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TRACK: Entrepreneurship and Small Business

**UNDERSTANDING HOW TIMING OF ALLIANCE FORMATION AFFECTS NEW-
VENTURE SURVIVAL: THE DYNAMICS OF TEMPORAL CONGRUENCE AND
CONTINGENCY**

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ABSTRACT

New-venture survival has greatly interested many scholars. While alliances have been shown to increase survival, the literature remains silent regarding the effect of *timing* of alliance formations. Related literatures regarding timing of other types of actions have also been unable to theoretically explain their conflicting empirical findings, which suggest that the effect of timing can range from positive to negative. To fill critical theoretical gaps, I develop a novel model based on temporal changes during the pre- and post-formation phases of an alliance. I show the effect can indeed range from positive to negative. I delineate further boundary condition.

INTRODUCTION AND LITERATURE REVIEW

“Timing is everything” –

Greg Gottesman & Matt McIlwain, Managing Directors, Madrona Venture Group

How does the timing of alliance formations (i.e. forming alliances earlier or later in time) affect new-venture survival? New-venture survival has been a topic of interest for many scholars. To survive, new ventures need to overcome their lack of resources, information, and legitimacy. As interorganizational relationships helps new ventures acquire those critical means of survival from other organizations, forming such relationships then becomes especially important for new-venture survival (Aldrich & Fiol, 1994; Delmar & Shane, 2004; Singh, Tucker, & House, 1986; Stuart, Hoang, & Hybels, 1999; Suchman, 1995). An alliance is a type of interorganizational relationship that new ventures frequently form with other organizations. An alliance is defined as a relationship formed between two or more independent organizations that involves exchanging, sharing, or co-developing resources and capabilities to achieve mutual benefits (Gulati, 1995; Kale & Singh, 2009). The literature has examined how alliances increase new-venture survival (e.g. Baum, Calabrese & Silverman, 2000; Baum & Oliver, 1991; Hoang & Antoncic, 2003; Raz & Gloor, 2007). However, the literature is relatively silent regarding how the *timing* of alliance formation (i.e. forming alliances earlier or later in time) can affect new-venture survival. This is despite the fact that the literature has highlighted that the issue of timing is critical (Gulati & Higgins, 2003; Hoang & Antoncic, 2003; Lavie, Lechner, & Singh, 2007). "Unfortunately, the alliance literature has largely overlooked the implications of timing" (Lavie et al., 2007: 583), which resonates with anecdotal evidences suggesting how some founders and venture capitalists claim that timing is important, if not “everything”.

To the best of my knowledge, the only study regarding the consequences of timing of alliance formations on performance is the work by Lavie et al. (2007)¹. In other words, the question of timing of alliance formation has practically been ignored. Based on the first-mover-advantage (FMA) theory, Lavie et al. (2007) argue that forming alliances earlier increases performance because being the first to enter a market should lead to positive economic profits.

¹ Although, a few studies have examined the *antecedence* behind the timing of relationship formation.

This is because moving first should allow firms to develop technology earlier, secure scarce resources, and prevent buyers from switching to competitors (Lieberman & Montgomery, 1988).

While the FMA theory fits well the context of Lavie et al (2007), which investigates firms' entry into a multipartner alliance in the Wi-Fi industry, in general alliance formation is different from market entry. More importantly, as of now, the FMA theory still faces challenges in explaining the conflicting empirical findings regarding the existence of such an advantage. Suarez and Lanzolla (2007) summarize that after many empirical studies, findings show that the relationship between order of entry and performance seems to range *from positive to negative, including no relationship*. Hence, FMA scholars themselves believe that their understanding can still benefit from further theorizations (Suarez & Lanzolla, 2007).

Furthermore, the related literature regarding decision speed of new ventures (Bourgeois & Eisenhardt, 1988; Eisenhardt, 1989) is not very well suited to answer the timing question either; new ventures can make the same decision with the same speed (e.g. 1 month) but at different timings (e.g. this year versus next year). More importantly, empirical studies in that literature have also resulted in conflicting findings. Studies have found that the relationship between decision-speed and performance can range *from positive* (e.g. Baum & Wally, 2003; Judge & Miller, 1991) *to negative* (e.g. Perlow, Okhuysen, & Repenning, 2002), *including no relationship* (e.g. Judge & Miller, 1991).

My research question is: *How does the timing of alliance formations (i.e. forming alliances earlier or later in time) affect new-venture survival?* While this question differs from that asked in the FMA and decision-speed literatures, this study indeed benefits from those literatures, and may enrich other literatures, including those two.

THEORY

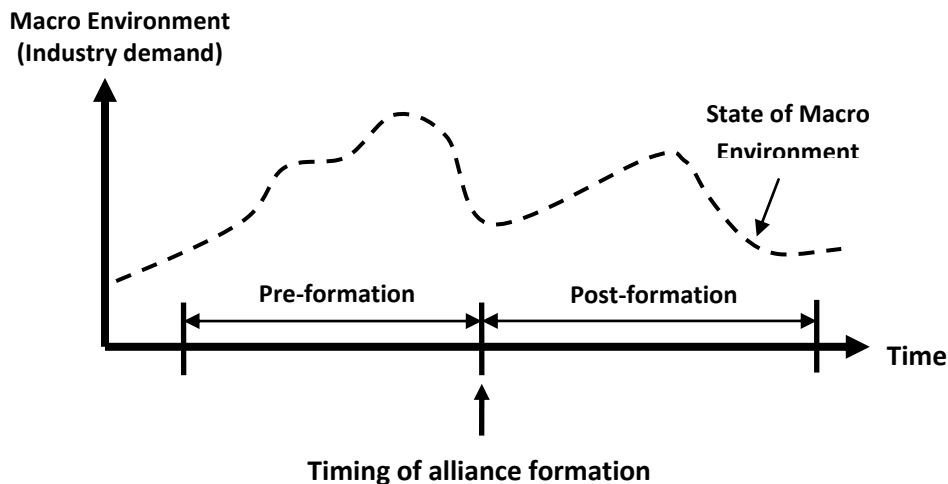
Understanding the effect of timing of alliance formations is challenging because the relationship involves many "moving parts", non-linear changes, and random elements. Following the literature (Ancona, Goodman, Lawrence, & Tushman, 2001; Davis, Eisenhardt, & Bingham, 2007; Gulati & Puranam, 2009), I use simple mathematical representations to aid my theorizations. Furthermore, to enable better analysis and exposition, the literature has recommended that the analysis be divided into static and dynamic components (Gulati & Puranam, 2009). During the static analysis, the task is to explain the causal relationships among the variables without involving any temporal element. After the static relationships become clear, the temporal elements can then be introduced in the following dynamic analysis. The ultimate goal is to integrate both analyses to reveal the causal relationship between timing of alliance formation and new-venture survival.

