

Emergency Management Agents Value Assessment of Public Private Partnerships

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[Abstract] Disasters wreak havoc on state, local, and international communities year after year with increasing devastation, loss of life, and economic impact. Weather disasters can have lasting implications for supply chains for all industries, including food, healthcare, manufacturing, and technology. As the COVID-19 global pandemic continues to ravage countries worldwide, research supports that a man-made disaster like COVID-19 can be just as devastating as a natural disaster. Emergency management agencies must focus on investing in strategic partnerships and the role of complementary and idiosyncratic resources to respond to these disasters. The research contributes empirical evidence collected from emergency management agencies that provides insight into the perception of the value of partnerships. The study evidence suggests partnerships impact the relationship between emergency agencies and complementary and idiosyncratic resources.

[Keywords] emergency management, resource-based theory, stakeholder theory

According to the United Nations Office for Disaster Risk Reduction (2020), disasters are becoming the norm worldwide due to natural and man-made occurrences, wreaking havoc on state and local communities. The disasters usually destroy critical infrastructure that are vital to nations' economies and public health and safety. Those infrastructures include such systems as transportation, electricity, banking, telecommunication, food supply, healthcare, and clean water.

No recent disaster to date has been as destructive and long-lasting as the global COVID-19 pandemic. This pandemic has created both a public health crisis and an economic crisis in the United States and abroad, causing large number of deaths and hospitalizations according to the World Health Organization (2021). The response to this global pandemic included closing non-essential businesses, social distancing, smaller public gatherings, and other safety precautions.

The COVID-19 pandemic and the response to it have had a devastating impact on supply chains around the world. Much of the supply chain issues have been due to immediate supply-demand mismatch, resulting in huge inventory shortages and overages. For example, according to Noble and Redick (2020), the pandemic brought about a supply-demand mismatch between farmers and the retail grocery market. This

mismatch was due mainly to the huge reduction in the number of shoppers in the grocery stores. Consequently, many farmers were left with unsold milk, poultry, hogs, heaps of produce, and other farm products, which increased on-farm food waste. For the automotive industry, because customers were on lockdown, dealerships were unable to sell cars, leaving a considerable number of vehicles on the lots. Further, because of labor shortages and import/export restrictions, the availability of critical components for manufacturing new cars were significantly decreased, forcing automakers to slow down or completely shut down production lines. According to Wayland (2021), the pandemic resulted in a \$60 billion global chip shortage for the automobile industry.

When natural disasters or man-made disasters strike any place in the United States or abroad, citizens rely on the responses of local, state, federal, and international emergency management agencies for the protection of lives and property (Wiens et al. 2018). Accomplishing these tasks requires emergency management agencies to coordinate local, state, and federal preparedness, mitigation, and response and recovery efforts to these disasters.

The preparedness phase includes planning, preparing, and training to deal with the various types of disasters. The mitigation phase focuses on the development of comprehensive plans and projects to protect people and property from exposure to natural hazards and potential man-made threats. The response phase occurs when the disaster strikes, requiring the agency to react to the disaster by coordinating the response of local, state, federal, volunteer, and private agencies. Finally, the recovery phase is responsible for administering the millions or even billions of dollars in disaster relief funds and working with local governments to ensure that reconstruction and rebuilding programs are complete to reduce the risk of further losses. According to the U.S. Department of the Treasury, the relief funds for COVID-19 have reached into the trillions of dollars. Finally, reconstruction and rebuilding include the restoration of the critical infrastructure needed to maintain the nation's defense, continuity of government, economic prosperity, and quality of life.

The primary responsibility of emergency management agencies is to develop continuing relationships between themselves and stakeholders in the public and private sectors. They must examine emergency management plans and determine what planning, training, exercise, personnel, and equipment gaps exist. Such gaps may exist due to a lack of physical assets, personnel, or expertise. Filling these gaps many times warrant collaborating with other public agencies or even the private sector through public-private partnerships (PPPs) (Izumi & Shaw, 2015).

While there is no official definition of PPPs available in the literature (Worldbank, 2018), the first model of PPPs can be traced to the building of infrastructure projects such as roads, highways, bridges, electrical, and telecommunication systems (Grimsley & Lewis, 2004; Delmon, 2011). Currently, PPPs have been applied to other areas, such as social service projects (Fandel et al, 2012; Spoann et al, 2019). PPPs follow the general principle that the collaboration of the public sector with the private sector (Iossa & Martimort, 2015). They confirm the participation of private partners with the tangible and/or intangible resources, allowing emergency management agencies to complement their resources to ensure that the various projects required to protect lives and property are successful (Harris, 2004; Hodge & Greve, 2007; Swanson & Smith, 2013).

Because many public projects require both building and operating after building, PPPs can extend for long-term periods for at least 20 years (Harris, 2004; Iossa & Saussier, 2018). Hence, the partnerships with emergency management agencies may be long- or short-lived contracts and implemented at either phase of the emergency management cycle: preparedness, mitigation, response, and recovery. The public and private sectors have unique characteristics that provide them with advantages in specific aspects of service or project delivery (Leiringer, 2006). Jefferies (2006) identified several critical success factors for PPP, including compatibility/complementary skills and resources among the parties, technical innovation in overcoming project complexity, and an efficient approval process. Other critical success factors include the necessity for the project, level of business operation and qualification of the contractor, competency of personnel of the project company, and expected benefit of the project (Hodge & Greve, 2007; Osei-Kyei & Chan, 2015). According to Bryson et al. (2007), the most crucial task for the public sector is to identify and build strategic capacities to produce the most significant public value for key stakeholders at a reasonable

cost. Again, emergency management agencies may form PPPs to complement their resources or fill gaps in their knowledge base. Hence, complementary resources are defined as "the degree to which firms in a partnership are able to eliminate deficiencies in each other's portfolio of resources by supplying distinct capabilities, knowledge, and other entities" (Lambe et al., 2002). The resources may be a tangible or intangible entity (e.g., physical assets and/or capabilities). The benefit of complementary resources is that the resources enable organizations to focus on maximizing their core capabilities with high productivity from the partnership (Dyer & Singh, 1998).

PPPs that are long-term collaborative relationships, as with some emergency management contracts, result in relationships that usually lead to idiosyncratic resources, which are derived from the vein of complementary resources. Idiosyncratic resources are developed during the life of the partnership (Lambe et al., 2002). Hence, given the normal occurrences of natural and man-made disasters, the critical role of emergency management agencies in the preparedness, mitigation, and response and recovery efforts, and the partnerships with other public agencies and the private sector to close the critical gaps due to lack of physical assets, personnel, or expertise in emergency management agencies, it is imperative to understand the value of the partnerships of emergency management agencies with other entities both public and private.

The body of literature focusing on PPPs during emergency collaboration remains scarce (Wang et al., 2016; Wiens et al., 2018; Diehlmann et al., 2021). Moreover, to the best of our knowledge, no publication exists that explicitly consider the value of PPPs from the perspectives of emergency management agents. This paper aimed to fill this research gap by empirically investigating the value of the partnership from the viewpoint of emergency management agents, focusing on complementary and idiosyncratic resources.

Three research questions guided this study from the perspective of these agents: Is there a direct relationship between complementary resources and idiosyncratic resources? Is there an indirect relationship between complementary resources and idiosyncratic resources? How do emergency management agents value the partnerships? The unique contribution of this paper is that empirical data were collected directly from emergency management agents to provide insight into their perception of the partnerships. Insight into how emergency managers value PPPs can help improve the relationships and reduce the burden on the public significantly (Papadopoulos et al., 2017). This study also highlighted the characteristics and challenges for emergency management agents.

