Strategic Resource Management under Causal Ambiguity – The Dynamic Resource-based view approach

Abstract

The Resource-based view (RBV) of a firm is a stream in the field of strategic management, which sees a firm as a bundle of resources. System Dynamics scholars, under the name of the Dynamic RBV, have employed system's perspective towards the RBV; that is, the firm is viewed as a resource system rather than a bundle of resources. This paper mainly discusses the notion of causal ambiguity, which is one of the theoretical cornerstones of the RBV. The traditional RBV sees causal ambiguity to have a paradoxical effect towards firm performance; a positive effect through providing protection to the firm's strategic resources, and a negative effect which undermines decision makers' decision quality. This paper attempts to disentangle the paradox by using the system's perspective; I identify causal ambiguity as a factor that hinders managers in understanding their resource system, and in turn their resource-developing decisions. The paper postulates that adopting system's perspective towards the resource system can help managers to manage causally ambiguous resource system. Finally five theoretical propositions that discuss potential resource management behaviors under causal ambiguity are presented.

Key words: Causal ambiguity, Dynamic Resource-based view, System's thinking, Decision behavior

Introduction

Over the years, system dynamics scholars have contributed to the field of strategic management through various channels such as strategic modeling (Morecroft 2007), System's perspective in strategy (Sterman et al. 2007, Gary et al. 2008), and the use of system dynamics simulation (Gary and Wood 2011). System dynamics scholars also made a contribution to the research stream of the Resource-based view (RBV) (Barney 1991) by combining system's perspective and the RBV. This system dynamics-based RBV perspective is referred as the 'Dynamic RBV' (Morecroft 2002, Morecroft 2008, Kunc and Morecroft 2010). The purpose of this paper is to extend the discussions of the Dynamic RBV.

This paper focuses on one of the founding column of the RBV, *causal ambiguity* (Lippman and Rumelt 1982). The two differing views on causal ambiguity are discussed. One sees causal ambiguity as an important source of a sustainable competitive advantage, whereas the other sees it as an obstacle to the firm performance. This paper reviews the theoretical contention of the both perspectives regarding this paradox of causal ambiguity. Then, the paper attempts to comprehend why such heterogeneous interpretation occurred in the first place. Also, following the Dynamic RBV line, I propose that adopting system's perspective towards the RBV and causal ambiguity can help disentangle the paradox.

Brief introduction to the Resource-based view

The RBV sees a firm as a bundle of resources. Resources refer to strategic assets that can be transformed into organizational performance (Barney 1986, Wernerfelt 1984). The core assumption of the RBV is that firms possess heterogeneous sets of resources and capabilities

(Barney 1991); in such context, a firm that possesses a superior resource than the competitors enjoys a supernormal profit or a competitive advantage over their rivals (Barney 1986, Peteraf 1993). However, the competitive advantage that results from possessing the strategic asset does not guarantee a sustainable competitive advantage. Once the value of the superior resource is revealed, there is a chance for competitors to follow the leading firm and pursue the same resources. If they can obtain the resources at similar cost, the competitive advantage of the leading firm will no longer exist. Addressing this issue, Barney (1991, 1995) proposed a VRIO framework, that is the Valuable, Rare, Inimitable, and Organizational structure to deploy such resources. He suggested that a firm will enjoy a sustainable competitive advantage if, and only if, the firm's strategic resource has VRIO characteristics. With this framework to hand, the RBV attests that firm profitability heterogeneity exists as leading firms have economic rent from possessing resources that are difficult to imitate and deploy.

Causal ambiguity as a source of sustainable competitive advantage

Under the traditional RBV, causal ambiguity is a core concept that forms the inimitability of strategic resources. The term was first coined by Lippman and Rumelt (1982); they suggested that firm heterogeneity rises as firms find it difficult to imitate a rival firm's product due to the presence of causal ambiguity in the rival firm's actions. Reed and Defillippi (1990) suggested that the presence of causal ambiguity raises the barrier to imitation; with the protection of valuable assets, firms can enjoy the sustainable competitive advantage which stems from casual ambiguity. Barney (1991) adopted this view and introduced inimitability as one of the four characteristics of strategic resources that can provide economic rent to the firm; causal ambiguity was contested as a source of inimitability. Barney contends that causal ambiguity must be experienced by the managers within the firm that possesses the strategic resources. He postulated that if the managers did not exhibit the causal ambiguity, the knowledge would be diffused into other firms in a long run, making the resource to be vulnerable to imitations. More specifically, the traditional RBV contests that causal ambiguity is an important *ex ante* condition for a firm to have a sustainable competitive advantage, as rival firms will find it hard to imitate or replicate the firm's success. That is, the rivals will find difficulty in choosing which resource to imitate, let alone how (Peteraf 1993). A mathematically articulated experimental study (Ryall 2009) showed that causal ambiguity protects a firm's core competency while the rival firms engage in an experimental behavior to understand the successful firm's competency. Despite these postulations, such positive effect of causal ambiguity has been often overlooked by scholars who viewed causal ambiguity as a factor that hinders resource utilizations.