However, to help guide through the rest of this paper, the main gist behind my theorizations is the following. First, forming an alliance later/earlier will allow new ventures to accumulate a higher/lower level of knowledge, which helps planning in the pre-formation phase. Second, however as new ventures forms an alliance later/earlier, new ventures may encounter different macro environments in the post-formation phase. Different macro environments can yield different outcomes for that alliance, and thus affect new ventures' survival differently. As a result, the effect of timing of alliance formation on new-venture survival jointly depends on how new ventures' knowledge and the macro environment change with time during the pre- and post-formation phases of that alliance (Figure 1).

Static Analysis

Planning during pre-formation phase as a congruence process. Like any other actions, the effect of alliance formation on new-venture survival depends on how the alliance is planned during its pre-formation phase. Given new ventures' strategy, new ventures can decide to form various alliances to carry out their strategy. For each alliance, new ventures strive to come up with a plan that can increase the expected outcome of that alliance. To produce such a plan, new ventures may need to undertake various planning activities during the pre-formation phase of an alliance, such as selecting an appropriate partner, or setting up appropriate governance to oversee the alliance (Gulati, 1998; Kale & Singh, 2009). However, an alliance could produce several potential outcomes, depending upon the scenario with which the alliance unfolds. These potential outcomes can range from the most preferred outcome to the least preferred. Similar to other planning process, the planning of an alliance can help new ventures identify various potential outcomes that may result from that alliance, and select a path of action likely leads to the most preferred outcome (Bhide, 2000; Delmar & Shane, 2003; Gulati, 1998; Mintzberg, 1994).

FIGURE 1
Pre- and Post-formation Phases, and Timing of Alliance Formation



Forming an alliance later/earlier will:

- Allow new ventures to accumulate more/less knowledge during the pre-formation phase.
- But, new ventures may encounter different macro environments during the post-formation phase.

Thus, the effect of forming an alliance later/earlier jointly depends on how new ventures' knowledge and the macro environment change with time.

For example, for a new venture that produces payment software, the broad objective of a technical alliance is to create web-based payment software. Given that objective, the most preferred outcome is web-based payment software that can generate a net income of a certain amount, let's say, \$ 1 million. The least preferred outcome is a complete waste of resources. As each potential outcome may occur, it then becomes associated with a certain probability. For example, that most preferred outcome hypothetically has a 20% probability of occurring, while

the least preferred outcome a 10% probability. The expected outcome of that alliance then becomes the sum of the probability of each potential outcome occurring multiplied by the value of each potential outcome (March, 1994: Ch. 1).

Of course, as any prediction about the future is fraught with errors, new ventures cannot be certain in advance with both the probability and the value of each potential outcome. Nonetheless, despite the presence of uncertainty (Knight, 1921; McMullen & Shepherd, 2006), with planning new ventures strive to identify various potential outcomes that may result from an alliance, and select a path that likely leads to the most preferred outcome (Bhide, 2000; Delmar & Shane, 2003; Gulati, 1998; Kale & Singh, 2009; Mintzberg, 1994). In that way, planning helps improve the outcome of an alliance (Gulati, 1998; Kale & Singh, 2009), and increases new ventures' performance (Bhide, 2000; Delmar & Shane, 2003). To highlight this, planning can be conceptualized as a process whose purpose is to select a path of action that is more likely to be in congruent with new ventures' objective of increasing performance, or a congruence process.

Furthermore, studies on decision-speed literature (Bourgeois & Eisenhardt, 1988; Eisenhardt, 1989; Perlow et al., 2002) suggests that new ventures' ability to make a better decision and take a more favorable action is influenced by the knowledge they possess at the time the decision is made. Intuitively, new ventures' ability to select a path that increases their probability of achieving the most preferred outcome should also be related to the level of knowledge that they have².

Following the previous example, given the objective of the technical alliance is to create web-based payment software, knowledge can help new ventures increase the probability of achieving the most preferred outcome, for instance, through identifying the right partner with a relevant experience, assembling a better team, understanding the appropriate technology to use, or designing a better incentive system to encourage the best efforts by all parties. Through any possible combinations of means, the knowledge that new ventures have when planning helps new ventures select a path that most likely leads to the successful fulfillment of the objective of an alliance. This way, such knowledge helps new ventures increase the expected outcome of that alliance, and, consequently, their survival.

The importance of striving to follow a better path during planning increases because the impact of such path continues after an alliance is formed (Arthur, 1989; David, 1985; Mintzberg, 1994). For example, after a new venture completes the planning of an alliance, that new venture needs to sign a binding agreement with its alliance partner. Consequently, during the implementation of that alliance, that new venture will find it harder to break away from that relationship, if such a need arises. The sunk cost that new ventures have incurred during planning can also lead to an escalation of commitment that reduces new ventures' subsequent choices in the post-formation phase. Even when no contractual agreement is involved, a planning process can cause new ventures to be emotionally and cognitively invested to follow a certain path. For example, by spending a lot of time planning for an alliance, a new venture might become invested to proceed with that alliance, despite the lack of any contractual agreement. Overall, the path new ventures decide to follow during planning can constrain the subsequent choices new ventures can take in the post-formation phase (Arthur, 1989; David, 1985; Mintzberg, 1994).

Implementation during post-formation phase as a contingency process. However, even though planning can steer new ventures to follow a path that increases their probability of

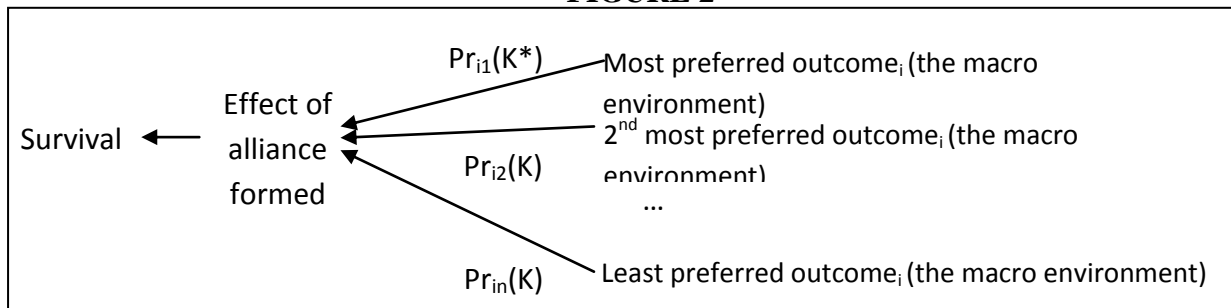
² Following Kogut and Zander (1992), I define knowledge as consisting of information, e.g. facts, and know-how, e.g. ability to execute something smoothly and effectively.

achieving the most preferred outcome, many contingent factors related to implementation can cause the actual outcome at the end of that path to differ from that expected during planning. Using the previous example, a new venture follows the path that has a 20% probability of creating web-based payment software that can generate a net income of \$ 1 million. However, an unexpected collapse in the market causes the demand for all technical products to slump. As a result, that technical alliance generates no net income. In that instance, the new venture is still following the same path. However, the outcome at the end of the path has now changed substantially. With that, the effect of that alliance on the new venture’s survival changes as well.