The remainder of this paper is organized as follows. In Section 2, we provide an overview of the literature. In Section 3, we describe the applied methodology. In Section 4, we present the research findings. Last, in Sections 5, we analyze and discuss our findings, suggest avenues for future research, and derive managerial implications.

Literature Review

Two theories are used in explaining PPPs with emergency management agencies: resource-based theory and stakeholder theory. Resource-based theory explains why emergency management agencies select certain private entities to form partnerships, and stakeholder theory explains why certain private entities are more willing to participate in PPPs with emergency management agencies.

The resource-based view (RBV) is a resource-based theory that has been used to explain partnership performance for various organizations (Barney 1991; Varadarajan & Cunningham 1995), and its origins go back to Penrose (1959). Penrose (1959) suggested that the resources possessed, deployed, and used by an organization are more important than the industry structure in which the organization operates. The term "Resource-Based View" was coined by Wernerfelt (1984), who viewed the firm as a bundle of assets or resources that are tied semi-permanently to the firm. Barney (1991) argued that the resources of a firm are its primary source of competitive advantage. Barney (1991) and Barney and Wright (1998) further suggested that other than the general resources of a firm, there are additional resources, such as physical capital resources, human capital resources, and organizational capital resources. Hence, these resources can be tangible or intangible (Ray et al. 2004).

Nonetheless, the fundamental argument of RBV is that to varying degrees, firm resources are significantly heterogeneous and imperfectly mobile (Conner 1991; Hunt & Morgan 1995; Wernerfelt 1984). That is, to

create competitive advantage, a firm's resources must be valuable and rare; they must be difficult for other firms to replicate or substitute; and the firm needs to manage, adapt, and deploy the resources to create value in the marketplace (Barney, 1991; Peteraf, 1993; Mahoney, 1995; Sirmon, Hitt, Ireland, 2007). Hence, because emergency management agencies need resources from private entities to complement their existing resources, RBV should influence which private entities form PPPs.

Next, stakeholder theory stresses the interconnected relationships between a business and its customers, suppliers, employees, investors, communities, and others who have a stake in the organization. The theory argues that a firm should create value for all stakeholders, not just shareholders (Freeman, 1999). The reasoning is that firms have ethical responsibilities to provide goods and services to stakeholders without immediate benefits to shareholders (Freeman, 1984).

Three research focuses of stakeholder theory have appeared in the literature: descriptive, instrumental, and normative (Donaldson, 1999). First, the descriptive research focuses on the nature of the relationship between stakeholders and the company (Brenner, 1992); the research proposes that firms recognize the communities, customers, and government touched by the disaster as stakeholders of their companies. Second, instrumental research centers on the behaviors and outcomes (Jones & Wick, 1999); it can be seen in the behavior of a business responding to disasters even though there are not financial incentives for that behavior (McDonald, 2012). Instead, the business may realize a nonfinancial benefit, such as goodwill, that may lead to future financial gains. Normative research focuses on the moral alignment and behavior of the business and its managers (Jones & Wick, 1999); it can be observed when private businesses respond to a disaster because it is the moral and right thing to do (Gibson, 2000). These three branches of stakeholder theory should explain why certain private entities participate in PPPs with emergency management agencies.

Risks and uncertainties are fundamental issues inherent in every project (Alinaitwe & Ayesiga, 2013). As a result, several factors combine to determine the success or failure of a project in terms of its objectives (i.e., cost, time, and quality) (Zhang, 2005). Aerts et al. (2014) identified two constraints important in classifying a project as successful; that is, the project must be completed within budget and within the allowed time. Consequently, Bryson et al. (2007) stated that the public sector must identify and build strategic capacities that produce the most significant public value for key stakeholders. Thus, RBV is relevant and useful in the public sector (Bryson et al., 2007).

Jefferies et al. (2006) identified several critical success factors (CSFs) for PPPs, including compatibility/complementary skills and resources among the parties, technical innovation in overcoming project complexity, and an efficient approval process. Other CSFs include the necessity for the project, level of business operation, qualification of the contractor, competency of personnel of the project company, and expected benefit of the project (Hodge & Greve, 2007; Osei-Kyei & Chan, 2015). In their study on risk allocation, Jin and Doloi (2008) noted that RBV of organizational capability must be considered given the degree of uncertainty in completing a project successfully. Further, Bryson et al. (2007) stated that public management practitioners should have a deep understanding of the implications of RBV and a practical method for implementing RBV theory in practice. Subsequently, RBV should explain why public agencies select certain private entities to form PPPs to accomplish various projects.

A complementary resource is the degree to which firms in a partnership can eliminate deficiencies in each other's resources by bringing distinct capabilities, knowledge, and other entities. Several studies have dealt with complementary resources and found that complementary skills and resources appear to be the most important factor influencing a firm's decision to participate in partnerships with other firms. These studies have shown that complementary skills and resources positively affect organizational performance (Lee, McKone-Sweet, & Ryu, 2013; Bi, Davison, & Smyrniotis, 2013). The benefit of complementary skills and resources is that they increase the probability of completing projects successfully beyond that of a firm doing the project alone.

Idiosyncratic resources connote a subset of resources and consist of abilities, sets of actions, technologies, or processes that help an organization perform well against important goals or CSFs. Complementary resources are positively related to idiosyncratic resources and that just the existence of complementary

resources is not enough to guarantee partnership success (Wittman, Hunt & Arnett, 2009). Idiosyncratic resources make possible the integration and allow the partnership to extract the competitive advantage from the combination of the respective resources (Hunt, 2000). Hence, the existence of idiosyncratic resources is necessary to provide optimization to business partnerships. Research dealing with the relationship between idiosyncratic resources and its impact on business partnership success has found positive results (Jap, 1999; Jap, 2001; Lambe et al., 2002). In this study, we posit the following hypothesis as it relates to emergency management agencies:

H1: *Emergency management agents perceive a positive relationship between complementary resources and idiosyncratic resources.*

Organizations select collaboration partners to complement the resources (Deken et al., 2018). A critical strategic explanation for collaboration is that organizations seek access to complementary resources (Barringer & Harrison, 2000; Dyer & Singh, 1998; Eisenhardt & Schoonhoven, 1996; Lavie, 2006). The public sector partnering with the private sector provides the government with technical expertise and complementary resources, developing a livelihood of project success (Brinkerhoff & Brinkerhoff, 2011). Researchers have shown that complementary resources are essential for the formation and outcomes of collaborations (Lin et al., 2009; Hitt et al., 2017). Further, research has indeed firmly established that resource complementarity makes the formation of collaboration more likely (Chung, Singh, & Lee, 2000; Hitt et al., 2017; Vasudeva, Spencer, & Teegen, 2013; Wang & Zajac, 2007) and enhances the probability of the success of the partnership (Lin et al., 2009; Murray, Kotabe, & Zhou, 2005; Deken et al., 2018). In this study, we posit the following hypothesis as it relates to emergency management agencies:

H2: *Collaboration partially mediates the relationship between complementary resources and idiosyncratic resources. H2a: Emergency management agents perceive a positive relationship between complementary resources and collaboration. H2b: Emergency management agents perceive a positive relationship between collaboration and idiosyncratic resources.*

Value is the perceived worth in monetary units of the set of economic, technical, service, and social benefits received in exchange for the price paid for a product offering, taking into consideration the available alternative offerings and prices. The success of PPPs is largely dependent on the value that they can generate for stakeholders and society (Villani et al., 2017). The vested interests involved and the lack of transparency of PPP arrangements may threaten democracy and create risks of collusion and corruption (Bowman 2000). Therefore, safeguarding public values, such as impartiality, equality and transparency, are crucial.