Causal ambiguity as a barrier to a sustainable competitive advantage

There are a number of researchers (Szulanski 1996, McEvily, Das, and McCabe 2000, Kunc and Morecroft 2010) who oppose the positive effect of causal ambiguity. In general, managers who experience causal ambiguity regarding their strategic resource are equally unknowledgeable regarding their strategic resources as their competitors (Peteraf 1993); such ignorance may lead them to find it difficult to leverage the strategic resource for various reasons. Firstly, causal ambiguity may initiate a potential difficulties in transfer of their resources (Szulanski 1996, Simonin 1999). The studies showed that causal ambiguity regarding a resource can result in *resource stickiness*, which causes complications in transfer of the resource to other department or organizations. Secondly, the economic rent that is

created by possessing a strategic resource may not be realized through performance (Coff 1997, Ambrosini and Bowman 2010); that is, the benefit of strategic resource can be vanished by improper resource management by managers. Thirdly, causal ambiguity can directly impede firm performance. Managers experiencing causal ambiguity cannot identify the source of their competitive advantage, and this will results in under-utilization or even destruction of the resource, caused by ignorance (Ambrosini and Bowman 2005, McEvily, Das, and McCabe 2000). Lastly, causal ambiguity hinders the resource-development behavior of managers (Foss and Ishikawa 2007, Kunc and Morecroft 2010). Managers need to manage and develop resources in a challenging complex environment, and having an inadequate comprehension of the strategic resources will lead them to exhibit subjective and biased decision behaviors; this will result in sub-optimal resource development behavior.

Then, causal ambiguity acts as a two-edged sword. On one hand, causal ambiguity protects the firm's strategic resources by raising the barriers from imitation; on the other hand, it can result in mismanagement and destruction of the resources. Such notion is known as *causal ambiguity paradox* (King and Zeithaml 2001, Powell, Lovallo, and Caringal 2006). The next sections introduce the two classifications of causal ambiguity by past literature that attempted to disentangle the paradox; namely, characteristic vs. linkage classification and inter- vs. intra-firm classification.

Characteristic and linkage ambiguity

One categorization of causal ambiguity is making a distinction between characteristic and linkage ambiguity (Ambrosini and Bowman 2010, King and Zeithaml 2001, Powell, Lovallo, and Caringal 2006). Characteristic ambiguity is defined as an ambiguity that arises from the resource itself, whereas linkage ambiguity relates to a confusion which surrounds the relationship between the resource and performance (King and Zeithaml 2001). It is found that characteristic and linkage ambiguity have, respectively, a positive and negative effect towards firm performance (King and Zeithaml 2001, Powell, Lovallo, and Caringal 2006). Characteristic ambiguity helps a firm to maintain their strategic resource from imitation. On the other hand, linkage ambiguity hinders managers in a firm to track down which specific resource is responsible for the competitive advantage of the firm; this may result in managers to not be aware of which resource needs to be protected and endorsed. Figure 1 illustrates the characteristic and linkage ambiguity graphically. Characteristic ambiguity refers to the potential ambiguity in understanding the working of the three resources (Supply chain capacity, loyal customer base, and customer base). In this case, ambiguity in each resource's relationship with performance will be noted as linkage ambiguity.