While I recognize that many contingencies can affect the outcome during the post-formation phase, here I only focus on the macro environment as a contingency (I also define macro environment as the strength of market demand in a given industry). This is because numerous studies have shown how the macro environment bounds and exerts a top-down influence on the effects of lower level factors (e.g. Agarwal, Sarkar, & Echambadi, 2002; Bourgeois & Eisenhardt, 1988; Suarez and Lanzolla, 2007). This top-down effect causes the contingent effect of the macro environment to override the contingent effects of other more micro factors (Catrogiovanni, 1991). As a result, the actual outcome from the implementation of an alliance in the post-formation phase is contingent upon the macro environment. To highlight this, the implementation of an alliance in the post-formation phase can be conceptualized as a process whose outcome depends on various contingencies, most importantly the macro environment, or a contingency process.

To summarize, in this static-analysis section I have highlighted how the effect of alliances on new-venture survival depends on which path is selected during planning in the pre-formation phase, and the changes in the macro environment during implementation in the post-formation phase. Having a higher level of knowledge during planning increases new ventures’ probability of selecting a path that leads to the most preferred outcome. While that path constrains new ventures’ subsequent actions, the actual outcome from those actions depends on the macro environment. Figure 2 depicts how knowledge influences the probability of an alliance to proceed along a certain path, and how each path is associated with a certain outcome. Figure 2 also highlights the role of the macro environment as an important contingency in affecting the outcome of an alliance. Figure 3 further details how having more knowledge at the pre-formation phase favorably increases the probability distribution associated with the various paths.

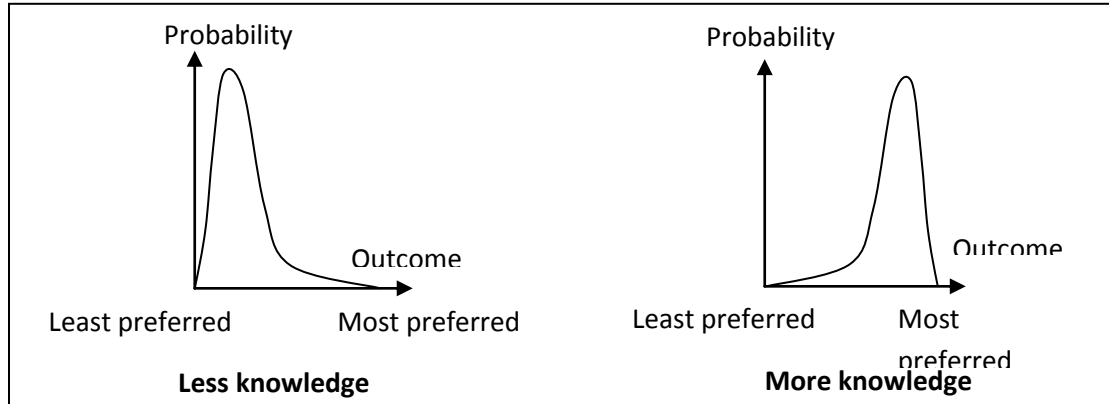
FIGURE 2



* K = Knowledge during planning

Knowledge during Pre-formation Phase and the Probability of Selecting the Most

Preferred Outcome



Dynamic Analysis

The difference between the static and dynamic analyses is that the latter now incorporates temporal components. During this dynamic analysis, I answer the research question of this paper. That is, how timing of alliance formation (i.e. forming alliances earlier or later in time) affects new-venture survival. I do so by building upon the previous static analysis. Specifically, I further elaborate on how knowledge and the macro environment changes with time, and how their effects then depend on when an alliance is formed.

To help identify the effect of timing of alliance formation on new-venture survival, I partially differentiate the new-venture-survival variable with respect to the timing-of-alliance-formation variable. I then group the results into two parts. These two parts reflect the effects of timing of alliance formation that arises from the pre- and post-formation phases. To understand the overall effect of timing of alliance formation on new-venture survival, both effects have to be summed up. To illustrate, the static and dynamic analyses can be simply expressed as the following equations (please see the Appendix for details). Due to the inclusion of the temporal components, planning can now be better conceptualized as a temporal-congruence process, while implementation as a temporal-contingency process. I label the dynamic model as the Temporal-Congruence-and-Contingency (TCC) model.

Static analysis:

New-venture survival = Effect from congruence process during planning, a function of *knowledge* + Effect from contingency process during implementation, a function of the *macro environment*

Dynamic analysis:

————— Effect from temporal-congruence process during planning, a function of how *knowledge* changes with the *timing of alliance formation* + Effect from temporal-contingency process during implementation, a function of how *macro environment* changes with the *timing of alliance formation*.

However, before I offer a proposition regarding the *overall* effect of timing of alliance formation, I first offer propositions regarding the effect of such timing that results from each of the pre- and post-formation phases, starting with the former. As usual, the propositions provide opportunities for future empirical validations. However, more importantly, the propositions help unpack the overall relationship between timing of alliance formation and new-venture survival.

Planning during pre-formation phase as a temporal-congruence process. Even when analyzed from a dynamic perspective, new ventures still strive to come up with a plan that can increase the expected outcome of an alliance. In this regard, there is no difference between the static and dynamic analysis. However, in reality, planning can be concluded earlier or later. As new ventures wait longer to finalize a plan for an alliance, new ventures' knowledge likely changes. For example, new ventures become more knowledgeable about what it takes to form a successful alliance. Those changes can then affect the outcome from planning. Accordingly, the timing of when new ventures end planning can influence the outcome from planning.

As explained earlier, the critical variable during planning is the knowledge that new ventures have. From a temporal perspective, such knowledge likely accumulates over time. This stems especially from the fact that new ventures often start with limited knowledge (Stinchcombe, 1965)³. In the static analysis, I have explained how knowledge can help new ventures make better decisions. This in turn helps new ventures survive. The same explanation still holds in this dynamic analysis. However, as new ventures' knowledge likely increases over time, new ventures' ability to select better alliances should also increase accordingly over time. Consequently, new-venture survival should increase as new ventures form alliances later and acquire more knowledge. This is the essence of planning as a temporal-congruence process.