Warsen et al. (2020) evaluated different viewpoints for governing the value of PPPs. Their study shows that experience, country, and PPPs distinction influence the perceived value of a PPP. They highlighted four paradigms that have proven to be recognizable and relevant in evaluating the value of PPPs: traditional public administration, New Public Management, collaborative governance, and a private governance mechanism (Ansell & Gash 2008; Osborne, 2010; Christensen & Lægheid 2011; Koppenjan, 2012).

Traditional public administration requires the PPP to follow clear regulations. The explicit standardization of roles, processes, and rules makes interaction predictable (Hughes, 2017). It is safeguarding public values, such as impartiality, equality, and transparency. The vested interests involved and the lack of transparency of PPP arrangements may threaten democracy and create risks of collusion and corruption (Bowman, 2000).

The New Public Management (NPM) paradigm focuses on efficiency and effectiveness using (performance) management and competition (Hood, 1991; Christensen & Lægheid, 2011). Governments define goals, translate these into output and performance indicators, and then decide through a competitive tendering process that delivers the service (Hood 1991). NPM has both a principal-agent focus (making managers manage) and a managerial focus (letting managers manage) (Christensen & Laereid, 2011). However, according to Shaoul (2005), the principal-agent relationship is vulnerable to strategic behavior.

If the principal imposes unrealistic contract conditions, the agent may only fulfill the obligations made explicit in the contract and may be inclined to cut corners if allowed.

Collaborative governance focuses on public decision-making and service delivery in networks of mutually dependent actors. It emphasizes the importance of interdependencies, collaboration, and coordination (Ansell & Gash, 2008; Osborne, 2010). Public goals are defined and implemented through a process of interaction and negotiation, aimed at resulting in win-win situations (Klijn & Koppenjan, 2016). Relationships are less defined as principal-agent relationships but rather as partnerships and stewardship relations in which actors have a mindset that encourages them to collaborate (Koppenjan, 2012).

The private governance mechanism builds upon the ideas of privatization and self-governance. More efficient and innovative service delivery promises require governments to transfer tasks and risks to the private sector (Hodge & Greve, 2018). Governments leave the daily management of the PPP projects to private companies so that they can use their expertise, skills, and creativity to determine how to execute, manage, and monitor their tasks (Bovaird & Sharifi, 1998). Because of the different governance ideas associated with PPPs, partners in PPPs can hold quite different views on the most appropriate and desired governance perspective and mechanism (Cheung et al., 2010). In this study, we posit the following hypothesis as it relates to emergency management agencies:

H3: *Emergency management agents perceive a positive relationship between idiosyncratic resources and relationship value.*

The conceptual model for this research study is presented in Figure 1.

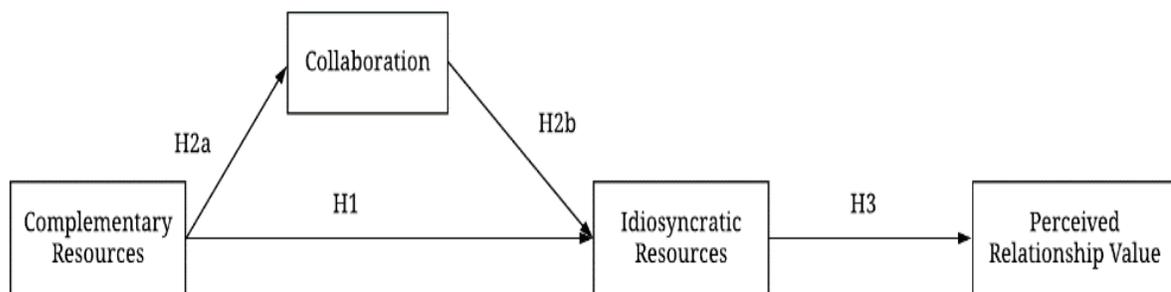


Figure 1. Conceptual Model

Methodology

Data Collection

Measures.

The analysis required measures for four constructs: complementary resources (CMR), collaboration (COL), idiosyncratic resources (IDEO), and perceived relationship value (PRV).

Sample

The research study involved administering an online questionnaire to a sample of emergency management agents employed in the public sector. The questionnaire was deployed on a web server, and invitations to respond were sent to members of two professional emergency management associations. Contact information for the potential sample respondents was obtained via the membership directories. Using members of these associations provided a sample of individuals who largely consider themselves professionals in emergency management. Participation was informed that the questionnaire was for

academic use and that participation was strictly voluntary. Information obtained from respondents was assured to be strictly confidential.

The Dillman's Tailored Design Method was used to guide the distribution of the survey (Dillman, Smyth, & Christian, 2014). Harzing et al. (2013) stated that administering questionnaires online provides several benefits, including lower cost, higher transmission, and response speeds. Of the 855 questionnaires electronically distributed to prospective study participants, 74% refused to respond, yielding an initial response rate of 26%. After eliminating the number of ineligible respondents who were employed in private organizations or submitted incomplete questionnaires, the final sample size was 130 respondents resulting in a 15% response rate.

The demographic profile of the respondents for this study was as follows. The sample was comprised of 35% females and 65% males. Most respondents were White/Caucasian (85%), while 15% were either Black/African Americans, Hispanic/Latino Americans, Native Americans, Asian/Asian Americans, or others. Most of the sample respondents were age 43 and older for a total of 69%, while 31% were less than age 43. None was younger than age 23. Of most respondents, 87% held a bachelor's or graduate degrees, while 14% had a high school diploma/equivalent or some college or professional certification. Roughly 64% of the respondents were local public emergency management agents, indicating specifically working for either city/town or county emergency management agencies. The majority, 63%, reported working for metropolitan areas supporting populations of 100,000 or more. The average organizational tenure was 11.2 years, with 46% with tenure of ten or more years.

Complementary Resources

We measured complement resources using the three-item scale developed by Jap (1999) and modified by Lambe et al. (2002). The three items include "We both contribute different resources to the relationship that help us achieve mutual goals," "We have complementary strengths that are useful to our relationships," and "We each have separate abilities that, when combined, enable us to achieve goals beyond our individual reach." A seven-point Likert scale was used for each item, with 1 representing strongly disagree and 7 representing strongly agree.

Idiosyncratic Resources

We measured idiosyncratic resources using the six-item scale developed by Jap (1999) and modified by Lambe et al. (2002). Sample items include "Together we have invested a great deal in building up our partnership," "Both of us have made a great deal of investment in this relationship," and "Both of us have created capabilities that are unique to this partnership." A seven-point Likert scale was used for each item, with 1 representing strongly disagree and 7 representing strongly agree.

Collaboration

We measured collaboration using the six-item scale developed by Kahn (1996). Sample items include "During the past year, to which degree did your organization share ideas, information and/or resources with your private sector partners?", "During the past year, to which degree did your organization share the same vision for partnership with your private sector partner?", and "During the past year, to which degree did your organization work together as a team with your private sector partner?" A five-point Likert scale was used, with 1 representing "never" to 5 representing "quite frequently."