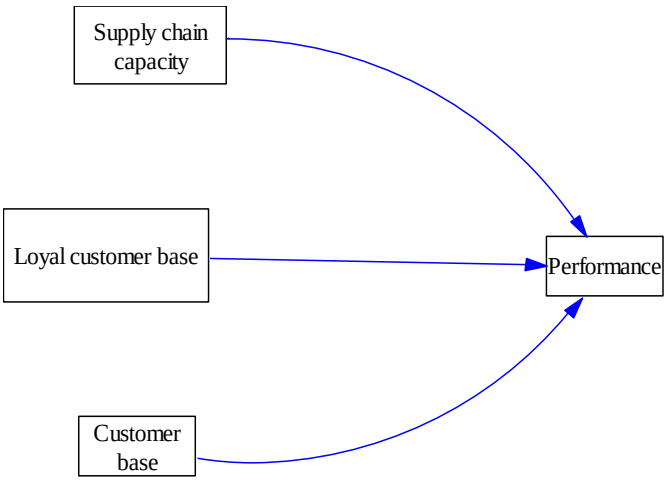

Figure 1: Characteristic/linkage ambiguity

I adopt system's perspective to further the characteristic/linkage ambiguity distinction. Conventional theories on causal ambiguities (Powell, Lovallo, and Caringal 2006, King 2007) focuses on a resource-performance relationship within a given time span. However, organizations do not run for a given period and then cease to exist. A snapshot of performance, which is normally interpreted via profit or Return On Asset (ROA), can only provide limited information (Gary et al. 2008). The performance of a firm should not only be interpreted as an output of the firm's activities, but should also be considered as an input of the firm's actions. That is, the performance of a firm can be fed back into the resource system of the firm, and be used as a basis for a new investment for a new resource or further development of the existing resources. This system's perspective advances the traditional static RBV into the Dynamic RBV, where a firm is seen as a dynamic resource system that needs to be managed over time (Morecroft 2002). In other words, I advocate that a firm should be interpreted as a *system of resources*, rather than a *bundle of resources*.

Figure 2 shows a simple illustrative example of the resource system of the same firm that was depicted in Figure 1. As can be seen from the figure, the resources are not only related with performance indicators (cash and sales), but also complexly intertwined with one another (Kunc and Morecroft 2010). Furthermore, the figure shows that there are several feedback loops in the resource system, where performance of the firm feeds back into the resource system in the form of investment and spending. Based on system's perspective, I propose that a complex and non-linear relationships between resources, as well as the feedback process of the resource system are the sources of causal ambiguity of the resource system. Therefore, I define causal ambiguity as *perceived ambiguity or confusion that arises from the firm's resources or the inter-relationship among them.*

