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Horse and cart: The role of resource acquisition order in new ventures



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ABSTRACT

Entrepreneurs need to accumulate different types of resources to take the initial steps to grow their ventures. While much is known about the configurations of resources that improve venture success, less is known on how ventures should *initially* accumulate resources to begin to exploit valuable opportunities. Using agent based simulations, we classify resources by the functions (search and execution) that they provide. We find that acquiring search resources before execution resources leads to more valuable opportunities, but only under conditions of higher uncertainty. We contribute to the entrepreneurial resource acquisition literature by showing how resource order may affect an entrepreneur's ability in opportunity discovery, evaluation, and exploitation. We draw inferences on contingencies that can increase the salience of resource order on venture success.

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1. Introduction

New ventures typically lack the necessary resources to survive and grow, and thus need to acquire critical resources in order to overcome liabilities of newness and smallness (Aldrich and Auster, 1986; Stinchcombe, 2000). Not surprisingly, research focused on entrepreneurial resource acquisition (Chen et al., 2008; Lounsbury and Glynn, 2001; Zott and Huy, 2007), is a core area of focus in the domain of entrepreneurship. Extant research has primarily focused on the attributes of resources that afford new ventures greater probabilities for growth and survival (Amit and Schoemaker, 1993; Mahoney and Pandian, 1992; Peteraf and Barney, 2003),

However, most resource bundles are not acquired instantly, but rather in a sequential and path dependent process (Lavie, 2012; Pacheco-De-Almeida et al., 2008). These resources influence the ability to discover, evaluate, and exploit opportunities (Fosset et al., 2013; Keh et al., 2002; Shane, 2000). The practice-oriented literature in lean startups (Blank, 2013; Breuer, 2013; Ries, 2011) also notes the path dependent nature of early resource choices and their effect on future venture growth. In particular, many entrepreneurs start from scratch with little or no resources; in such instances, early resource choices may have a heightened impact on venture growth and performance (Alvarez and Busenitz, 2001; Lichtenstein and Brush, 2001).

In this paper, we focus on how the functions for which resources are used create contingencies in the ordering of resources. Resources do not, in and of themselves, provide functionality (Penrose, 1959). And, even when ventures acquire

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similar resource configurations, their choice of which resource to acquire first can vary. We propose that resources can be used for search and execution, and that some resources are better suited for each function. Using agent based simulations, we explore the effects of acquiring search and execution resources in different orders. In short, we find that different resource acquisition orders equate to putting the horse before the cart while others seem to be putting the cart before the horse.

2. Resource configurations

There is increasing awareness that besides resource attributes themselves (Barney et al., 2001), the process of resource accumulation itself may affect resource bundle attributes and contribute to performance benefits (Hoopes et al., 2003; Lavié, 2012; Peteraf and Barney, 2003). Emerging ventures that seek to develop new resource combinations find that many resources are non-tradable with non-existing factor markets (Alvarez and Busenitz, 2001; Dierickx and Cool, 1989; Stevenson and Jarillo, 1990). Rather, resources are combined together to provide the firm services, or functions (Baker and Nelson, 2005). Yet the general lack of resources and incomplete and fragmented factor markets often force new ventures 'to beg, borrow, or steal', to co-opt whatever resources they can find (Starr and MacMillan, 1990) and/or 'make do with what is at hand' (Baker and Nelson, 2005). The need for resources may cause entrepreneurs to acquire resources that are needed, but ill-adapted to their most immediate needs.

We focus on two functions that resources can enable that allow new ventures to take the initial steps of pursuing entrepreneurial opportunities (McMullen and Dimov, 2013). First, *search resources* are resources that help ventures discover and evaluate opportunities. Prior research indicates that entrepreneurs become aware of, recognize (Baron and Ensley, 2006) or discover (Klein, 2008) opportunities largely due to prior knowledge (Shane, 2000). Although an entrepreneur may be able to recognize many different opportunities, only after evaluation does an entrepreneur know if the opportunity is worth pursuing, or whether another opportunity would be better (McMullen and Shepherd, 2006). In sum, we label resources related to the processes of discovery and evaluation—which are inherently intertwined processes—as search resources.