Perceived Relationship Value

We measured perceived relationship value using the six-item scale developed by Barry and Terry (2008) and modified by Geiger et al. (2012). Samples of the items include "This relationship makes a crucial positive contribution to our organizational success," "This relationship makes a crucial positive contribution to our organization achieving its goals," and "This relationship strongly matches our conception of an optimal relationship." A seven-point Likert scale was used, with 1 representing strongly disagree and 7 representing strongly agree.

Common Method Variance

Given that single-respondent questionnaires may introduce common method variance (CMV), we assessed CMV using Harmon's one-factor test (Podsakoff & Organ, 1986). We ran an exploring factor analysis with principal component analysis to extract factors (eigenvalues > 1) using Varimax rotation to obtain a more interpretable factor matrix. The Bartlett Test of Sphericity (BTS) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were used to validate the use of factor analysis. With few exceptions, items had factor loadings of at least 0.50. Four items had loadings between 0.38 and 0.46 on their respective factors. Because these items did not reach the commonly used standard for factor loadings of 0.50, these items with low factor loadings were omitted from subsequent analysis.

The extraction and rotation found four factors had eigenvalues exceeding one, with the first factor accounting for 29% of the variance. The four factors explained 76% of the total variance. No one construct could explain more than 30% of the total variance. Therefore, common method variance was not a significant concern in this study (Podsakoff et al., 2003). We also confirmed this finding in our confirmatory factor analysis (Byrne, 2006). KMO for complementary resources was 0.720, idiosyncratic resources were 0.728, collaboration 0.848, and perceived relationship was 0.751. Respectively, BTS were 336.60, 422.86, 347.38, and 491.64, all significant ($p < 0.000$). The study scales are internally consistent with a Cronbach's alpha of .70 or higher (Nunnally, 1978). The Cronbach's alpha values are presented in Table 1.

Table 1
Means, Standard Deviations, and Correlations

Variable ($n = 130$)	Mean	s.d.	1	2	3	Cron α	AVE	CR
1 Complementary Resources	6.03	1.14				0.894	0.798	0.922
2 Collaboration	3.81	0.73	0.333***			0.904	0.611	0.904
3 Idiosyncratic Resources	5.89	0.91	0.379***	0.470***		0.828	0.561	0.703
4 Perceived Relationship Value	5.58	0.91	0.361***	0.567***	0.417***	0.873	0.740	0.794

Notes: Correlations are shown below the diagonal. s.d. = standard deviation, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Results of the Confirmatory Factor Analysis

To assess the reliability and validity of the scales, we conducted confirmatory factor analysis (CFA) on our sample data ($n = 130$). Survey items, item descriptive statistics, and factor loadings are listed in Table 2a-d. Our results show acceptable model fit ($\chi^2 = 56.508$, d.f. = 38, $p = 0.027$; RMSEA = 0.067; CFI = 0.978; SRMR = 0.027) and that all item-to-factor loadings were significant ($p < 0.01$) and substantive ($\lambda > 0.5$). Computing standardized loadings also confirmed the following:

Table 2a. Factor Analysis and Reliability of Constructs (Complementary Resources)

Item		Mean	S.D.	Loading ^a
CMR1	We both contribute different resources to the relationship that help us achieve mutual goals.	5.92	1.32	0.834*
CMR2	We have complementary strengths that are useful to our relationship.	6.05	1.17	0.980*
CMR3	We each have separate abilities that, when combined, enable us to achieve goals beyond our individual reach.	6.10	1.24	0.859*

^a Standardized coefficient: all loadings are significant at $p < 0.001$ (two-tailed test).

^b Dropped due to poor psychometric properties.

Table 2b. Factor analysis and reliability of constructs (collaboration)

Item		Mean	S.D.	Loading ^a
COL1	During the past year, to which degree did your organization achieve collective goals with your private sector partner.	3.66	0.96	0.755*
COL2	During the past year, to which degree did your organization develop mutual understanding with your private sector partner.	4.00	0.81	0.748*
COL3	During the past year, to which degree did your organization informal work activities with your private sector partner.	3.87	0.90	0.762*
COL4	During the past year, to which degree did your organization share ideas, information and/or resources with your private sector partner.	3.86	0.85	0.756*
COL5	During the past year, to which degree did your organization share the same vision for partnership with your private sector partner.	3.70	0.84	0.778*
COL6	During the past year, to which degree did your organization work together as a team with your private sector partner.	3.85	0.94	0.883*

^a Standardized coefficient: all loadings are significant at $p < 0.001$ (two-tailed test).

^b Dropped due to poor psychometric properties.

The reliability and convergent validity of the measurement model for the indicators and bootstrap t-statistics for their significance (Anderson & Gerbing, 1988). Items with standardized loadings that were not close to the 0.70 threshold were dropped from the analysis. The remaining indicators were significant at the 1% significant level. We examined items for loadings onto unintended factors and found no significant cross-loadings; these results provide evidence of scale unidimensionality. We assessed the reliability of our scales using average variance extracted (AVE) and composite reliability (CR) scores. As reported in Table 1, all CR statistics exceed the 0.70 cutoff established in the literature. In addition, all scales surpassed the accepted 0.50 cutoff for AVE, indicating the variance captured by each latent variable is significantly larger than the variance due to measurement error, thus demonstrating unidimensionality and the high convergent validity of the constructs (Table 1). As such, we conclude that the convergent validity of our multi-item scale is adequate (Fornell & Larcker, 1981).

Table 2c. Factor analysis and reliability of constructs (idiosyncratic resources)

Item		Mean	S.D.	Loading ^a
Idiosyncratic Resources				
IDIO1	Both of us have created capabilities that are unique to this partnership. ^b	6.16	1.01	-
IDIO2	Together we have developed a lot of knowledge that is tailored to our relationship. ^b	6.15	0.92	-
IDIO3	Together we have invested a great deal in building up our partnership.	6.05	1.03	0.744*
IDIO4	Both of us have made a great deal of investments in this relationship.	5.82	1.29	0.852*
IDIO5	If this relationship were to end, we would be wasting a lot of knowledge that is tailored to our relationship.	5.72	1.62	0.688*
IDIO6	If either organization were to switch to another partner, we would lose a lot of investments made in the present relationship.	5.47	1.59	0.702*

^a Standardized coefficient: all loadings are significant at $p < 0.001$ (two-tailed test).

^b Dropped due to poor psychometric properties.

Table 2d. Factor analysis and reliability of constructs (perceived relationship value)

Item		Mean	S.D.	Loading ^a
PRV1	This relationship has an outstanding value to us. ^b	5.62	1.31	-
PRV2	All in all, the benefits of this relationship far outweigh the disadvantages. ^b	5.85	1.27	-
PRV3	This relationship makes a crucial positive contribution to our organization's success.	5.77	0.99	0.929*
PRV4	This relationship makes a crucial positive contribution to our organization's achievement of goals.	5.71	1.04	0.950*
PRV5	This relationship strongly matches our conception of an optimal relationship.	5.20	1.24	0.806*
PRV6	This relationship meets the requirements of my organization in all important aspects.	5.39	1.11	0.739*

^a Standardized coefficient: all loadings are significant at $p < 0.001$ (two-tailed test).

^b Dropped due to poor psychometric properties.

Discriminant validity is assessed by determining whether each latent variable shares more variance with its own measurement variables or with other constructs (Fornell & Larcker, 1981; Chin, 1998). The square root of the AVE for each construct was compared with the correlations with all other constructs in the model. A correlation between constructs exceeding the square roots of their AVE would indicate that they may not be sufficiently discriminable. In this case, the square roots of AVE are always higher than the absolute correlations between constructs. Thus, all constructs have acceptable validity.