Empirical findings about how firms that act later excel in product quality (Bohmann, Golder, & Mitra, 2002; Shamsie, Phelps, & Kuperman, 2004) or incorporate the newest technology (Dowell & Swaminathan, 2006) support this argument. Those studies show how taking action later enables firms to design better products or select a better technology, which increases their performance. The following proposition describes the essence of planning as a temporal-congruence process (please see the appendix for proof).

Proposition 1. Because new ventures likely accumulate more knowledge over time, which helps planning, forming alliances later has a positive effect on new-venture survival⁴.

However, different new ventures accumulate their knowledge at different rates, and this heterogeneity could be critical. Studies on the speed of decision process show how different managers acquire different amount of knowledge within the same amount of time by using different approaches to acquire it (Bourgeois & Eisenhardt, 1988; Eisenhardt, 1989). Managers with an ability to acquire knowledge at a higher rate perform significantly better (Bourgeois & Eisenhardt, 1988; Eisenhardt, 1989). Using a completely different approach (NKC-simulation), Ganco and Agarwal (2009) show how new ventures that acquire knowledge at a higher rate can outperform even more established firms. These studies (Bourgeois & Eisenhardt, 1988; Eisenhardt, 1989; Ganco & Agarwal, 2009) support the insight generated from analyzing planning as a temporal-congruence process.

New ventures with a higher rate of knowledge growth can accumulate more knowledge within a given amount of time than those with a lower rate. As knowledge facilitates planning, which helps increase survival, new ventures that have more knowledge during planning should also have a higher probability of survival. This way, new ventures' ability to accumulate knowledge at a higher rate will enhance, or positively moderate, the benefits they receive from delaying the formation of an alliance by a given amount of time. For example, new venture A

³ To remove unnecessary confusion, I distinguish the term *level* or the value of a variable at a point in time from the term *rate* or how a variable changes values or levels over a period of time.

⁴ This is provided that the window of opportunity to form those alliances is still open (Tyre & Orlikowski, 1994).

can acquire knowledge twice as much as new venture B within, let's say, a month. Let us assume that in a month, new venture A is able to acquire information regarding its competitors and customers; whereas new venture B can only acquire information regarding its competitors. In that case, the ability of new venture A to accumulate knowledge at a higher rate will allow it to make a better decision at the end of the month. That way, the ability of new venture A to accumulate knowledge at a higher rate enhances the benefit it receives from delaying its alliance formation by a month⁵ (please see the appendix for proof).

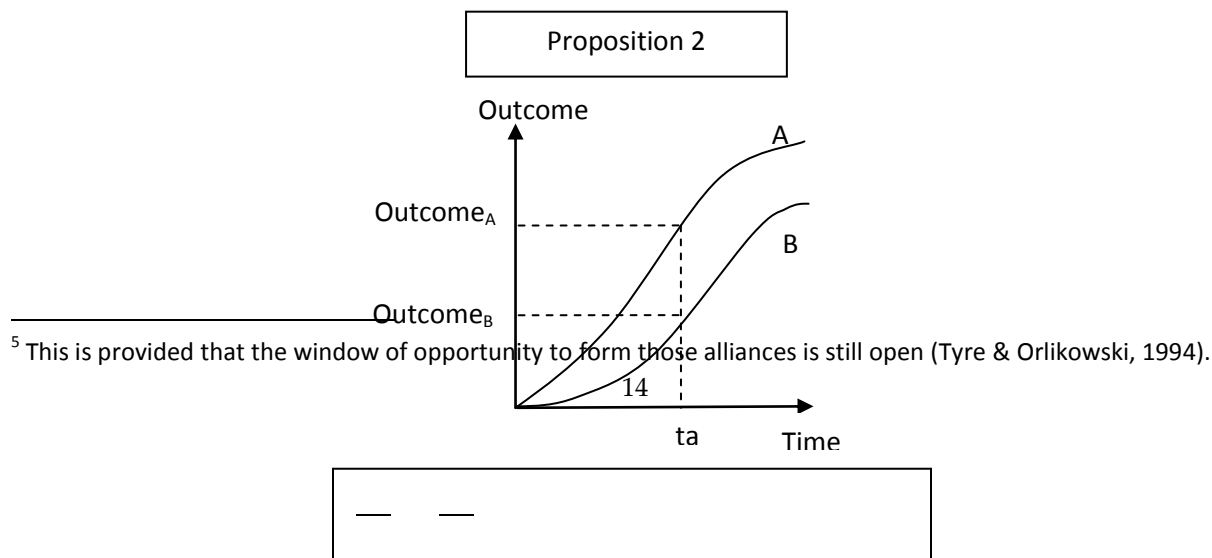
Proposition 2. The rate with which new ventures accumulate knowledge positively moderates the effect of forming alliances later on new-venture survival.

Implementation during post-formation phase as a temporal-contingency process. From a dynamic perspective, two temporal components affect the implementation process, and its corresponding outcome. They are timing of alliance formation, and the length of period over which the performance of an alliance is observed (I elaborate later on why the effect of the length of observation period needs to be considered). Next, I explain the effect of each temporal component, starting from the effect of timing of alliance formation.

Timing of alliance formation can significantly affect the outcome during the post-formation phase through the following process. Different macro environments likely yield different outcomes, as discussed during the previous static analysis. However, the macro environment likely changes over time. As such, alliances formed at different time periods likely encounter different macro environments. Consequently, alliances formed at different time periods likely yield different outcomes. This way, timing of alliance formation can significantly affect implementation outcome.

While the change in the macro environment over time can take all kinds of shapes, three different scenarios presented in Figure 5 indicate how the effect of timing of alliance formation can range from positive to negative, depending upon the macro environment. In case 1, the macro environment becomes more favorable over time in a non-linear manner. In that case, if new ventures form an alliance at ta_1 , and assuming that the outcome (net income from that alliance) increases in the same manner as the macro environment, then the outcome of that alliance will increase by A over the observation period Δt . However, if the alliance is formed at ta_2 , the increase is B, which is bigger. In this case, delaying the alliance formation

FIGURE 4
Relationship among Rate of Knowledge Accumulation, Outcome and Timing of Alliance Formation



⁵ This is provided that the window of opportunity to form those alliances is still open (Tyre & Orlikowski, 1994).

from ta_1 to ta_2 allows new ventures to earn a higher outcome (i.e. B and not A). In case 2, where the macro environment becomes more favorable before reaching its peak and starting to decline, forming alliance at ta_2 instead of ta_1 costs new ventures a loss (-B) instead of a gain (A). In case 3, where the macro environment becomes more favorable but in a stable manner, new ventures neither gain nor lose anything by taking actions at ta_2 instead of ta_1 . This is due to a subtle, but critical, difference between time (clock time) and timing of alliance formation (event time) (Ancona, Okhuysen, & Perlow, 2001). While outcome increases with time (clock time), outcome does not change with timing of alliance formation (event time).

