

Advances in Project Management Series¹

Effectual Project Management: Thinking Like an Expert Entrepreneur²

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The most complex of them all?

Quick – think of a complicated project. Did implementing an ERP system in a large organization come to mind? Maybe developing a next-generation high technology product? How about starting a new venture? The new venture might not have been your first intuition. But take a step back and consider it. It represents the ultimate complicated project. All the complicated projects rolled up into one mega-complicated project. That new venture needs a new product or service. It needs an ERP system. It needs a strategy and a customer generation/retention process. It needs marketing and finance and human resources ... and the list continues. Much work has sought to bring ideas and processes from project management to entrepreneurs, but surprisingly little has gone the other direction. In this article, we seek to expose a few things entrepreneurs, in many ways super-project managers, have learned from starting ventures, and translate them back into ideas for managing projects in larger organizations. As we do, it is important to appreciate one additional complexity borne by the entrepreneur. Aside from the broad aspiration of building a venture, the goals of the project (the venture) are uncertain at the start and can be subject to constant revision as the project unfolds. As such, the tools and approaches learned by expert entrepreneurs may be extremely valuable to project managers facing similar levels of uncertainty.

Corporate projects and entrepreneurial projects

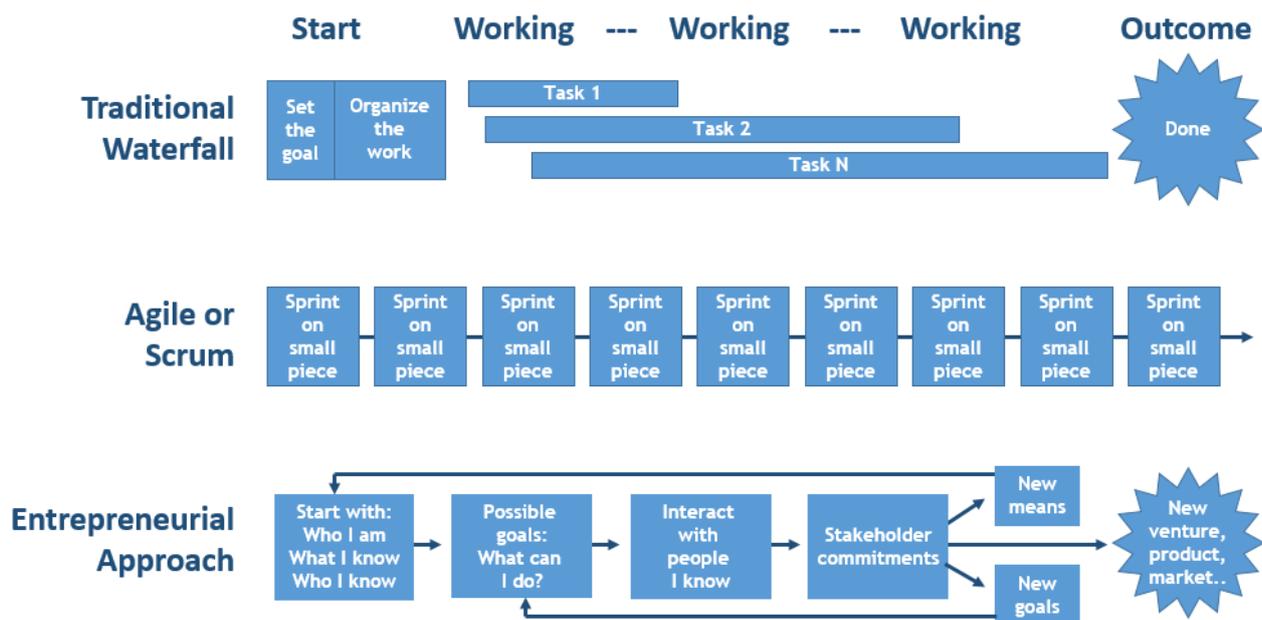
Useful tools help capture relevant information, enable managers to strategize and facilitate a plan that fits project target, context and surrounding conditions. Thereby, tools differ in various aspects. Projects that have a fixed goal or objective use tools to sequence the steps and follow the most efficient linear, or causal logic (please see Figure 1; Traditional Waterfall). In situations