Data Analysis Method

We adopted path analysis to analyze the quantitative data. The choice of path analysis in this study was based on the following reasons: 1) this research was in an exploratory stage and tackled a theory-building environment; 2) path analysis has a minimum demand for sample size (Hair et al., 2012); 3) path analysis is a good option if scores of latent variables are used in the later analysis for predictive purpose.

We analyze the hypotheses in two steps. In step one, we assessed the significance of direct paths among all constructs. The significance of path coefficients was assessed via bootstrapping with a sample of 20,000 subsamples and no sign changes option (Hair et al., 2013). The results are presented in the path model in Figure 2. Step two was to perform mediation analysis to assess the indirect effects of complementary resources on perceived relationship value through collaboration and idiosyncratic resources. We used the R^2 values to express the explanatory power of the equations explaining the endogenous constructs: collaboration, idiosyncratic resources, and perceived relationship value. The proposed model reveals relevant explanatory power for collaboration ($R^2 = 0.110$), idiosyncratic resources ($R^2 = 0.227$), and perceived relationship value ($R^2 = 0.307$). Further, the figure shows the estimates of the path coefficients of the proposed model and the respective significances. The total, direct, and indirect effect sizes are presented in Table 3. All the effects were strongly significant statistically.

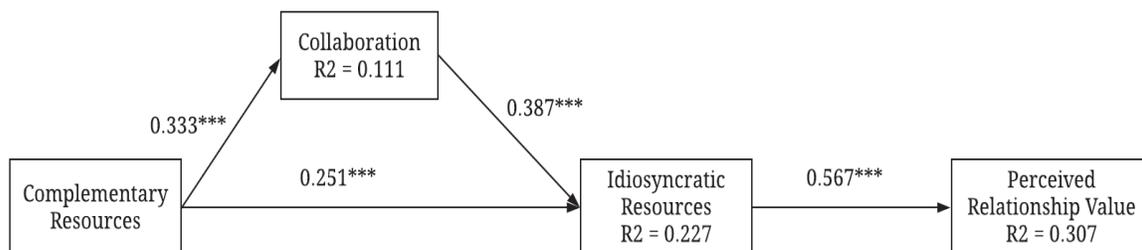


Figure 2. Path model (parameters are estimated by maximum likelihood method)

The data indicates that complementary resources positively affected collaboration ($\beta = 0.333, p = 0.001$). Collaboration increases by 0.333 standard deviations for every one standard deviation increase in complementary resources. Therefore, H1 was supported. Also, complementary resources directly affected idiosyncratic resources ($\beta = 0.251, p = 0.005$). Hence, H2 was supported. The direct effect of collaboration on idiosyncratic resources was significant ($\beta = 0.387, p = 0.001$). Idiosyncratic resources increase by 0.251 standard deviation for every one standard deviation increase in complementary resources and by 0.387 standard deviations for every one standard deviation increase in collaboration.

Table 3.
Test Of Total Effect, Direct Effect, And Indirect Effect

Antecedent	CMR	95%		COL	Total effect				
		LL	UL		95% LL	95% UL	IDIO	95% LL	95% UL
Collaboration	0.333**	0.148	0.493	0.000	0.000	0.000	0.000	0.000	0.000
Idiosyncratic Resources	0.379***	0.209	0.533	0.485***	0.163**	0.575	0.000	0.000	0.000
Perceived Relationship Value	0.215***	0.108	0.334	0.273***	0.091**	0.370	0.563**	0.390	0.696
					Direct effect				
Collaboration	0.333**	0.148	0.493	0.000	0.000	0.000	0.000	0.000	0.000
Idiosyncratic Resources	0.251**	0.081	0.436	0.387**	0.163	0.575	0.000	0.000	0.000
Perceived Relationship Value	0.000	0.000	0.000	0.000	0.000	0.000	0.567***	0.390	0.696
					Indirect Effect				
Collaboration	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Idiosyncratic Resources	0.129**	0.046	0.247	0.000	0.000	0.000	0.000	0.000	0.000
Perceived Relationship Value	0.215***	0.108	0.334	0.219**	0.091	0.370	0.000	0.000	0.000

Notes: ⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

To test the mediating role, we used bias-corrected bootstrapping of 5,000 subsamples to test the indirect effects of complementary resources on perceived relationship value through collaboration and idiosyncratic resources. Table 3 shows the Lower Limit (LL) and Upper Limit (UL) of 95% bias-corrected bootstrap confidence interval. The table indicates that collaboration mediated the positive effects on idiosyncratic resources for complementary resources ($\beta = 0.129, p = 0.002$). Together, collaboration and idiosyncratic resources mediated the positive on perceived relationship value for complementary resources ($\beta = 0.215, p < 0.000$). Therefore, H3 was supported.

Discussion

Disasters are becoming the norm worldwide due to natural and man-made occurrences, wreaking havoc on state and local communities. The results are destruction of major infrastructures that are vital to nations' economies and public health and safety. The COVID-19 pandemic and the response to it have had a devastating impact on supply chains around the world, creating inventory shortages and overages. Emergency management agencies were created to help the nation prepare, mitigate, respond, and recover from these disasters. Emergency management agencies must determine what planning, training, exercise,

personnel, and equipment gaps exist. PPPs are used to complement the resources of emergency management agencies to close these gaps; these resources may be tangible or intangible. The benefit of complementary resources is the resources enable organizations to focus on maximizing their core capabilities with high productivity from the partnership.

To the best of our knowledge, no publication existed that explicitly considered the value of PPPs from the perspective of emergency management agents. The aim of this paper was to fill this gap by empirically investigating the value of the partnership from the viewpoint of emergency management agents, focusing on complementary and idiosyncratic resources. Three research questions guided this study: Is there a direct relationship between complementary resources and idiosyncratic resources? Is there an indirect relationship between complementary resources and idiosyncratic resources? Finally, how do emergency management agents value the partnership? Two theories were used in explaining PPPs with emergency management agencies: resource-based theory and stakeholder theory. Resource-based theory explained why emergency management agencies select certain private entities to form partnerships, and stakeholder theory explained why certain private entities are more willing to participate in PPPs with emergency management agencies.

To test the three proposed hypotheses, data were collected for four constructs: complementary resources, collaboration, idiosyncratic resources, and perceived relationship value. Local, state, and federal emergency management agents participated in this study. In the statistical analysis, we used path analysis to determine the estimated coefficients of the proposed model and the respective statistical significance. The results showed that from the perspectives of emergency management agents, complementary resources positively affect collaboration, which may imply that emergency management agencies seek partnerships with organizations whose resource-tangible or intangible- are able to complement their resources, thus closing or eliminating deficiencies resources.

The results also showed that from the perspectives of emergency management agents, complementary resources positively affect idiosyncratic resources to the degree that the more the private entities' resources complement the resources of the emergency management agencies, the greater the interaction during the partnership. The increased interaction combines into idiosyncratic resources, which benefits communities before, during, and after disasters. This study provides insight into how emergency management agents value PPPs, and highlights the characteristics and challenges for these agencies.