These examples demonstrate the following points. First, the effect of timing of alliance formation on the outcome from implementation during the post-formation phase is contingent upon the macro environment. Second, the effect can be positive, negative, or even none (please see the Appendix for further proof). All considered, during implementation, the macro environment is an important contingency that influences how timing of alliance formation can affect new-venture survival. The following proposition describes that contingent effect.

Proposition 3. Depending upon the changes in the macro environment during implementation, the effect of forming alliances later on new-venture survival can range from positive to negative.

Earlier, I indicated that the effect of the length of period over which the performance of an alliance is observed (or the length of observation period) needs to be considered. Two reasons explain this argument. First, it is because performance is a cumulative, not a snapshot, measure. Hence, performance has to be observed over a period of time. Second, understanding the effect of such length also becomes necessary because that effect can be related to the effect of timing of alliance formation under certain scenarios. Assuming that observation is truncated after a certain point, a common empirical practice, new ventures that form alliances earlier/later will experience a longer/shorter observation period. Thus, understanding the effect of length of observation period complements our understanding regarding the effect of timing of alliance formation.

The length of observation period can affect implementation outcome through the following process. As the macro environment changes over time, changing the length of observation period allows different macro environments to influence the implementation process. As the macro environment can change the outcome from implementation, changing the length of the observation period can also change the outcome from implementation. Figure 6 illustrates this point. Consequently, the effect of changing the length of the observation period can range from positive to negative depending upon the macro environment (please see the Appendix for

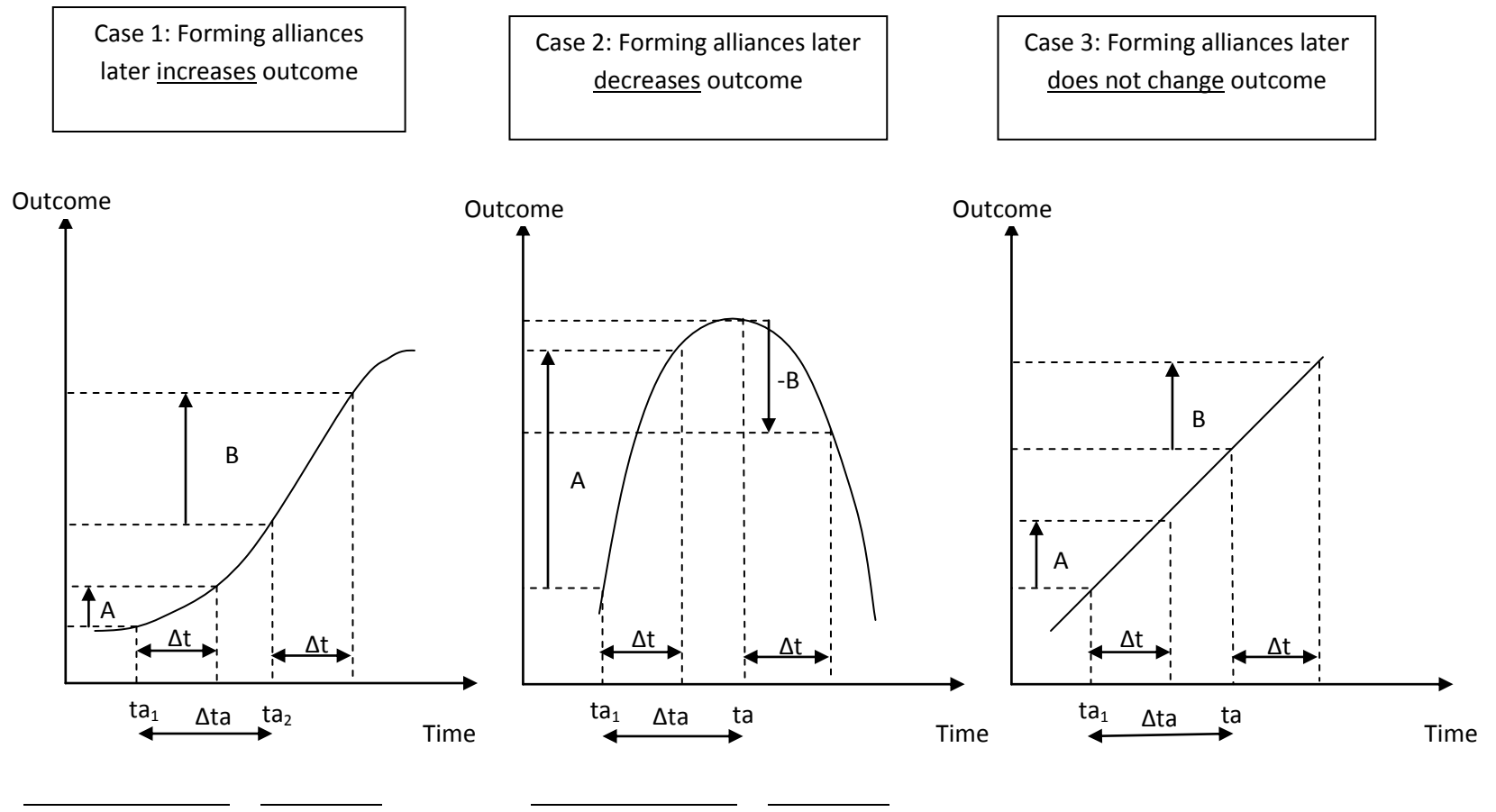
proof). This means that another temporal-contingency effect that depends on the length of the observation period emerges.

Proposition 4. Depending upon the changes in the macro environment during implementation, the effect of increasing the length of observation period on new-venture survival can range from positive to negative.

Overall effect of timing of alliance formation. So far, I have explained how the effects of timing of alliance formation on new-venture survival depend not only on what goes on during planning in the pre-formation phase, but also that during implementation in the post-formation phase. However, as I indicated throughout this paper, to understand the overall effect of timing of alliance formation, its effects from both phases have to be summed up. While the effect from planning is positive (Proposition 1), the effect from implementation can range from positive to negative, depending upon the macro environment (Proposition 3 and 4). Under certain macro environments, it thus becomes possible that the effects from both temporal processes are both positive. In this case, the planning and implementation processes yield synergistic effects (i.e., both positive effects). However, under other macro environments, the effects from both processes may differ. In that case, the planning and implementation processes yield non-synergistic effects (i.e., positive and non-positive effects). In that case, it also becomes possible that timing of alliance formation has no effect on new-venture survival (i.e. overall zero effect). The following proposition simply sums up the effects from Proposition 1, 3 and 4.