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² How to cite this paper: Mathiaszyk, L., Volkmann, C., Read, S. (2019). Effectual Project Management: Thinking Like an Expert Entrepreneur, *PM World Journal*, Vol. VIII, Issue III (April).

of greater ambiguity, breaking a big project down into smaller “sprints” enables manageable work increments and allows for project objectives to evolve after the project has begun, by implementing agile or dynamic cycles (please see Figure 1; Agile or Scrum). But entrepreneurs face a far more open-ended problem. In addition to managing a different project for each function in the organization, it is unclear at the outset what the startup will end up doing. Certainly the objective is to create a viable venture, but that is a very broad goal. More than 90% of new ventures end up doing something different than the idea they started with (Reynolds, Carter, Gartner, & Greene 2004), so the notion entrepreneurs write a business plan and execute it in a systematic and organized fashion is naïve. Instead, the entrepreneurial approach to a project starts with the resources readily available at hand, explicitly incorporates feedback loops into the process, and functions atop elements within the control of the entrepreneur (Sarasvathy & Dew 2005). A stylized representation of the entrepreneurial approach is contrasted with the traditional and agile approaches to project management in the diagrams in Figure 1.

Figure 1: Contrast of traditional, agile and entrepreneurial project approaches



What expert entrepreneurs learn

Within the entrepreneurship literature, scholars have been fascinated to understand how experts in the domain think. Effectuation (Sarasvathy 2001) offers a clear and well-researched foundation of entrepreneurial expertise that we develop and apply to project management. Effectuation was induced from a cognitive science study of 27 entrepreneur founders (started multiple ventures, taken at least one to \$250m in sales, spent more than 15 years in the domain).

The central finding in effectuation is expert entrepreneurs focus on elements within their control “to bring about effect”, i.e. shape, develop, initiate, and create beneficial outcomes. Effectuation contrasts with causal or linear processes that build on prediction, goal-setting and forecasting. The general explanation for why expert entrepreneurs learn effectual heuristics is connected with their domain. New venture creation is an inherently uncertain activity, where (market) analyses are expensive and insufficient because of high complexity and unknown dynamics. In such a domain, predictions offer the entrepreneur limited meaningful input, so the entrepreneur adopts alternative heuristics. The entrepreneurial approach diagrammed in Figure 1 assumes the environment is constructible through the actions of the entrepreneur and her committed stakeholders, and enables project goals to emerge as negotiated residuals of stakeholder commitments.

While it was developed in entrepreneurship, effectuation offers a more general behavioral scientific answer to the question of how individuals handle complexity and uncertainty. Effectuation has consequently attracted significant attention in corporate strategy (Faschingbauer, 2010, Ambrosch, 2010, Blekman, 2011). Davidsson (2005) was the first to suggest the relevance of effectuation to projects characterized by uncertainty, but until now little work has picked up and developed his observation.

Effectuation principles

Within the process diagrammed in Figure 1, there are a series of specific heuristics expert entrepreneurs employ which help them take action in uncertain situations. In Table 1, we outline those heuristics, and contrast each with a causal (predictive) alternative. The fundamental difference between effectual and causal heuristics is causal heuristics assume the ability of the entrepreneur to apply prediction to goal-setting and then take appropriate actions to achieve those goals. In contrast, each effectual heuristic enables the entrepreneur to act in uncertainty using a foundation of control instead of prediction.

Table 1: Effectuation and Causation Principles

Issue	Causation (Prediction Based Heuristics)	Effectuation (Control Based Heuristics)
Starting point	Goals Goals determine the actions and thus the resources required for a project	Means Readily available means, resources and contacts define the starting point for a project
Risk perception	Expected returns Project should maximize return on invest/outcome	Affordable loss Project should not risk more resources than are affordable to lose
Attitude toward outsiders	Competition Protection of ideas is important, as a project is positioned in competitive environment	Partnership Partnerships emerge as stakeholders commit resources to the common project while influencing its development - collaborate
Attitude toward surprise	Avoidance Planning and focus on goals help to avoid surprises	Leverage Surprises provide the foundation for new opportunities
View of the future	Forecast Future environment is externally given, forecast provides insight	Create Prediction is not possible, since future environment depends on own actions

Starting with their own readily available means of what they know, who they know and what they have, entrepreneurs begin taking action immediately without waiting for others to provide resources. Considering risk according to what they are willing to lose means the worst case is always within the control of the entrepreneur. Building goals together with self-selected stakeholders means entrepreneurs share the risk, gain access to partners’ resources and prioritize goals through commitments – goals more likely to be valuable as they are tested with each new partner. Finally, treating unexpected events as the source of new opportunities means entrepreneurs don’t fail when things don’t go as expected, but have the chance to learn, iterate, and create something perhaps even more valuable moving ahead.

