innovation speed* that focuses on the need for speed, the strategic orientation for speed, organizational capability for

speed, product quality, innovation speed, cost of development, and project success. If *innovation speed* contributes to a competitive advantage, because it helps companies bring new products/services to market before competitors, then researchers may find it helpful to consider the variable of speed as an element of project success.

Some researchers argue that organizational decline leads to an increase in innovation; others argue that it decreases innovation [4]. Some of the variations in these findings are attributed to the different ways that researchers study concepts [6]. Reference [4] show how organizational decline is moderated by environmental, organizational, and decision-maker variables in terms of the organizational decline-innovation relationships. If organizational decline relates to a competitive disadvantage, then the elements moderating decline may be useful ones to consider in the context of using the VRIO framework for innovation studies.

Some researchers say size inhibits innovation because large organizations are more hierarchical, while other researchers argue that larger organizations are more innovative [6] [45]. Reference [45] recently conducted a narrative review and meta analysis of innovation and organizational size. In this, they found a significant positive relationship between size and innovation: They attribute prior contradictory results to divergent methods used to operationalize variables. These authors also indicate that there are other moderating variables involved in the size-innovation relationship, such as types of innovation: technical, administrative, product, process, radical, incremental, intensity in R&D, spending on R&D, and number of innovations. They then claim that organizational size is more positively related to innovation in service organizations than industrial

organizations. Researchers interested in using the VRIO framework to assess innovations as a source of competitive advantage should be mindful of issues related to organizational decline and organizational size as they select independent variables.

I encourage those researchers who are interested in applying the VRIO framework to innovations to select several independent variables that reflect the appropriate tangible and intangible dimensions, as opposed to attempting to assess the breadth of variables available. For example, in my project management study, I assessed tangible (codified) project management knowledge sharing practices by asking questions on project management tools and techniques, project management maturity, project management offices, and *know-what* knowledge sharing. I assessed intangible project management practices by asking questions about tacit knowledge sharing practices (e.g. *know-how* knowledge). I also used the four modes of knowledge conversion to assess which modes are used in project management [52]. I specifically focused on those independent variables that related to my research question and reflected the concepts predominantly covered in the academic literature.

Many moderating variables can affect the relationship of organizational factors and innovation, including the type of organization (entrepreneurial or conservative, not for profit and for profit), type of innovation, stage of adoption, and number innovations [8]. A further impediment to theoretical and empirical advancement is confusion on concepts, measures, and units of analysis. Many innovations are measured and conceptualized at the product level, but data is gathered at the subsystem levels [44]. These are all factors that innovation researchers should bear in mind as they consider using the VRIO

framework. In my project management study, I decided to use a cross-section of PMI members because my study is exploratory. Once I have analyzed the study results, I will then build on these findings by examining additional variables such as moderating variables within a specific industry.

In one study specific to innovation, Anderson implores researchers to ensure that they address specific research question that are well-grounded in theory [53]. Such studies should clarify what the levels of analysis are in terms of innovation, because researchers can complete such studies at the individual, group, organizational, or multi-organizational level. Such studies should use appropriate measures that are based on concepts from the field. The researchers working on such studies should take into account the ways that interaction effects variables, such as mediating and moderating variables [53].

To summarize, there are many challenges related to developing good research designs. Many of these challenges relate to the methods researchers use when selecting independent and dependent variables. The presence of many independent variables raises the issue of variable interdependence. Such a presence may warrant using multivariate analyses. Not only can such analyses be complicated, these will also require adequate sample sizes [54]. In the VRIO study on project management as a strategic asset, I plan on using structural equation modeling techniques because I have multiple independent and dependent variables.

## **Conclusion**

In this paper, I introduced readers to the RBV as well as the VRIO framework that I used to study project management as a strategic asset. The paper discussed how the conceptual framework could be applied to organizational innovations to assess them as strategic assets. Then the paper presented three key issues for innovation researchers to consider in terms of study designs.

In the preface to the 1996 issue of the *Academy of Management Review* on innovation [31], despite the proliferation of papers on innovation, a consistent body of knowledge on the topic remains to emerge. She attributed this problem, in part, to researchers failing to present specific characteristics for the innovations they have studied, the stage of innovation they studied, and the types of organizations they studied. These issues are equally relevant to researchers interested in using the VRIO framework in innovation studies. When fields such as innovation are evolving, and when such fields lack a holistic body of knowledge or well-developed corpus of theories (for example, strategy and human resources) [55] [56], these researchers draw from other disciplines. This is especially helpful to understand because more evolved theories involve well-developed conceptual frameworks—as well as instruments—that are valid and reliable.

To advance the field of innovation study, researchers should be receptive to the applicability of well-developed theories from other fields and those from related conceptual frameworks and instruments. Researchers should also ensure that they address study design and methodological issues. Many such issues are common to fields of management, which means other researchers have already addressed these issues through empirical studies in other fields. Over time, by drawing from the research methodology

lessons our colleagues in other fields have learned, we can continue to advance research on organizational innovations.

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