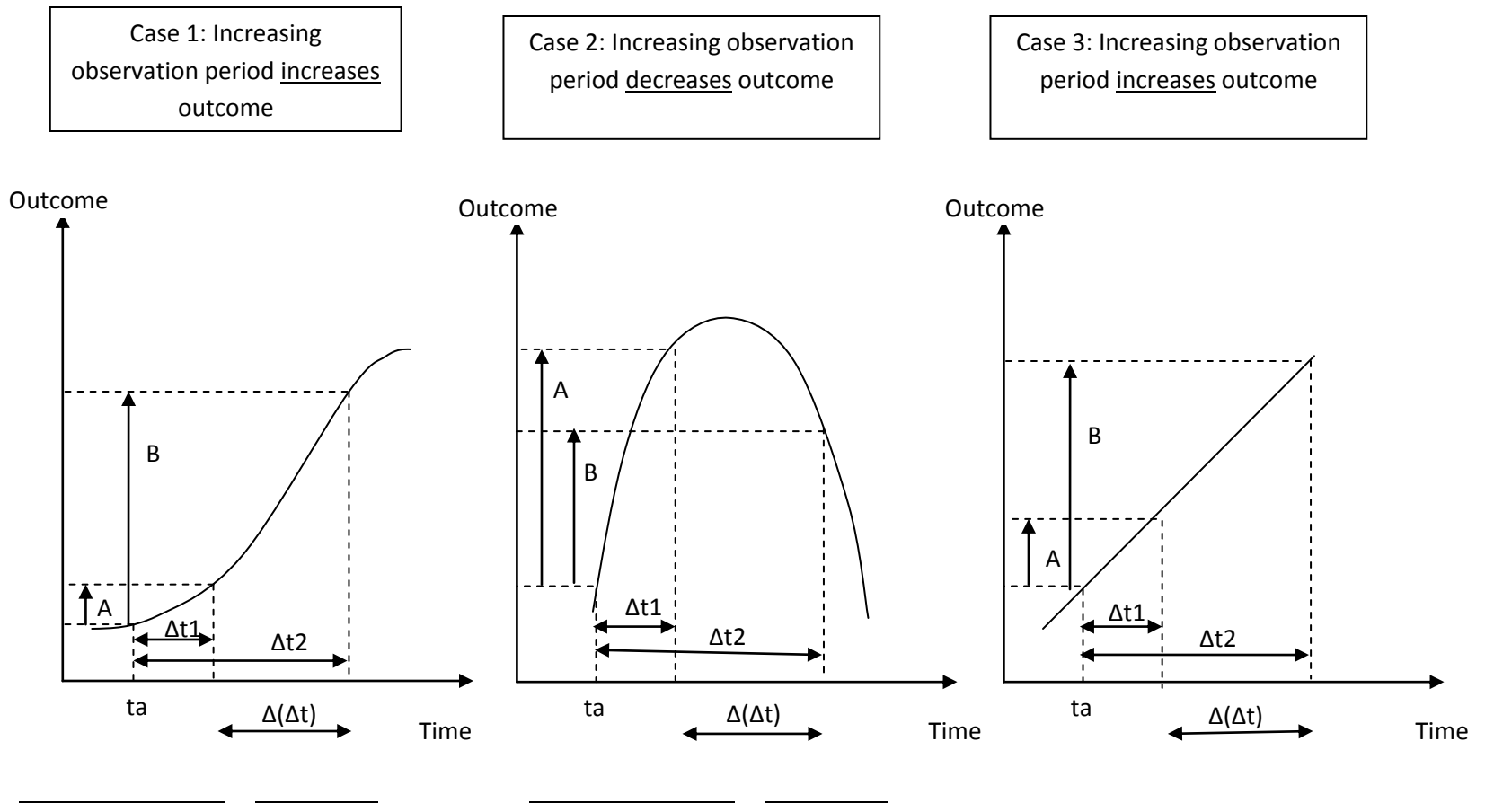
Proposition 5. The overall effect of forming alliances later on new-venture survival is the sum of its effects from temporal changes during planning and implementation. That overall effect can range from positive to negative, depending upon changes in new ventures' knowledge and the macro environment over time.

FIGURE 5
Change in Performance Outcome When the Timing of Alliance Formation Changes⁶



⁶ These are only some possible scenarios, and not exhaustive. ta_1 and ta_2 refer to different timings of alliance formations, i.e. timing 1 and timing 2; Δt refers to the length of observation period. All cases refer to changes in performance outcome corresponding to changes in the macro environment.

FIGURE 6
Change in Performance Outcome When the Length of Observation Period Changes⁷



⁷ These are only some possible scenarios, and not exhaustive. t_a refers to timing of alliance formation; Δt_1 and Δt_2 refer to different lengths of observation period. All cases refer to changes in performance corresponding to changes in the macro environment.

Increasing and decreasing macro-environmental munificence. The presence of a temporal-contingency process means that finer propositions need to be based on a specific context. One interesting context for new ventures will be survival under an increasing or a decreasing level of resources in the macro environment, or macro-environmental munificence (Catrogiovanni, 1991). Given the importance of resources for new-venture survival (Stinchcombe, 1965), the changing level of macro-environmental munificence can influence the effect of timing of alliance formation on new-venture survival. For example, while rushing in might cost new ventures their better judgment, doing so might make more sense under a certain context. The question is then whether new ventures should form an alliance earlier or later under an increasing or a decreasing macro-environmental munificence.

From the planning process, forming an alliance later allows new ventures to accumulate more knowledge, and hence increases their survival, regardless of whether the macro-environmental munificence is increasing or decreasing. However, from the implementation process, the relationship between the timing of alliance formation and new-venture survival is likely to be contingent upon the changing macro-environmental munificence.

When the macro-environmental munificence *decreases* and the industry demand weakens, investing in an alliance more likely yields a negative than a positive outcome. If that is the case, forming an alliance earlier likely causes new ventures to suffer from more negative outcome. New ventures may spend their valuable resources without seeing any return for a longer period of time. Having less resource, new ventures would then have reduced flexibility to take advantage of more attractive opportunities. The decreasing level of resources in the environment will also provide fewer opportunities to recover from any mistakes. Consequently, from the implementation process, new ventures should form an alliance later in order to increase survival. As a result, under a decreasing macro-environmental munificence, the planning and implementation processes yield a synergistic relationship. That is, both processes suggest that forming an alliance later should increase new-venture survival.