Effectual decision-making in project management

Effectuation is largely unknown in the project management world. But because effectuation is derived from research into entrepreneurial cognition, managers facing situations of uncertainty and complexity can benefit from what expert entrepreneurs have learned. Today's world changes fast. Volatile markets, intense competition, crises and growing complexity combine to present managers with a relentless demand for innovative technologies, new knowledge and strategy. Once these demands turn into projects, managers face complex performance requirements, regulations, vertical organization layers, shifting customer demand and widespread coordination with external stakeholders (Morieux, 2011). Uncertainty is the norm (McKelvie, Haynie & Gustavsson, 2011) and managers have to make thoughtful project decisions without adequate predictive information (Busenitz & Barney 2007).

As applied to project management, we expect effectuation operates the same way expert entrepreneurs use it in starting new ventures. The starting point is the accessible means. The project team following effectual decision-making strategy works with resources at their disposal, including skills, competencies, contacts and social networks. Team members self-select into the project. Each new member brings new means, ideas and psychological ownership that enable the co-creation processes of the stakeholders to expand and advance the project (Read, Dew, Sarasvathy, Song & Wiltbank 2009). The project output, therefore, arises from the interaction between the individuals involved in the project (Sarasvathy 2001).

The commitments of project team members follow the affordable loss principle—how much they are willing to put at risk as part of engaging in a particular project. As a result there is always a preference for alternatives that face small potential failure if they are unsuccessful and the potential to learn from those failures and iterate. Davidsson (2005) describes it as follows: “It is more important to limit the damage if unsuccessful than to get the highest possible return if successful” (p. 12).

The effectual approach to project management builds on partnerships and asks: “With whom do I have to ally, in order to be able to take the [...project] one step further?” (Davidsson, 2005, p. 12). To answer this question, effectual project management involves social networking, forming partnerships, and obtaining commitments from potential customers or suppliers. At the end of the effectual process, the project team may have created a “crazy quilt”, as Sarasvathy (2001) describes it, composed of diverse fabric swatches provided by each of the various partners. Commitments advance the cycle of resource transformation and converge the cycle toward constraints on project outcomes, as diagrammed in Figure 1. Throughout the process, effectual strategy is “sensitive to what comes up along the road, and prepare[s] to turn these contingencies into business strengths” (Davidsson 2005, p. 12). Sarasvathy (2008) describes this

form of leveraging contingencies with the proverbial phrase “When life gives you lemons, make lemonade” (Ucbasaran 2008, p. 226).

In the same way effectuation contrasts with causation when understanding the logics of expert entrepreneurs, an effectual approach to project management contrasts with a goal-oriented project management approach such as the waterfall.

Empirical study of effectuation in project management

In order to build a more complete understanding of the differences associated with an entrepreneurial project management approach compared with a goal-oriented waterfall approach, we designed and conducted an empirical study. The study examines managers’ heuristics when facing project complexity and analyzes success outcomes. Often discussed in the project management literature, complexity is integrally connected with the concept of uncertainty, the setting where effectuation originated (Sarasvathy 2008). While uncertainty provides a characteristic of the external environment, complexity describes internal features of the project and how organization is perceived by individuals involved (Müller, Geraldi, & Turner 2012). As such, the study is driven by two questions:

- *Do project managers apply effectual or causal decision-making heuristics more intensely when they perceive their project environment as complex?*
- *What effects does the choice of effectual or causal decision-making have on project success?*

We include both hard (financial and market) and soft (innovativeness and learning) success measures as these two outcome categories may not be correlated. A project may achieve some level of near-term financial success, but fail to build team knowledge or innovation which provides more sustainable growth for the organization. Alternatively, a project might deliver novelty, but fail to achieve the financial results necessary to sustain the organization. Projects and project management must seek to address both.