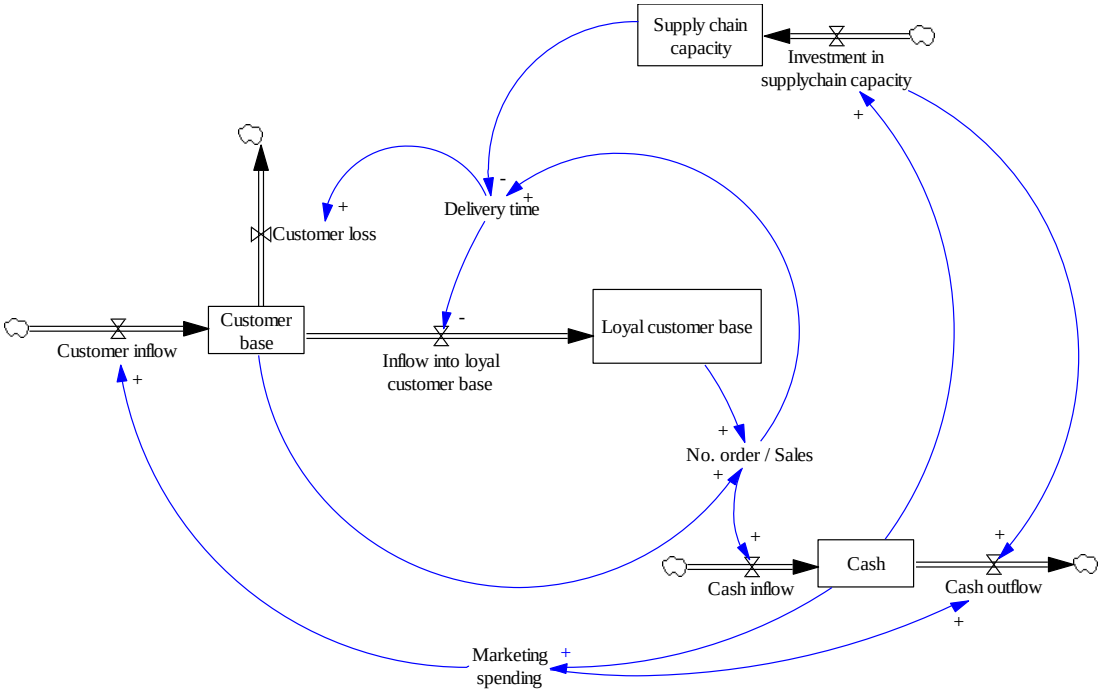

Figure 2: The resource system of a firm

Inter- and intra-firm causal ambiguity

Aside the categorization of characteristic/linkage ambiguity, there is also a categorization based on the location of the causal ambiguity. Conventional causal ambiguity literature strongly proposes that causal ambiguity should be experienced by both the firm and its rivals; this is to prevent the potential knowledge diffusion to its rivals over the long term (Barney 1991). Opposing to this view, King (2007) introduced a categorization of inter- and intra-firm causal ambiguity. She suggested that inter-firm causal ambiguity raises barriers to imitation, whereas intra-firm causal ambiguity causes management confusion. Although this demarcation can be useful, this distinction did not directly solve the paradox, as it did not confront the traditional RBV's contention regarding the need for both intra- and inter-firm causal ambiguity. Instead of simply demarcating intra- and inter-firm causal ambiguity, I discuss a condition where both types of ambiguities are essential, and also a condition where only inter-firm casual ambiguity is essential to have a competitive advantage. I demarcate such conditions by categorizing resources into two types, *idiosyncratic (firm specific)* and *generic*.

An idiosyncratic resource refers to a resource that is only available to a specific firm. This type of resource is no longer special once rival firms comprehend the workings of the resource, therefore, maintaining the inimitability of the resource is a key task in order for the firm to enjoy a sustainable competitive advantage (Peteraf 1993). In this setting, the traditional notion of causal ambiguity can be applied, a notion where both intra- and inter-firm causal ambiguity act as a beneficial factor that raises a barrier to imitation (Barney 1991, Reed and DeFillippi 1990). On the other hand, a generic resource refers to a resource that is available throughout the competitive environment thus all competitors have access to it. For a generic resource, a firm that understands the workings of the resource will accumulate the resource at a relatively faster rate, leading them to enjoy the competitive advantage over their

rivals. In this case, intra-firm causal ambiguity can be defined as a negative factor that hinders managers to accumulate their resource (King 2007, Kunc and Morecroft 2010). However, in a case where the generic resource is accumulated to a certain level, inter-firm causal ambiguity (King 2007) can prevent rivals from comprehending the accumulation process of the leading firm. This inhibits the imitation of the resource, giving the leading organization to have sustainable competitive advantage (Dierickx & Cool, 1989). Lastly, it is also possible that a generic resource can be accumulated to convert into a firm-specific resource (for example, patent from accumulated R&D activities). Therefore, causal ambiguity can play different roles depending on the type of resource.

It is important to note that a resource system is normally consisted of both generic and idiosyncratic resources. Moreover, those resources are complexly interconnected with each other (Dierickx and Cool 1989, Kunc and Morecroft 2009). Due to such interconnectedness and complexity, a manager experiencing causal ambiguity over an idiosyncratic resource is susceptible to experiencing causal ambiguity over its interconnected resources, or even over the whole resource system. In that case, the manager will not only be able to accumulate the idiosyncratic resource, but also can fail to accumulate interrelated generic resources. For example, returning to Figure 2, the figure shows the difficulty in separating generic and idiosyncratic resources. *Loyal customer base*, which is a potential idiosyncratic resource, is determined by the flow from the *Customer base*, a generic resource. The outflow of *Customer base* and the inflow to *Loyal customer base* is both determined by *Delivery time*. In this case, a management leaving a certain degree of ambiguity in *Loyal customer base* resource will inevitably deter their accumulation process in the generic resource, *Customer base*. Therefore, I echo the Dynamic RBV's perspective (Morecroft 2002, Kunc and Morecroft 2010) by acknowledging the importance of comprehending the causal relationship between resources. Based on the clear definition of casual ambiguity, this paper proposes that systemic understanding of a resource system helps managers to effectively manage causally ambiguous resource system.

Theoretical propositions

Seeing a resource system with a system's perspective will support managers to effectively manage their resources A resource management process is often challenged by causal ambiguity (Kunc and Morecroft 2010); managers often misinterpret the resources' interrelationships and thus make ineffective decisions. By having a systemic understanding of the resource system, managers can appreciate the causal effect of their decisions and thus experience less causal ambiguity of the firm resource system during management of these resources. The following proposition was created, based on the above notion:

P1. A manager who possesses a systemic understanding of the interrelationships between resources will exhibit less causal ambiguity regarding the firm's resource system than one who understands resources as discrete resources.