Search resources aid in pattern recognition (Baron and Ensley, 2006). Breadth of knowledge and experience (e.g., working in different startups, different lines of business, different contexts, playing different roles), technological knowledge (Keh et al., 2002; Kor et al., 2007), and experiencing both success and failure (Cope, 2011) can create search resources. These various dimensions of experience help to more fully develop decision-making heuristics needed in discovering and evaluating opportunities (Wood and Williams, 2014). While an individual entrepreneur or entrepreneurial team may possess some of these search resources, they typically need to also access additional search resources through advice and mentoring from other investors, advisors, and mentors (Amezcuca et al., 2013; Dutt et al., 2015; Kor and Misangyi, 2008), professional forums, and even nearby colleagues who act as sounding boards for business ideas (Ozgen and Baron, 2007). Access to resources that can be used for search is one of the benefits of working in an entrepreneurial cluster. As entrepreneurs interact with these requisite resource providers, they are better able to evaluate and validate opportunities (Wood and McKelvie, 2015).

The second resource category is *execution resources*, which embody elements that enable new ventures to fulfill the core value proposition by providing the product and/or service to customers. Execution resources specifically are focused on opportunity deployment (Choi et al., 2008; Foss et al., 2013) and are needed to configure inputs and develop processes—in short, to facilitate opportunity exploitation. While money is often considered as a key resource, in and of itself, money does not perform search or execution functions. Rather, it facilitates acquiring resources that can serve these functions for the firm. This can include intangible resources such as management, human resources, programming knowledge, marketing and financial resources, as well as tangible resources such as equipment, facilities, or materials. As in the case of search resources, an entrepreneur or entrepreneurial team may possess some execution resources, but they often need to acquire execution resources through others, including employees, suppliers, investors, and advisors (Foss et al., 2013).

Overall, although we can clearly identify what resources new and emerging ventures need—search resources and execution resources—we have precious little empirical knowledge to guide us (as researchers) or inform stakeholders (practitioners and entrepreneurs) which resources to acquire first. We model this dilemma in the following simulation.

3. Simulation study

We model the performance effects of the process of acquiring resources in new ventures by focusing on how resources influence a new venture's ability to discover, evaluate, and exploit opportunities. Our use of the term 'ventures' encompasses both sole entrepreneurs as well as teams of entrepreneurs who have already set up a firm. We use NETLOGO's agent based modeling environment that approximates the process of resource assembly for two types of resources (i.e., search and execution). While we do not build specifically on a prior model, similar methods have yielded insights across multiple domains including computer science (e.g., Dickerson, 2014), marketing (e.g. Negahban and Yilmaz, 2013), and entrepreneurship (e.g., Dilaver et al., 2014). Previous studies have, for example, used simulations to study organizational co-evolution, decision choices, and high-performance achievement (Ethiraj and Levinthal, 2004; Levinthal, 1997; Rivkin, 2000).

Simulations hold promise to reveal insights in areas where empirical data are hard to obtain (Davis et al., 2007), such as choices of innovation or imitation by firms (Strang and Macy, 2001) or a firm's search for the optimal organization design (Rivkin and Siggelkow, 2007). We depart from these models in our selection of counterfactuals—alternate resource order choices made early in the life of firms. Specifically, in our model, ventures are assigned exogenously to two counterfactual resource accumulation orders and we compare the steady state effects of these different resource choices on performance. Our goal is not to develop a formal computational model but rather to derive intuition for future theory building (Harrison et al., 2003). We focus on the simplest possible ordering relationship between just these two types of resources to build a foundation on which more complex ordering relationships can later be developed.

4. Model description and setup

In the NETLOGO simulation environment we created a 'fitness landscape' where each location represented an opportunity of a given potential value that varied from 0 to 1 which was denoted as the elevation of that location. We then randomly placed 500 ventures (agents) on this 'fitness landscape.' The random placement of ventures on the fitness landscape mimics the differences in initial opportunities available to new ventures. The performance goal for each venture is to move across the landscape to reach higher elevations. To achieve their performance goal of achieving the highest value available—our dependent variable is the highest elevation reached—ventures need to do two things: 1) visualize the adjacent terrain (via search resources), and 2) move over increasing gradients to reach higher potential (via execution resources). In each time period, ventures can identify and move to a location in their von Neumann neighborhood which has a higher elevation than their current location. It is important to note that merely having search resources may not suffice since to move to higher locations, using optimal paths, ventures would have to use execution resources. Similarly, having only execution resources restricts ventures to inefficient paths around the local maxima. The key advantage of our simulation setup is it allows us to compare and contrast two counterfactual resource accumulation sequences—search followed by execution or execution followed by search.