Directions for Future Research

While we used the resource-based theory and stakeholder theory as the framework for our study, we believe future researchers can apply other theories that can be applied to this line of research. For instance, when considering the collaboration of many emergency management associations, research can apply the knowledge-based theory. Knowledge is often viewed as being within an individual, and the primary goal of any organization should be capitalizing on applying the knowledge that is within an individual (Grant, 1996). This can be a critical factor in collaborations as key individuals need transferable knowledge to apply old knowledge to new knowledge. Knowledge-based theory is often an extension of the Resource-Based View (Hörisch, Johnson & Schaltegger, 2015). However, the main difference between the two is that Knowledge Base Theory is often considered the most important due to its ability to efficiently streamline other tangible resources and create increased innovation and creativity (Kogut & Zander, 1992; Grant, 1996).

Future research must also consider the duration of the man-made or natural disaster event. From hurricanes to tornados and, now, man-made disasters, time becomes a critical factor to consider. Local, state, federal, volunteer, and private agencies must appropriately allocate resources to account for the average length of a disaster, which directly influences the devastation possible. The ongoing COVID-19 pandemic continues to demand resources globally that will require additional collaborations that bring competitive advantages and value not just in supporting immediate recovery efforts but in providing long-term support to those most affected. Therefore, a time factor measure would need to be integrated to account for the influence the disaster duration has on the perceptions of complementary resources, idiosyncratic resources, and collaborations within PPPs.

Research is needed to investigate the process of emergency agency collaborations further. While public-private partnerships are formed (Harris, 2004), there is scant evidence that these relationships work. However, through this study, we understand that such collaborations do indeed work, but the depth in which they do is still unclear. For instance, what resources are generally adopted and/or shared? What systems are in place contractually? How are the gaps in the collaborations explored to understand what other emergency management association to collaborate with? While the answers to some of these questions are controversial, we believe blockchain technologies could answer questions related to collaboration.

Blockchain technologies are described as a suite of technologies that can record and track value items (Gupta, 2018). Therefore, if all emergency agencies operated on a shared or public blockchain technology, each agency would be aware of the resources that another has that may be needed elsewhere. Blockchain characteristics are network consensus, smart contracts, distributed ledgers, and cryptography (Yaga, Mell, Roby, & Scarfone, 2019; Bach, Mihaljevic & Zagar, 2018; Schuetz & Venkatesh, 2019). Given each of these characteristics, a network consensus is when all community users have authority for transaction approvals (Bach et al., 2018).

For instance, if one emergency agent has a shared resource that is or will be used for the community, the community has the ability to approve whether or not the provided resource is updated and has the same quality and/or value as other resources. A smart contract is a transaction protocol that will automatically execute, providing efficiency and effectiveness to the overall process (Yaga et al., 2019). Distributed ledgers are the recording of all transactions that take place within the blockchain. The use of smart contracts and distribution ledgers are helpful to emergency agencies, as they will have a record of all transactions (Lacity, 2018). Last, cryptography provides a mechanism that verifies each change or transaction, allowing trust to take place with each transaction (Yaga et al., 2019). The verification of each transaction is beneficial, as no alterations or modifications can take place without verification or approval. Considering Resource-Based View, each emergency agent that is on the blockchain or has blockchain technology implemented is creating a sustainable competitive advantage, as the blockchain technology alone is a resource that is rare, inimitable, non-substitutable, and valuable (Barney, 1991).

Limitations of the Research

While we have tested our study empirically, we believe that researchers who conduct future studies should take our results with caution. While we met the suggested sample requirements per Hair et al. (2010), we realize that data was only collected from two emergency management associations. We discussed the collaboration between public and private agencies or local, state, or federal agencies throughout our study. Based on the data collected, 64% of the respondents were local; therefore, the collaboration between emergency agents does not fully represent the entire emergency agent associations.

We also did not study the type of disaster and whether a man-made disaster, as opposed to a natural disaster, would dictate a different outcome. For instance, COVID-19 was stated to be man-made. If this is true, we do not know the planning or preparation measures that emergency response agencies implemented prior to the global spread of the disease. The COVID-19 pandemic illustrated a lack of collaboration, supply chain breaks, and many more flaws within our healthcare system, emergency agents, and other necessary parties. However, we do not know if the lack of collaboration was taken into consideration to spotlight the gaps.

Conclusion

Despite practical interest in emergency management, the evolution of theory and research in this area has not kept pace with the increase in natural disasters that occurred prior to the arrival of COVID-19. Based on the widespread effects of COVID-19 and other disaster disruptions, we sought to uncover how the value of partnerships can impact emergency management agencies. To theorize how complementary and idiosyncratic resources and collaboration impact relationship value, we use a Resource-Based View framework to articulate the mechanisms underlying these relationships. Our results suggest that partnerships are more valuable when complementary resources are used to increase collaborations and idiosyncratic resources to form valuable relationships. We hope to provide a unique perspective to the

emergency management dialogue and provide an innovative research agenda to carry the conversation forward.

References

- Aerts, G., Grage, T., Dooms, M., & Haezendonck, E. (2014). Public-private partnerships for the provision of port infrastructure: An explorative multi-actor perspective on critical success factors, *The Asian Journal of Shipping and Logistics*, 30(3), 273-298.
- Alinaitwe, H. & Ayesiga, R. (2013). Success factors for the implementation of public-private partnerships in the construction industry in Uganda, *Journal of Construction in Developing Countries*, 18(2), 1-14.
- Anderson, J.C. & Gerbing, D.W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3), 411-423.
- Ansell, C. & Gash, A. (2008). Collaborative governance in theory and practice, *Journal of Public Administration Research and Theory*, 18(4), 543-571.
- Bach, L.M., Mihaljevic, B., & Zagar, M., (2018). Comparative analysis of blockchain consensus algorithms, 41st *International Convention on Information & Communication Technology, Electronics & Microelectronics (MIPRO)*, 1545-1550.
- Barney J. Firm (1991). Resources and sustained competitive advantage, *Journal of Management*, 17(1), 99-120.
- Barry, J & Terry, T.S. (2008). Empirical study of relationship value in industrial services, *Journal of Business & Industrial Marketing*, 23(4), 228-241.
- Barney, J.B. & Wright, P.M. (1998). On becoming a strategic partner: The role of human resources in gaining competitive advantage, *Human Resource Management*, 37(1), 31-46.
- Barringer, B.R. & Harrison, J.S. (2000). Walking a tightrope: creating value through interorganizational relationships, *Journal of Management*, 26(3), 367-403.
- Bi, R., Davison, R.M., & Smyrnios, K.X. (2013). The effect of IT complementary resources on fast growth small-to-medium enterprise performance: A resource-based view. *2013 Annual Pacific Asia Conference on Information Systems*.
- Bovaird T., Sharifi S. (1998) Partnerships and networks as self-organizing systems: An antidote to principal-agent theory. In: Halachmi A., Boorsma P.B. (eds) *Inter and Intra Government Arrangements for Productivity*. Springer, Boston, MA.
- Bowman, L. (2000). P3; problem, problem, problem. *Project Finance*, 206, 25-28.
- Brenner, S.N. (1992). The stakeholder theory of the firm: A methodology to generate value matrix weights, *Business Ethics Quarterly*, 2(2), 99-119.
- Brinkerhoff, D.W. & Brinkerhoff, J.M. (2011). Public-private partnerships: Perspectives on purposes, publicness, and good governance, *Public Administration & Development*, 31(1), 2-14.
- Bryson, J.M., Ackermann, F., & Colin, E. (2007). Putting the resource-based view of strategy and distinctive competencies to work in public organizations. *Public Administration Review*, 67(4), 702-717.
- Byrne, B. M. (2006). *Structural equation modeling with EQS: Basic concepts, applications, and programming* (2nd ed.). Lawrence Erlbaum Associates Publishers.
- Cheung, E., Chan, A.P.C. & Kajewski, S. (2010). The researcher's perspective on procuring public works projects. *Structural Survey*, 28(4), 300-313.
- Chin W. (1998). The partial least squares approach to structural equation modeling, *Modern methods for business research*.
- Christensen, T., & Lægreid, P. (2011). Complexity and hybrid public administration-theoretical and empirical challenges. *Public Organization Review*, 11, 407-423.
- Chung, S., Singh, H., & Lee, K. (2000). Complementarity, status similarity and social capital as drivers of alliance formation, *Strategic management Journal*, 21(1), 1-22.
- Conner, K.R. (1991). A historical comparison of resource-based theory and five schools of thought within industrial organization economics: Do we have a new theory of the firm? *Journal of*