The causal ambiguity regarding the resource system hinders managers in correctly comprehending the working of their resources (King 2007). Within the context of managing resources, where the task is to develop and accumulate the resources in a sustainable way, causal understanding of the resource system plays an important role. If a manager does not possess appropriate knowledge of the firm's resource system, the manager may make wrong decisions in an attempt to develop a strategic resource (Kunc and Morecroft 2009); this will

result in an unexpected outcome which may be different from the decision maker's initial expectation. Hence, a manager who experiences less causal ambiguity will comprehend the working of the resource system better and thus is expected to make more effective decisions than one who experiences a high level of causal ambiguity.

The idea of cognitive overload (Kirsh 2000) can also cause potential performance gap between the managers with systemic and discrete understanding. Managers who attempt to develop strategic resources develop two levels of understanding (Kunc and Morecroft 2010). First, relevant resources, factors and their relationships are conceptualized (resource conceptualization). Secondly, the resources' specific flow-rates (Sterman 2002) that are imposed on each relationship are understood through goal-seeking behavior (resource management) (Morecroft 2002, Kunc and Morecroft 2009); in other words, managers develop an understanding of the flow-rate by learning from how a change in one factor affects its related resources. Using this knowledge, the gap between current and desired level of resources can be narrowed. When managing strategic resources, managers with a systemic understanding are considered to have conceptualized the resource system to some extent; this is because they have developed an understanding of the relationships between the resources and they only need to develop the understanding of the specific flow-rates that are attached to resources. On the other hand, managers with a discrete understanding of the resource system need to improve their understanding of the relationship between the resources while managing the resources from decision feedback. However, managers' perceptions of the decision feedback are known to be unreliable due to "misperceptions of feedbacks" (Sterman 1989, Sterman 2000). Taking this into consideration, the task of conceptualizing the interrelationships of the resources and their specific flow-rates simultaneously exceeded the managers' cognitive processing capacity, causing cognitive overload (Speier, Valacich, and Vessey 1999, Kirsh 2000); this is expected to adversely affect the decision effectiveness.

Based on the above two theoretical ideas, the following proposition is proposed:

P2. A manager who experiences less causal ambiguity in the resource system would enjoy superior performance than a manager experiencing high level of causal ambiguity.

The difference in performance outcome is likely to arise since a manager experiencing a high level of causal ambiguity would accumulate the resources at a slower pace. Managers develop resources based on managing the rate of the inflow and outflow of the resource level: this decision behavior is named *purposive adjustment behavior* (Morecroft 2002, Kunc and Morecroft 2010). A manager who exhibits less causal ambiguity is likely to know how to accumulate a resource, thus he or she will be able to control the resource system effectively through comprehending the effect of his or her decisions. This systemic and goal-oriented accumulation behavior is termed *proactive resource management behavior* (Morecroft 2002). Conversely, managers who do not possess this understanding will be slower to accumulate the resource as they will need to improve their understanding of the working of the resources before they can initiate proactive resource management behavior. These managers are first likely to engage in *hypothesis testing decision behavior* (Mosakowski 1997), where they make a set of rules and test them, then learn from the outcome and revise their decision. The following proposition originates from this idea:

P3. A manager who experiences high causal ambiguity over a resource system will exhibit hypothesis testing behavior for longer than a manager experiencing lower causal ambiguity.

Managers who experience less causal ambiguities are considered to be in control of the resource system. With their comprehensive knowledge of the causal relations, they are expected to evaluate information accurately enough in order to be able to choose which resources need to be controlled appropriately. This may lead them to develop their resources through proactive resource management behavior (Morecroft 2002), driven by systemic interpretation of information. On the other hand, managers who experience a high level of causal ambiguity are in a position where they are required to make decisions with limited information. Managers with limited information make "satisficing" decisions (Simon 1978, Pidd 2004). That is, due to limited time and resources, managers focus only on the information which he or she perceives to be helpful (Ocasio 1997, Cho and Hambrick 2006). Upon selecting the information, managers selectively pay attention to the information that falls within their speciality or interest (Dearborn and Simon 1958, Beyer et al. 1997); this selective perception not only gives managers confidence regarding their decisions, but also enables them to process the information quickly. However, it does not guarantee effective strategic decision-making for two reasons. Firstly, the use of selective perception can have a positive effect upon the managers' understanding of the competitive environment only if the managers focus on the information that is applicable to the problem situation (Cho and Hambrick 2006, Gary, Wood, and Pillinger 2012). The interests of managers differ from one to another thus decision effectiveness is dependent on the relationship between selected information and the problem situation. Hence, selective perception may result in managers making a sub-optimal decision as the decision process is not an objective analytical process but rather a biased process. In short, selective perception can lead to poor performance due to an inappropriate comprehension of the resource system. Secondly, biased decision-making may lead a manager to develop the resources that he or she is interested in, rather than developing the resource system based on a comprehensive understanding of the system; this conforms to the luck aspect in the strategic factor market of the RBV which Barney proposed as the origin of resource heterogeneity between managers (1986; 1989) He proposed that bounded rational managers are likely to make biased decisions due to absence of perfect information, which leads firms to possess heterogeneous resources with different values.