On the contrary, when the macro-environmental munificence *increases* and the industry demand strengthens, the reverse happens. As a result, from the implementation process, new ventures should form an alliance *earlier* in order to increase survival. However, as the planning process suggests that new ventures should form an alliance later, a trade-off arises. All considered, I argue that the effect from the implementation process will outweigh the effect from the planning process. On the one hand, if the alliances that new ventures form early are fraught with mistakes due to, let's say, a rather premature plan, the effect should not be fatal. This is because as the market continues to grow, new ventures should still have opportunities to acquire new resources from their stakeholders or the market. Given such slack, new ventures should be able to afford forming an alliance based on a rather premature plan. On the other hand, if those alliances turn out to be successful despite the shorter planning time, new ventures can reap the benefits of those alliances earlier. Overall, I propose that when macro-environmental munificence increases, forming an alliance earlier should increase survival (Table 1).

Proposition 6. Under increasing/decreasing macro-environmental munificence, the overall relationship between forming alliances later and new-venture survival is negative/positive.

TABLE 1

Effect of Forming Alliances Later on New-Venture Survival

	Under increasing macro-environmental munificence	Under decreasing macro-environmental munificence
Effect from temporal-congruence process	Positive	Positive
Effect from temporal-contingency process	Negative	Positive
Total effects	Negative	Positive

DISCUSSION

This study examines the question of how to increase new-venture survival from a relatively new lens – the temporal lens (Ancona et al., 2001). In specific, this study asks how timing of alliance formation affects new-venture survival. Given the dynamics and complexity of such timing question, I developed my conceptual theorizations with the aid of a simple mathematical model. The resulting theorization shows how the effect of timing of alliance formation on new-venture survival jointly depends on how knowledge accumulates while an alliance is planned in its pre-formation phase, and how the macro environment changes in the post-formation phase of an alliance. Depending upon the rate of knowledge accumulation and the changes in the macro environment, the overall effect of timing of alliance formation can then range from positive to negative. I then hypothesize that under increasing/decreasing environmental munificence, forming an alliance earlier/later increases new-venture survival.

The conceptual theorizations developed here conform to various empirical findings found in other temporally focused literatures. For example, the fact that the effect of the timing of alliance formation can range from positive to negative can potentially explain the seemingly conflicting findings found in the first-mover advantage literature. As Suarez and Lanzolla (2007) highlighted, important contingencies, especially the macro environment, may play a large role in generating the seemingly conflicting findings. By looking at the macro environment, this paper strongly supports the argument put forward by Suarez and Lanzolla (2007).

Similarly, the conceptual theorizations developed here can potentially explain the seemingly conflicting findings found in the decision speed literature. One potential reason behind this conflicting finding is the fact that effect of decision speed on performance is closely intertwined with the timing at which the decision is made. As the dual temporal congruence and temporal contingency processes suggest, what matters is not only how fast the decision is made, but also when the decision is made. Decisions made under different timings may face different macro environments, and hence may yield different outcomes. By incorporating the effect of the macro environment, the relationship between decision speed and performance can now range from positive to negative, just like what the empirical findings suggest.

Likewise, the conceptual theorizations developed here also supports the empirical findings by Lavie et al. (2007). While the study by Lavie et al., (2007) investigates a multipartner-alliance context, the macro environment for that study increases in munificence, as evidenced by the increasing demand for Wi-Fi products and the increasing number of

participants in that multipartner alliance. In that increasingly munificent macro environment, their finding shows that entering the multipartner alliance earlier increases performance, just like what the temporal-congruence-and-contingency model predicted here.

Contributions

Building upon established foundations regarding the importance of knowledge and the macro environment, this study helps connect seemingly disparate streams of literature into a broader, more closely related picture. To the entrepreneurship and the alliance literatures, this study provides a new perspective in our pursuit of trying to understand what can increase new-venture survival. By investigating how timing of alliance formation can increase new-venture survival, this study not only reaffirms the importance of alliances, but also explains how the timing of alliances can accentuate or attenuate their benefits, and hence affect survival. While finding the right partner is important, finding the right time to pick the right partner could be as important, if not more. Given the appropriate amount of time to accumulate knowledge about one's potential partner, a new venture can potentially increase its probability of selecting the right partner. In that sense, new ventures' ability to pick the right partner can be a function of new ventures' ability to pick the right time to form that alliance. Furthermore, as new ventures usually form alliances rather frequently, the issue of timing of alliance formation should frequently surface. As such, this paper can have a rather significant implication for practice.

To the first-mover advantage literature, this paper suggests the important of not rushing in. In fact, what is more certain from the theorizations here is that waiting longer to form an alliance allows new ventures to accumulate more knowledge and form better alliances. In other words, the temporal congruence process highlights the advantage of taking actions later. Put differently, the temporal congruence process highlights that first mover *disadvantages* potentially exist, a point suggested by Lieberman & Montgomery (1998) and is consistent with various empirical findings suggesting that late movers can actually perform better than earlier movers (Bohlmann et al., 2002; Dowell & Swaminathan, 2006; Shamsie et al., 2004). This counterintuitive argument can be important as the inclination to move first can be so impulsive.

Furthermore, the temporal congruence-and-contingency model demonstrates that timing matters in both absolute and relative sense. Being the first to move is a relative definition. However, timing is also essential when viewed based upon a fixed and common reference point in time, or in an absolute sense. At different points in time, the conditions of the macro environments differ. As the macro environment could affect the outcome of an action, where an action is located along the temporal axis – and not just relative to the first mover- could be critically important. In this sense, this study further highlights the role of macro environments in understanding the effect of timing.

Some areas for future studies include testing the propositions here and exploring other macro environmental conditions, e.g. uncertain market environments. Also, understanding how various decision-making strategies, e.g. incremental resource allocations (Adner & Levinthal, 2004; McGrath, 1997; McGrath, Ferrier, & Mendelow, 2004) can influence the timing of alliance formation could be an interesting avenue for future study. To conclude, timing is an almost inescapable part of every decision new ventures have to make. Anecdotal evidences even suggest that some entrepreneurs and investors swear that timing is everything. However, our extant understanding regarding how time and timing can affect new-venture performance remains relatively limited. Expanding this understanding could potentially result in not only an exciting and prolific stream of research, but also relevant, practical recommendations to new ventures.