Each venture has an initial endowment of resources that enables it to identify the opportunity potential in its immediate 4-cell neighborhood and traverse to a location with higher gradient. Ventures in the sample are randomly assigned to two different resource accumulation orders—search followed by execution and vice versa. Ventures are given search or execution resources after a random number of ticks. Search resources are operationalized as the radius for the local von Neumann¹ neighborhood occupied by the focal venture while execution resources represent the steps required to traverse to the highest elevation within the search space.² The opportunity potential in a given landscape for traversing within the maximum radial distance r using for example k steps within its visualized search space is given by the function $\sum_{k=0}^r (r/k)(r+k/k) \cdot V_i$ where V_i denotes the value (elevation) for that location. The ability of the venture to reach optimal opportunity potential thus depends on three key factors—search resources, execution resources, and their current location in the landscape of opportunities. The potential of the current location is a dynamic variable which changes as the ventures traverse the landscape to improve their potential. This simulates dynamism of opportunities over time. The simulation stops at steady state when no further improvements in fitness are possible. We ran the simulation for 1000 iterations and collected steady state behavior over all iterations consistent with simulation based computational models used in prior literature (Watts and Gilbert, 2014).

4.1. Model assumptions

Our simulation models the movement of the ventures across the landscape over multiple time periods—mirroring the iterative process by which ventures exploit opportunities, constantly tweaking and changing plans in light of new information (Gerasymenko et al., 2015). Evidence from practice also supports this assumption that entrepreneurs are unlikely to be correct in their *initial* perception of opportunities and value creation is often an iterative process that requires shifting and pivoting from the original plan (Breuer, 2013; Ries, 2011)—ventures in our simulation frequently change direction to reach higher elevations in their constantly changing neighborhoods. In addition, this process is boundedly-rational with ventures often following non-optimal paths as their information sets change over time (Denrell et al., 2003). Since our primary interest was comparing two counterfactual resource orders, for the sake of simplicity, the effect of competition is modeled only in the shape of the landscape (opportunities are defined with respect to existing competition). In other words, while we simulate 500 ventures on the same landscape, the ventures do not interact with each other or compete for search and execution resources (this would be a valuable area for follow-up research). While the simulation runs through multiple periods, it provides insights solely on the initial process by which ventures discover, evaluate, and exploit opportunities

¹ The ventures start with a von Neumann radius of 1 that allows them to tweak their opportunity in a 4-cell neighborhood region but as ventures acquire search resources the value of radius r increases allowing the venture to visualize its opportunity potential over increasingly larger areas given by the function $f(r)=(2r+1)^2-1$.

² The number of possible ways to traverse a given radius of locations is given by the Delannoy number for that particular radius. Initially, all ventures start with the ability to travel to the next higher elevation within a 4-cell neighborhood but as they acquire execution resources the subset of paths they can take to reach the highest elevations reduces allowing faster and efficient realization of opportunity potential.

(Galunic and Rodan, 1998; Hoopes and Madsen, 2008).

4.2. Complexity contingencies

In addition to varying the order of resources, we also manipulated the complexity of opportunities by varying the steepness of the landscape—i.e., the gradient between two spatial locations. A steeper landscape (lots of high elevations and valleys) implies that within any search space radius, the difference in opportunity potential is likely to be very high making any gradient climb less predictive of reaching optimal elevations. In contrast, less complex landscapes are modeled as landscapes with moderate hills and valleys where the contrast in opportunity potential is mild and gradients are good indicators of paths to higher elevations. We consider the contingencies of complexity by reporting results for the effect of resource order on the two different landscapes.