- Management*, 17(1), 121-154.
- Deken, F., Berends, H., Gemser, G., & Lauche, K. (2018). Strategizing and the initiation of interorganizational collaboration through prospective resourcing, *Academy of Management Journal*, 61(5), 1920 – 1950.
- Delmon, J. (2011). Public-private partnership projects in infrastructure: An essential guide for policy makers. Cambridge University Press, Cambridge.
- Diehlmann, F., Lüttenberg, M., Verdonck, L., Wiens, M., Zienau, A., & Schultmann. (2021). Public-private collaborations in emergency logistics: A framework based on logistical and game-theoretical concepts. *Safety Science*, 141(2021), 1-16.
- Dillman, D.A, Smyth, J.D., & Christian, L.M. (2014). Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method 4th Edition, Wiley Publisher.
- Donaldson, T. (1999). Making stakeholder theory whole. *Academy of Management Review*, 20(1), 65-91.
- Dyer, J.H., & Singh, H. (1998). The relational view: cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review*, 23(4), 660-679.
- isenhardt, K.M. & Schoonhoven, C.B. (1996). Resource-based view of strategic alliance formation: Strategic and social effects in entrepreneurial firms, *Organization Science*, 7(2), 103-209.
- Fandel, G., Giese, A., & Mohn, B. (2012). Measuring synergy effects of a public social private partnership (PSPP) project. *International Journal of Production Economics*, 140(2), 815-824.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50.
- Freeman, R.E. (1984). *Strategic Management: A Stakeholder Approach*. Boston, MA: Pitman/Pallinger.
- Freeman, R.E. (1999). Divergent stakeholder theory. *Academy of Management Review*, 24(2), 233-236.
- Geiger, I., Durand, A., Saab, S., Kleinaltenkamp, M., Baxter, R., & Lee, Y. (2012). The bonding effects of relationship value and switching costs in industrial buyer–seller relationships: An investigation into role differences. *Industrial Marketing Management*, 41(1), 82-93.
- Gibson, K. (2000). The moral basis of stakeholder theory. *Journal of Business Ethics*, 26(3), 245-257.
- Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic management journal*, 17(S2), 109-122.
- Grimsley, D. & Lewis, M.K. (2004). Public Private Partnerships: The Worldwide Revolution in Infrastructure and Project Finance. Edward Edgar Publishing Limited.
- Gupta, M. (2018). Blockchain for Dummies. In *Journal of Applied Polymer Science* (2nd IBM Li, Vol. 134, Issue 36). <https://doi.org/10.1002/app.45263>
- Hair, J.F., Ringle, C.M., & Sarstedt, M., (2013). Editorial - Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance. *Long Range Planning*, 46 (1-2), 1-12.
- Hair, J.F., Sarstedt, M., Ringle, C.M., & Mena, J.A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research, *Journal of the Academy of Marketing Science*, 40, 414–433.
- Harris, S. (2004). Public private partnerships: Delivering better infrastructure services. *Recouping Infrastructure Investment in Latin America and the Caribbean*, 2004 Inter-American Development Bank Infrastructure Conference Series, Juan Benavides, Editor, Washington, D.C., 77-98.
- Hair, J. F., Black, W. C., & Babin, B. J. (2010). Anderson. RE, 2010. *Multivariate Data Analysis*. New Jersey, Pearson Prentice Hall.
- Harzing, A.W., Reiche, B.S., & Pudelko, M. (2013). Challenges in international survey research: a review with illustrations and suggested solutions for best practice. *European Journal of International Management*, 7(1), 112-134.
- Hitt, M.A., Dacin, M.T., Levitas, E., Arregle, J., & Borza, A. (2017). Partner Selection in Emerging and Developed Market Contexts: Resource-Based and Organizational Learning Perspectives. *Academy of Management Journal*, 43(3), 449-467.
- Hodge, G.A. & Greve, C. (2007). Public–private partnerships: An international performance review.

- Public Administration Review*, 67(3), 545-558.
- Hodge, G.A. & Greve, C. (2018). Contemporary public-private partnership: Towards a global research agenda. *Financial Accountability & Management*, 67(3), 3-16.
- Hood, C. (1991). A public management for all seasons? *Public Administration*, 69(1), 3-19.
- Hörisch, J., Johnson, M. P., & Schaltegger, S. (2015). Implementation of sustainability management and company size: A knowledge-based view. *Business Strategy and the Environment*, 24(8), 765-779.
- Hughes, O. (2017). Public management: 30 years on. *International Journal of Public Sector Management*, 30(6-7), 547-554.
- Hunt, C.C. (2000). What have we learned about generic competitive strategy? A meta-analysis, *Strategic Management Journal*, 21(2), 127-154.
- Hunt, S.D. & Morgan, R.M. (1995). The comparative advantage theory of competition, *Journal of Marketing*, 59(2), 1-15.
- Iossa, E. & Martimort, D. (2015). The simple micro-economics of public-private partnerships. SSRN Electronic Journal.
- Iossa, E. & Saussier, S. (2018). Public private partnerships in Europe for building and managing public infrastructures: An economic perspective. *Annals of Public and Cooperative Economics*, 89(1), 25-48.
- Izumi, T. & Shaw, R. (2015). Overview and introduction of the private sector's role in disaster management. In: *Disaster Management and Private Sectors*. Springer, 1-10.
- Jap, S.D. (1999). Pie-expansion efforts: Collaboration processes in buyer-seller relationships. *Journal of Marketing Research*, 37(May), 227-245.
- Jap, S. D. (2001). Pie sharing" in complex collaboration contexts. *Journal of Marketing Research*, 38(1), 86-99.
- Jefferies, M. (2006). Critical success factors of public private sector partnerships: A case study of the Sydney Super Dome. *Engineering, Construction, and Architectural Management*, 13(5), 451-462.
- Jin, X.H. & Doloi, H. (2008). Interpreting risk allocation mechanism in public-private partnership projects: an empirical study in a transaction cost economics perspective, *Construction Management and Economics*, 26(7), 707-721.
- Jones, T.M. & Wicks, A.C. (1999). Convergent stakeholder theory. *Academy of Management Review*, 24(2), 206-221.
- Kahn, K.B. (1996). Interdepartmental integration: A definition with implications for product development performance. *Journal of Product Innovation Management*, 13(2), 137-151
- Klijn, E.H. & Koppenjan, J. (2016). The impact of contract characteristics on the performance of public-private partnerships (PPPs). *Public Money & Management*, 36(6), 455-462.
- Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization science*, 3(3), 383-397.
- Koppenjan, J.F.M. (2012). *The New Public Governance in Public Service Delivery*. Retrieved from <http://hdl.handle.net/1765/93164>.
- Lacity, M. C. (2018). Addressing key challenges to making enterprise blockchain applications a reality. *MIS Quarterly Executive*, 17(3), 201-222.
- Lambe, C.J., Spekman, R.E., & Hunt, S.D. (2002). Alliance competence, resources, and alliance success: Conceptualization, measurement, and initial test. *Journal of the Academy of Marketing Science*, 30(2), 141-152.
- Lavie, D. (2006). The competitive advantage of interconnected firms: An extension of the resource-based view. *The Academy of Management Review*, 31(3), 638-658.
- Lee, Y., McKone-Sweet, K.E., & Ryu, S. (2013). The role of complementary resources in the development of e-supply chains and the firm's performance: an exploratory analysis of secondary data. *International Journal of Operations Research and Information Systems*, 4(2), 1-21.
- Leiringer, R. (2006). Technological innovations PPPs: Incentives, opportunities and actions, *Construction Management and Economics*, 24(3), 301-308.
- Lin, Z., Yang, H., & Arya, B. (2009). Alliance partners and firm performance: Resource complementarity