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APPENDIX

Static Model

An alliance can have multiple outcomes, ranging from the most preferred to the least preferred, with each having a certain probability of being realized. Let 'Best' be the most preferred outcome and 'Worst' be the least preferred outcome. Let the probability of each outcome be labeled from Pr(1) to Pr(n) starting from the most preferred to the least preferred outcome, respectively.

$$\text{Performance of an alliance} = \text{Pr}(1).\text{Best} + \text{Pr}(2).\text{Outcome 2} + \dots + \text{Pr}(n).\text{Worst} \quad - (1)$$

To simplify the mathematical model, equation (1) can be represented by only the most and least preferred outcomes. To do so, let Pr(Best) and Pr(Worst) be another set of probabilities.

$$\text{Pr}(1).\text{Best} + \text{Pr}(2).\text{Outcome 2} + \dots + \text{Pr}(n).\text{Worst} = \text{Pr}(\text{Best}).\text{Best} + \text{Pr}(\text{Worst}).\text{Worst} \quad - (2)$$

where $\text{Pr}(\text{Best}) + \text{Pr}(\text{Worst}) = 1$ or $\text{Pr}(\text{Worst}) = 1 - \text{Pr}(\text{Best})$, such that

$$\text{Pr}(\text{Best}) = [(\text{Pr}(1).\text{Best} + \text{Pr}(2).\text{Outcome 2} + \dots + \text{Pr}(n).\text{Worst}) - \text{Worst}] / (\text{Best} - \text{Worst}) \quad - (3)$$

Furthermore, to differentiate the effect of various alliances, let the subscript "i" represents the characteristics of an alliance "i", while "Env_i" represents the characteristics of the macro environment associated with an alliance "i". The performance of an alliance can then be represented by equation (4).

$$\text{Performance of an alliance} = \text{Pr}_i(\text{Best}).\text{Best}_i(\text{Env}_i) + \text{Pr}_i(\text{Worst}).\text{Worst}_i(\text{Env}_i) \quad - (4)$$

Dynamic Model

So far, the variables have been treated as time-invariant. However, the actual outcome of an alliance may change depending upon the macro environment, which may change with time. As such, alliances formed at different time (t_a) may have different outcome. Further, as the effect of an alliance accumulates over time, that outcome also depends on how long the performance of an alliance is observed (Δt). Including these temporal factors, equation (4) becomes the following. (For conciseness, let variable "P" be an abbreviation for cumulative performance from time t_a to time

- (5)

However, the probability of achieving the most or least preferred outcome depends on the cumulative knowledge (K) that new ventures have at the time the alliance is formed (t_a), and a random error (ϵ), which is not a function of timing of alliance formation. As a higher level of knowledge helps new ventures increase their probability of achieving the most preferred outcome, I have the following relationship.

$$Pr_i(\text{Best}) = K(t_a) + \epsilon \quad (6)$$

As any probability ranges from 0.0 to 1.0, $K(t_a)$ is standardized from 0.0 to 1.0. Replacing $Pr_i(\text{Best})$ with $(K(t_a) + \epsilon)$ gives the following

$$\epsilon. \text{WorstiEnvi}(\dots, +\Delta) \quad (7)$$

To shorten notations, let K be the short form for $K(t_a)$, ϵ for ϵ , and P for $Pr_i(\text{Best})$. As ϵ is not a function of t_a , $\frac{\partial \epsilon}{\partial t_a} = 0$. Partially differentiating performance (P) with respect to timing of alliance formation t_a using the product rule will allow me to observe the effect of forming an alliance earlier or later. This results in the following equation.

$$\frac{\partial P}{\partial t_a} = \frac{\partial K(t_a)}{\partial t_a} + \frac{\partial \epsilon}{\partial t_a} \quad (8)$$

However, as Performance also depends on t_a , I can also differentiate P with respect to

$$\frac{\partial P}{\partial t_a} = \frac{\partial K(t_a)}{\partial t_a} + \frac{\partial \epsilon}{\partial t_a} \quad (9)$$

The total change in performance in (equation 8 and 9) can be decomposed into temporal congruent and contingent effects (see the body of paper for the meaning of temporal congruent and contingent effects).

Congruent effect:

$$\frac{\partial P}{\partial t_a} = \frac{\partial K(t_a)}{\partial t_a} \quad (10a)$$

Contingent effect with respect to timing of alliance formation:

$$\frac{\partial P}{\partial t_a} = \frac{\partial \epsilon}{\partial t_a} \quad (10b)$$

Contingent effect with respect to length of observation period:

$$\frac{\partial P}{\partial t_a} = \frac{\partial \epsilon}{\partial t_a} \quad (10c)$$

Proof of Proposition 1.

In (10a), the difference between the best and the worst outcomes is the range of outcome, and is positive by definition. Given that new ventures likely accumulate more knowledge over time, then — As a result, — is positive.

Proof of Proposition 2.

Following the proof of proposition 1, it is clear that the higher — the higher — is.

Or, for a given desired increase in performance, — multiplied by δ_j (where δ_j is some temporal delay), a higher — increases δ_j , or reduces δ_j for a given

Proof of Proposition 3.

From equation (10b), — depends on —, which can range from positive to negative under different macro environments, as argued in the body of the paper. As the macro environments can take many different shapes, the following scenarios are not exhaustive.

Scenario 1: The macro-environmental munificence decreases, such that forming an alliance later shifts the range of possible outcomes unfavorably, i.e. —. Equation (10b) becomes negative.

Scenario 2: The macro-environmental munificence does not change, such that there is no gain or loss from forming an alliance later, i.e. —; —. Equation (10b) becomes zero or very minimal.

Scenario 3: The macro-environmental munificence increases, such that forming an alliance later shifts the range of possible outcome favorably, i.e. —. Equation (10b) becomes positive.

Proof of Proposition 4.

From equation (10c), — depends on —, which can range from positive to negative under different macro environments, as argued in the body of the paper. As the macro environments can take many different shapes, the following scenarios are not exhaustive.

Scenario 1: The macro-environmental munificence decreases, such that increasing the observation period shifts the range of possible outcomes unfavorably, i.e. —. Equation (10c) becomes negative.

Scenario 2: The macro-environmental munificence does not change, such that there is no gain or loss from increasing the observation period, i.e. —; —. Equation (10c) becomes zero or very minimal.

Scenario 3: The macro-environmental munificence increases, such that increasing the observation period shifts the range of possible outcomes favorably, i.e. —. Equation (10c) becomes positive.

Proof of Proposition 5.

To understand the overall effect, the effects from equations (10a), (10b), and (10c) have to be summed up. While the value of (10a) is positive, the value of (10b) and (10c) can range from positive to negative. Unless, (10b) and (10c) are non-negative, the overall effect can then range from positive to negative.

Proof of Proposition 6.

Due to the trade-off between the effect of timing of alliance formation and the length of observation period under a changing macro-environmental munificence, I rely on conceptual theorizations to proof for Proposition 6, which is discussed in the body of the paper.