This study suggests that this selective perception is more prevalent in managers with a discrete understanding of the resource system than in managers with a systemic understanding. As mentioned when introducing H1, managers with a discrete understanding of the resource system need to conceptualize the resource system while managing it; this is a highly complex task which is likely to overload their information processing capacity (Speier, Valacich, and Vessey 1999, Eppler and Mengis 2004). In this case, managers are likely to engage in selective perception in order to handle excessive information within a limited time and resources. Hence, the following proposition is proposed:

P4. A manager who experiences high causal ambiguity is more likely to attend to those resources which align to their interests than a manager experiencing lower causal ambiguity.

Lastly, having a systemic understanding is expected to support managerial learning over time. Systemic understanding helps managers to build an accurate conceptualization, or model, of a resource system. It has been argued that having a model can be used as an effective learning tool (Morecroft 1984, Graham et al. 1992, O'Brien and Dyson 2007). By having a model of a system, a manager can build their understanding in the concept of stock and flow as well as the idea of feedback loops (Morecroft 2007). Through the accurate identification and understanding of the feedback loops, managers can interpret better their decisions; this helps

managers to be less susceptible to misperceptions of feedback (Capelo and Dias 2009). Through the accurate interpretation of the feedbacks, managers can challenge their mental models, and improve their decisions over time, helping their managed firm to become a learning organization (Senge 2006). Therefore, managers with a systemic understanding of a resource system would not only effectively improve their performance over time, but also improve their resource management decision behaviors over time. Based on this, the following proposition is presented:

P5. *A manager with a systemic understanding of a resource system would improve their decision behavior and performance more effectively than a manager without such understanding*

Conclusion

This study discussed one of the prevalent concepts in the RBV, causal ambiguity. I have reviewed the paradox of causal ambiguity, and advocated that system's perspective can be a key to disentangle the paradox. I postulate that a firm should be seen as a *system of resources*, rather than a *bundle of resources*; adopting this systemic view should supplement the RBV to appreciate the complexity and interrelationships between resources, and highlights the aspect of managing the resource system. Furthermore, I suggested that the casual ambiguity paradox originates from neglecting the difference between generic and idiosyncratic resources. Most firms' resource systems are composed of both firm-specific and generic resources. To achieve a sustainable growth via resource management, an accurate understanding of the interrelationships between the resources, both generic and idiosyncratic, is required. For the case of idiosyncratic resources, it is important for managers to be accurately aware which resources are idiosyncratic resources in order to protect the resource by leaving some aspect of the resource to be ambiguous. However, it is more important for managers not to simply neglect (Morecroft 2008) the idiosyncratic resources as those resources form an integral part of the resource system, and a failure to comprehend their relationships with other resources will result in ineffective resource management behavior. Based on this premise, I developed five theoretical propositions that discuss the potential resource management behaviors that managers may exhibit when they adopt system's perspectives towards the resource system[1].

This paper, through discussing causal ambiguity from the system dynamics' perspective, joins the recent endeavor of the Dynamic RBV in bridging system dynamics and the RBV. The Dynamic RBV has applied many system dynamics' concepts into the RBV; stock and flow is depicted as a resource accumulation process, and auxiliaries and causalities highlight the management policy and external factors that influence the resource accumulation process (Kunc and Morecroft 2009). I believe that this system's perspective can help the RBV scholars to depict a firm as a complex resource system rather than depicting it based on the static neo-classical economic model. This will help the scholars to better locate the source of competitive advantage, which in turn would help ameliorate explaining the origin of firm heterogeneity.

[1] The twin study by the same author, *"Strategic Resource Management under Causal Ambiguity – An Empirical Study of Resource Management Dynamics"* tests four of the propositions (P1, P2, P3 and P5) in a manner of hypotheses testing study.

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