Measures

Effectual and causal decision-making

We measure strategy using the effectuation/causation scale originally developed by Brettel et al. (2012). Because Brettel et al. (2012) analyzed strategy behavior in R&D projects, some questions were revised to fit a more general project context. The scale was characterized by forced-choice items, indicating the degree of difference between effectual and causal heuristic in project strategy (Bradley, Wiklund & Shepherd 2010). For example, one item pair consists of:

New project findings influenced the project target --vs.-- New project findings did not influence the project target. We validated the 23 item scale and found strong reliability as indicated by a Cronbach's Alpha of 0.74.

Complexity

We measured project complexity as it is perceived by managers in practice using an existing scale (Geraldi & Albrecht 2007; Jaafari 2003; Maylor et al., 2008; Shenar & Dvir 2007; Williams 2005).

Hard project success

We measured general project success using nine dimensions established in prior research (Müller and Turner 2006). The construct was operationalized using a five-point Likert scale ranging from "very low" to "very high." In order to establish the dependent variable of hard project success, we took the mean of all nine items into an unweighted additive score. Using a Cronbach's Alpha of 0.78, we documented a high degree of internal consistency.

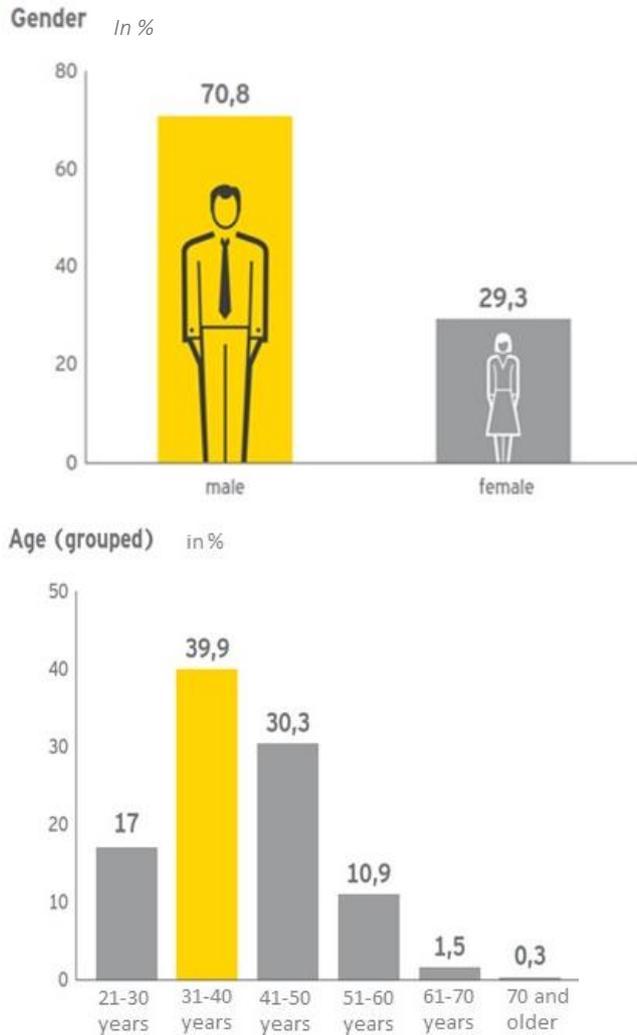
Soft project success

Soft project success was measured using a scale validated by Brettel et al. (2012). The items asked if the project met expectations in terms of the (1) learning and expertise that could be leveraged in other projects, (2) generation of new ideas as a starting point of potential future projects, and (3) enhancement of competencies and capabilities. We integrated the three items with Cronbach's Alpha of 0.68.

Sample

We sampled 395 public companies in over 42 countries. The companies had a turnover of at least USD \$50 million with more than 500 employees, are on average 45 years old, and belong to different sectors including manufacturing, trade, and service activities. The survey addressed business owners (first- and second-level management - 43.7 percent of sample) as well as middle management (56.3 percent of sample). Gender distribution was 70.8 percent male and 29.3 percent female. Managers were on average 40 years old, had 14 years of professional experience, and on average worked nine years in their present company.