5. Results

5.1. Baseline model

To investigate *whether* order matters and how, we first need to establish, *ceteris paribus*, that both search and execution resources actually do matter and are important for the ventures in our simulation. This is akin to a manipulation check that ensures that our model requires new ventures to combine two different resources to enhance their fitness. If our arguments are valid then ventures that use both search and execution resources should outperform those that have access to only one of them and reach higher elevations.

In Fig. 1a, we see that ventures with both resources have performance (achieve higher elevations) that exceeds that of ventures with just execution resources, which in turn exceeds that of ventures with just search resources. The intuition is that having both resources allows ventures to combine search and execution resources and identify the shortest paths to improve their elevations. The importance of both resources is enhanced for steeper landscapes (Fig. 1a) while the advantage of combining resources has less benefit when the terrain is smooth and stakes are low (Fig. 1b). Overall in steeper landscapes, ventures with only execution resources on average do 21.34% better than ventures with only search resources—however having access to both resources is better than having only execution resources by 7.2%. These baseline advantages do not hold when the landscape is very smooth as all resource endowments have the same probabilities of reaching higher elevations.

5.2. Resource accumulation order

Having established that search and execution resources do matter, we next manipulated the order of resource accumulation and observed how it affects performance. We contrast the performance between ventures that acquired search after execution to those that acquired execution after search. By experimentally assigning the two different orders of resource assembly for the ventures in our model, we can identify the relationship between order and performance for different values of opportunity complexity.

For less steep landscapes (Fig. 2b), the simulation demonstrates little difference in performance between ventures with different orders of resource accumulation. This is because for less steep landscapes, moving along paths of increasing elevations is likely to result in reaching optimal opportunity potential. In addition, with missteps being less expensive, over time both resource orders yield similar levels of steady state performance. Whether firms choose search and execution or execution and speed, the paths to reach higher elevations are relatively straightforward. However, for steeper landscapes (Fig. 2a), ventures that gain search resources followed by execution resources do 7.9% better than those that have execution followed by search resources. In these situations, ventures with execution resources first pursue sub-optimal paths and the ruggedness of landscapes makes missteps expensive. Overall, we observe that the effect of resource accumulation order on performance is more salient in steeper landscapes.

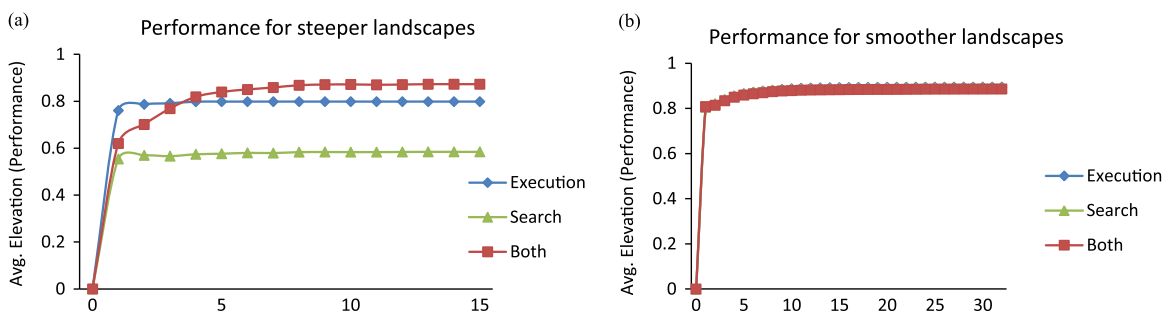


Fig. 1. The Effect of Both Resources on Performance.

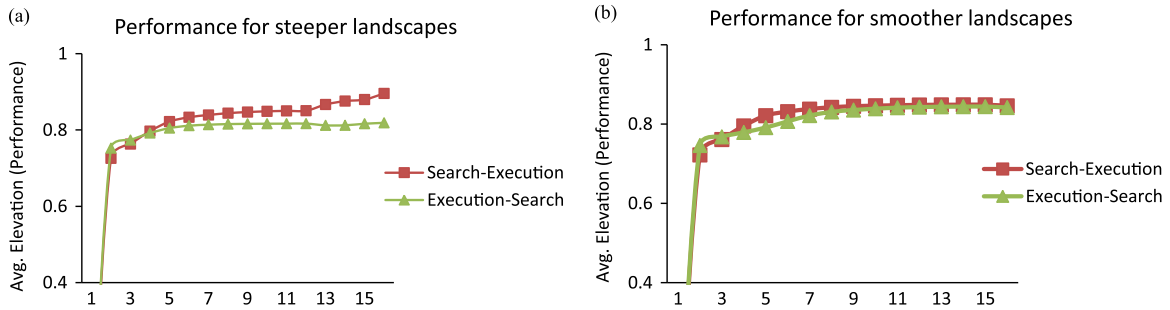


Fig. 2. The Effect of Resource Order on Performance.