- and status association, *Strategic Management Journal*, 30(9), 921-940.
- Mahoney, J.T. (1995). The management of resources and the resource of management, *Journal of Business Research*, 33(2), 91-101.
- McDonald, C. (2012). Superstorm alters companies' risk focus. November 14. <https://www.cfo.com/risk-management/2012/11/superstorm-alters-companies-risk-focus/>
- Murray, J., Kotabe, M. & Zhou, J. (2005). Strategic alliance-based sourcing and market performance: Evidence from foreign firms operating in China. *Journal of International Business Studies*, 36, 187–208.
- Noble, M.L. & Redick, T.P. (2020, December 21). COVID 19 and food: Spotlight on food waste. *American Bar Association*.
https://www.americanbar.org/groups/environment_energy_resources/publications/am/20201221-covid-19-and-food/.
- Nunnally, J. C. (1978). *An overview of psychological measurement. Clinical diagnosis of mental disorders*, 97-146.
- Osborne, S.P. (2010). Introduction the (New) Public Governance: a suitable case for treatment? *The New Public Governance?*
- Osei-Kyei, R. & Chan, A.P.C. (2015). Review of studies on the critical success factors for public-private partnership (PPP) projects from 1990 to 2013. *International Journal of Project Management*, 33(6), 1335-1346.
- Papadopoulos, T., Gunasekaran, A., Dubey, R., Altay, N., Childe, S.J., Fosso Wamba, S. (2017). The role of big data in explaining disaster resilience in supply chains for sustainability. *Journal of Cleaner Production*, 142, 1108-1118.
- Penrose, E.T. (1959). *The Theory of the Growth of the Firm*. New York: John Wiley.
- Peteraf, M.A. (1993). The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal*, 14(3), 179-191.
- Podsakoff, P.M., & Organ D.W. (1986). Self-Reports in Organizational Research: Problems and Prospects. *Journal of Management*, 12(4), 531-544.
- Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., & Podsakoff, N.P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903.
- Ray, G., Barney, J.B., Muhanna, W.A. (2004). Capabilities, business processes, and competitive advantage: Choosing the dependent variable in empirical tests of the resource-based view. *Strategic Management Journal*, 25(1), 23-37.
- Schuetz, S. & Venkatesh, V. (2019). Blockchain, adoption, and financial inclusion in India: Research opportunities. *International Journal of Information Management*, 1–8.
- Shaoul, J. (2005). A critical financial analysis of the Private Finance Initiative: selecting a financing method or allocating economic wealth? *Critical Perspectives on Accounting*, 16(4), 441-471.
- Sirmon, D.G., Hitt, M.A., & Ireland, R.D. (2007). Managing firm resources in dynamic environments to create value: looking inside the black box. *The Academy of Management Review*, 32(1), 273-292.
- Spoann, V. Fujiwara, T., Seng, B., Lay, C., & Yim, M. (2019). Assessment of public private partnership in municipal solid waste management in Phnom Penh, Cambodia. *Sustainability*, 11(5), 1228.
- Swanson, R.D. & Smith, R.J. (2013). A path to a public-private partnership: Commercial logistics concepts applied to disaster response. *Journal of Business Logistics*, 34(4), 335-346.
- United Nations Office for Disaster Risk Reduction (2020). *Annual Report 2019*.
<https://www.undrr.org/publication/undrr-annual-report-2019>.
- U.S. News and World Report (2020, December 22). *Here are 10 of the Deadliest Natural Disasters in 2020*. <https://www.usnews.com/news/best-countries/slideshows/here-are-10-of-the-deadliest-natural-disasters-in-2020>.
- Varadarajan, P.R. & Cunningham, M.H. (1995). Strategic alliances: A synthesis of conceptual foundations. *Journal of the Academy of Marketing Science*, 23, 282-296.
- Vasudeva, G., Spencer, J.W., & Teegen, H.J. (2013). Bringing the institutional context back in: A cross-

- national comparison of alliance partner selection and knowledge acquisition. *Organization Science*, 24(2), 319-644.
- Villani, E., Greco, L., & Phillips, N. (2017). Understanding value creation in public-private partnerships: A comparative case study. *Journal of Management Studies*, 54(6), 876-905.
- Wang, L. & Zajac, E.J. (2007). Alliance or acquisition? A dyadic perspective on interfirm resource combinations. *Strategic Management Journal*, 28(13), 1291-1317.
- Wang, X., Wu, Y., Liang, L., & Huang, Z. (2016). Service outsourcing and disaster response methods in a relief supply chain. *Ann. Operations Research*, 240(2), 471-487.
- Warsen, R., Greve, C., Klijn, E.H., Koppenjan, J.F.M., Siemiatycki, M. (2020). How do professionals perceive the governance of public-private partnerships? Evidence from Canada, the Netherlands and Denmark. *Journal of Public Administration*, 98(1), 124-139.
- Wayland, M. (2021, February 11). *How Covid led to a \$60 billion global chip shortage for the auto industry*. CNBC. <https://www.cnbc.com/2021/02/11/how-covid-led-to-a-60-billion-global-chip-shortage-for-automakers.html>.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171-180.
- Wiens, M., Schätter, F., Zobel, C., & Schultmann, F. (2018). Collaborative emergency supply chains for essential goods and services. In: Fekete, A. Fiedrich, F. (Eds.), *Urban disaster resilience and security*. Springer Cham, 145-168.
- Wittmann, M., Hunt, S.D., & Arntt, D.B., (2009). Explaining alliance success: Competences, resources, relational factors, and resource-advantage theory. *Industrial Marketing Management*, 38(7), 743-756.
- Worldbank (2018). What are public private partnerships? Viewed online July 28th 2020, <https://ppp.worldbank.org/public-private-partnership/library/procuring-infrastructure-ppps-2018>
- World Health Organization (2021). WHO Health Emergency Dashboard (COVID-19). Retrieved from <https://covid19.who.int/region/amro/country/us>.
- Yaga, D., Mell, P., Roby, N., & Scarfone, K. (2019). Blockchain Technology Overview. *ArXiv*. <https://doi.org/10.6028/NIST.IR.8202>
- Zhang, X. (2005). Critical success factors for public-private partnerships in infrastructure development. *Journal of Construction Engineering & Management*, 131(1), 3-14.