Figures 2 & 3: Gender and age of sample

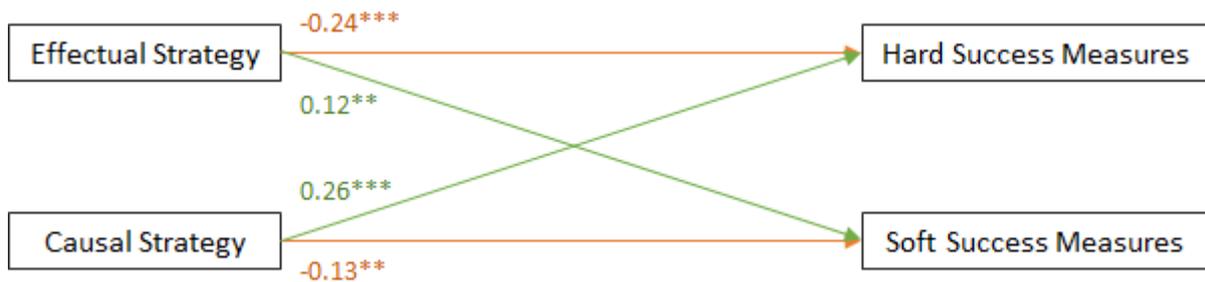


Finding 1: Causal heuristics are positively associated with hard success outcomes, effectual are positively associated with soft success outcomes

Focusing on the main effect of relationships between decision making heuristic and outcomes, we find causal decision-making strategy positively associated with hard success factors, while effectual decision-making is positively associated with soft success measures. We interpret this result as a function of the differences in the processes underlying causal versus effectual approaches. Causal strategy often starts with pre-set goals and runs along a tight project plan that – if nothing unexpected happens – leads to efficiently reaching that goal. Effectual strategy on the other hand offers room for self-selected stakeholders to co-create different effects that in the end may lead to an innovative but unexpected outcome. Thus, while the effectual process is not as efficient at achieving one specific goal which results in a hard success outcome, it

inherently grows breadth in experiences and competencies, as indicated by the soft success measures.

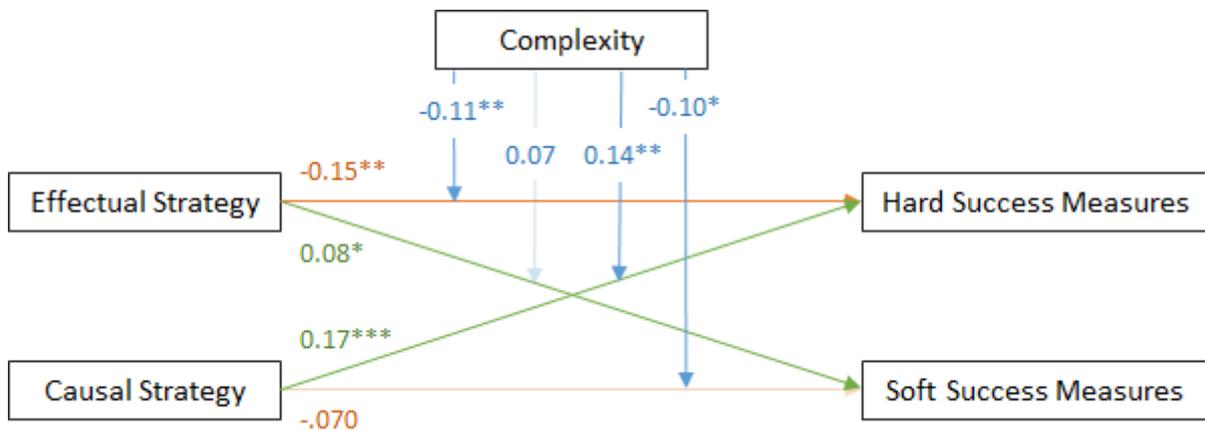
Figure 4: Main effects of effectuation/causation and hard/soft success outcomes



Finding 2: Complexity weakens the relationships between effectuation and outcomes

The results of our moderated regression indicate that after accounting for the moderating impact of complexity, the main effects between effectuation and both hard and soft success outcomes weaken though remain significant.

Figure 5: Moderating effects of complexity on the relationship between effectuation/causation and hard/soft success outcomes



Finding 3: Complexity also weakens the connection between causal heuristics and soft outcomes

After including the moderating effect of complexity, the relationship between causal strategy and soft project success is not significant.