6. Discussion

Our results support the following conclusion: *Ventures that acquire search resources before execution resources will outperform those ventures acquiring execution resources before search resources. Furthermore, this effect is stronger when an environment is complex.* This is an insight that is of great theoretical as well as practical value. First, this challenges the prevailing wisdom in the literature—that the resource configuration, not order, matters most. And, this insight helps drive intuition that can inform theory development on how resource orders *may be as important as* resource configurations in their effect on venture growth and survival. Furthermore, this finding provides clear, actionable, advice for practitioners and entrepreneurs to bear in mind during startup (i.e., search resources before execution resources).

Although the experimental control of this simulation study involves a simplification of reality, we maintain that it still has applicability to real-world complexity. Our findings agree with research that suggests that an entrepreneur's understanding of the value of a resource is limited, as it is impossible to put a value on the entire gamut of possible resource configurations (Denrell et al., 2003). Over time, an entrepreneur's understanding of the venture's opportunities and capabilities almost invariably change (Helfat and Peteraf, 2003), forcing adjustments to accommodate new resource combinations as new information is gained. In practice, it is generally recognized that initial perceptions may require significant tweaking and even experienced entrepreneurs urge stakeholders to understand that they must often "pivot" (Ries, 2011), or move quickly to 'plan B' (Mullins and Komisar, 2009), rather than fail based on the original opportunity that they perceived. Where we add value—and how we propose this study maintains its real-world applicability—is that we explicitly link specific resources (search vs. execution), and the order of acquisition, with the ability to discover, evaluate, and exploit opportunities.

Overall, our simulation supports the inference that emerging ventures that first acquire resources (e.g., hiring employees, buying equipment, investing in infrastructure) to enable deployment (i.e., execution) of the business model before resources that enable validation (i.e., search) of that business model (e.g., external investments based on substantial due diligence, voice of customer validation, focus group market research) have a lesser likelihood of exploiting the most valuable opportunities. In the case of two resource types we modeled in our simulation, acquiring resources that embodied elements of search reduced the need to time-consuming process of resource reconfiguration in order achieve higher potential opportunities.³ These effects were accentuated when any changes due to acquisition of future resources were costly (as in the case of steeper landscapes).

These findings resonate with research on path dependence where greater path dependence implies higher stakes for any deviations from the original path (Garud and Karnoe, 2001). Path dependence due to technology and industry characteristics compounds the importance of order for firms. For example, high product attrition coupled with high development costs, as in the drug industry (Higgins, 2007), require resources to be very specialized to the venture. This specialization can often not be reversed, and thus severely constrains future actions. Similarly, high lead time manufacturing (Cusumano and Nobeoka, 1998); time compression diseconomies (Dierickx and Cool, 1989), patent races (Patel and Pavitt, 1997), capacity constraints (Harrison et al., 1991) may all increase path dependence. Thus, we believe that contexts characterized by high lead times, capacity constraints, significant irreversible investments, and winner take all rules would be ripe for studying the role of resource accumulation order in venture growth and survival. The present research may offer insights into these, and other areas, where emerging ventures are focused on accumulating resources in complex environments (McMullen and Shepherd, 2006).

³ Consider a case of two ventures choosing different resource orders for scaling production (execution) and market segmentation (search) resources. In such a scenario, if early resource choices cannot be easily reversed, then choosing segmentation (search) before scale production (execution) enables ventures to achieve growth faster since market segmentation affords better customer match with lower inventories. On the other hand, scale production before segmentation can lead to inefficiencies due to higher inventories and the need to customize products for variegated preferences.

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