Finding 4: Managers rely on causal heuristics even as complexity grows

Overall, our findings indicate a managerial preference for causal strategy in complex situations. This result is surprising, as research has shown expert entrepreneurs prefer effectual decision-making in contexts of high uncertainty (Read et al. 2009). We infer that because companies encourage and train employees on causal tools and techniques (Frame 2002), deeply embedding predictive heuristics (Staw & Epstein 2000), managers continue to rely on causal heuristics even when complexity rises and effectuation may be more suitable. Illustrating how this happens, managers in a traditional organization get assigned a goal (e.g. from top management) and are tasked with reaching that goal in a preset time frame. Jeopardizing the goal is out of a question. Managers then determine the steps to acquire resources, organize the workflow and assign tasks. This causal approach is effective when clear objectives need to be reached in a fixed time frame. Starting with junior positions, project managers are taught methods that support the causal process, such as Sig Sigma, a set of techniques for process improvement. When they report results, they run failure analyses to further streamline the process and improve outcomes next time. Excellence initiatives honor solutions that optimize resources and reduce process cycle time. This inference is consistent with research on cognition that in situations of stress, when cognitive systems are taxed, people tend to apply well-known (decision-making) patterns.

Discussion

At first glance, our results might suggest a dichotomous choice in front of project managers. Adopt causal heuristics and achieve hard results. Or adopt effectual heuristics and achieve soft results. However, neither represents a sufficient solution, particularly as projects become more complex. The more detailed implication of our findings is that decision making need not be dichotomous. Certain heuristics can be applied to certain situations. The practical implication of our results is an image of the ambidextrous project manager, selectively and situationally applying diverse sets of heuristics as a project progresses and different issues arise.

A project management fairy tale

Let us consider a hypothetical story of Sarah, a project manager at YumCo, a multinational firm in the fast-moving consumer products space. Sarah has been charged with bringing another innovative snack food to the market. Competition is strong, complexity is substantial and expectations are high within her organization. Seeking to deliver solid financial results and an innovative product while encouraging learning and collaboration in her team, Sarah intends to select and employ different heuristics depending on the situation. As we narrate her story we pay special attention to the underlying logic in her decisions.

Project start (effectual)

This is not the first time YumCo has created a new product. In fact, the organization already offers successful product lines of energy bars, snack cookies and salty crackers. Sarah and her team worked on these and other prior YumCo product lines. To support these existing products, YumCo owns manufacturing plants and distribution warehouses in the many different countries where it serves its distribution partners. Sarah's first step is to bring her team together to assess their means. The things they know, the assets available and the people they know. It is a long list, and certainly the team will not use every single resource. However, these resources are within the control of Sarah and her team. It is not necessary to commit large investments or find experts as these resources are available and well understood. These will serve as the starting inputs for the project.

Transformations (effectual)

Together with her team, Sarah begins to generate ideas. Starting points. Primitive product prototypes or descriptions that offer enough specificity to initiate conversations with possible partners. Because she encourages a diversity of ideas, suggestions range from a protein-fortified ice cream snack, to breakfast muffins infused with caffeine for customers needing a little boost at the start of their work day. She is careful not to let any of these ideas go further than a simple description or drawing. These are only starting hypotheses which need to be tested, and it will be hard for her team to revise or reject them later if they invest too much time now.

Interactions (effectual)

Almost immediately, Sarah sends her team out into the world. The hypotheses provide a starting point for conversations with distributors, retailers and end customers in every segment. To get those conversations going, Sarah points her team to the people they already know either individually or through corporate relationships. The team is encouraged to let those conversations assume a different direction as the person they are interacting with is willing to bring their own resources toward a new idea which is interesting to both her team and the partner.

Early commitments (scrum/agile)

A big chain of supermarkets which features in-store cafes gets excited talking with one of the members of the team. The supermarket doesn't want another snack food on the shelf, but they do want innovative snacks to serve at their cafés. The idea of caffeine-infused snack cake treats is something their customers have been asking for. They offer space in 20 of their cafés, and

offer to pay the cost of manufacturing for a trial of caffeine-infused treats. Sarah shifts gears. The team moves into execution mode, focused on quick cycles necessary to bring a small selection of caffeine-infused treats as quickly as possible to 20 test cafés.

Dealing with the CFO (causal, with an effectual option to manage downside)

As part of the experiment, Sarah has to execute an agreement between YumCo and the supermarket chain. The agreement goes to YumCo's CFO for financial review. While Sarah knows this experiment will likely be only the first of many before this project scales up a new product offering, she also knows the CFO deals in forecasts. So she completes two pieces of documentation regarding the experiment. The first is a projection of the possible size of the opportunity if the experiment is successful. And the second is a detailed expenditure plan for the experiment, detailing costs she will incur in the near term regardless of whether the experiment is successful or not. She is also careful to ensure the budget for the whole project well exceeds the cost of this particular experiment, so her team will have room to learn and iterate if this experiment is not successful.

Experiment failure (effectual)

At the cafés, many customers purchased a cup of coffee and enthusiastically tried one of the experimental caffeine-infused snack cake treats. The comments were overwhelmingly positive and initially trial units sold quickly. But repeat purchases were few. Customers discovered that consuming a caffeine-infused snack cake treat with a cup of coffee left them jittery, anxious, and unable to sleep in the evening. A month into the trial, the caffeine-infused snack cake treats sat largely overlooked on the shelves in the cafés. After the experiment concluded, members of the YumCo and supermarket teams conducted a debrief. One of the supermarket employees shared a note from a customer who was sorry to see the caffeine-infused snack cake treats go. The customer was an athlete and stopped at the café for water on his way home from the gym. The treats provided him with a little energy that let him keep working after having been physically exhausted by his exercise.

Pivot (effectuation, moving to scrum/agile)

Sarah and her team created a new prototype with healthier ingredients, a little protein and the same caffeine fortification that had been present in the snack cakes. They took it to gyms and started the conversations again. A national chain of gyms offered to pay in advance for a large order they would sell at their front desks to athletes on their way out of the gym. Sarah and her team shifted gears and initiated focused activity cycles to deliver this second experiment.

Rollout (causal)

The initial order to the gym sold well. Based on the volume numbers from the initial order, the gym placed a second, larger order. Based on the success with one gym, YumCo began targeting other gyms for the new product. And based on all these data, Sarah and her team began to plan the sequence of most efficient steps to full rollout. The end of a workout would never be the same.

Implications for practice

Though simplified, Sarah's story highlights the importance of having alternative heuristics to deal with different aspects of a project. For the uncertainty embedded in the creation processes, she focused on what was in her control (team knowledge, company means and external partnerships) and anticipated iterations as well as inexpensive failures. Not until she had a specific goal did Sarah shift into the traditional (causal) approach of project management where she invested significant time and resources against a prediction.

To act according to project circumstances and context, managers need a variety of different heuristic tools. Once these are available, project managers confronted with different project problems, phases and challenges can apply heuristics appropriately and successfully. As project managers strive to make good decisions – even as complexity arises or context changes – we encourage project managers consider the following:

1. Acknowledge not every heuristic is appropriate for every situation. Projects have many different tasks and problems. Project managers are best prepared if they work with a diverse set of strategies. Each of the project approaches diagrammed in Figure 1 has a time and place.
2. For your next assignment, chose a project or context that enables learning about a broad range of diverse decision-making heuristics. Reading and simulating the different decision-making heuristics, e.g. in workshops or similar settings, is a good starting point, but applying these heuristics over time in real-life project situations is necessary to build ambidexterity. Reflect from time to time and change perspectives regularly to positively influence the learning process.
3. Use the team to widen the portfolio of perspectives. Each individual will have had different experiences and pausing at each step to invite project management approach suggestions will encourage options from the team. Not only does this strengthen the

team relationship and commitment – it also widens the set of available heuristics and helps project managers select strategy that matches projects conditions.

From experts to experts

If you are an expert project manager in a large firm and the effectuation principles feel foreign to you, take heart. As difficult as it may be for you to imagine applying the heuristics of expert entrepreneurs in your job, expert entrepreneurs find it equally hard to plan, optimize surprise out of a project, and drive efficiently toward a single goal. It is why so many entrepreneur founders leave their ventures (or get thrown out) as their firms become successful and need more causal approaches. Bill Gates and Mark Zuckerberg are some of the few who have successfully embraced both effectual and causal heuristics, bringing an uncertain venture to a Fortune 100 firm. So though its rare, you know its possible to be an expert times two.

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