Appendix to Accompany:

Organizational Poverty in Nonprofit Organizations: Why Do Non-Profits Persistently Underinvest in Capabilities?

1 Fieldwork Interview Guide

The following is an example of the interview guide used to direct conversations during the fieldwork conducted for this research. This interview guide was approved as part of the design of this qualitative fieldwork by the XXX Committee on the Use of Humans as Experimental Subjects, filed under Protocol # 1810543537

1. Let's begin with you telling me about a little about your background and role in the organization.
2. Now let's transition to the organization.
    a. What's the mission? Has that changed at all over the years?
    b. How do you measure success? What made you choose those measures over other potential measures?
    c. In what ways do you and your staff monitor performance?
    d. Is any kind of overhead cost measure important to your organization? Why?

3. How is the organization funded?
    a. What proportion of your revenue would you estimate is grant funded?
    b. What kinds of organizations are typically your big funders?
    c. In what ways, if at all, have you changed/built this organization to fit with their priorities or ways of working?

4. In your experience, what are the key elements of a successful appeal for funding (grant or individual donor)?
    a. What does a donor need to feel confident about in order to cut you a check?

5. How regularly do you find you're able to make investments in your own staff or organization - to develop new systems, redesign processes, provide professional development for people etc.?
    a. What are the things that make this possible?

b. What are the challenges to doing this kind of work?

6. I wonder if there's ever been a point in time when you looked at your numbers/measures and said: "we're just not doing well enough"?

    a. If so, what did you do in response?
    b. What made you choose that course of action over, say, [working hard/investing in capabilities]?

2 Model Development and Shock Testing

We model the concept of capability as a stock or level variable that cannot be directly influenced by managerial action in keeping with previous treatments of capability building (Dierickx, Cool, & Constance, 1989). Instead, managers in this space can only affect the rate of change of this stock via the decisions they make vis-à-vis spending organizational effort and resources on either direct performance outcomes or investing in organizational capability.

Capability is therefore modeled as a stock or level variable whose value is determined by its initial conditions and rate of change over time. The rate of change is influenced by two flows, growth due to investment, and decline due to natural erosion over time.

$$\frac{dC}{dt} = e_C \rho - \frac{C}{\tau} \tag{1}$$

In the above, the first term is the product of the resources the organizations invests in building capability, R_C, and the efficiency of converting those resources into stock of capability, ρ. The second term is the erosion of the capability stock over a given time constant τ.

As discussed above, we model that the management of the firm has the choice of allocating available firm resources towards either direct performance-related tasks or toward building

capability. We define the level of resources available to the firm at a given time as *h*, and the fraction of those resources dedicated towards performances-related activities as *u.*

$$e_P = uh \tag{2}$$

$$e_c = (1-u)h \tag{3}$$

Following and modifying the example set by previous work modeling organizational decision making to appeal to external actors (Rahmandad, Repenning, & Henderson, 2010), we define the performance of the firm, P, as a constant return to scale Cobb–Douglas function of the stock of capability, C, the resources currently being dedicated to generating performance, R_C, and an exogenous environmental shock, S.

$$P = C^{\beta} e_P^{(1-\beta)} + S \tag{4}$$

Under the system defined above, steady state is achieved when the change in the capability stock is zero for any given period of time. For any constant values of resource efficiency ρ, capability erosion time constant τ, and zero exogenous shocks S, the allocation value u must be equal to (1-β). We define this as the optimal allocation u^*.

$$u^* = (1-\beta) \tag{5}$$

From this, we can also determine the steady-state value of the stock of capability, which is equal to the optimal capability given the values of ρ, τ, h, and β.

$$C^* = (1-u^*)h\rho\tau \tag{6}$$

Assuming the model of the firm is initialized at a steady state, the value of C^* further acts as the initial value of the stock of capability given the firm is allocating resources based on u^*.

$$C_{t=0} = C^*$$ (7)

We further assume that the environment in which the firm operates has an expectation of performance based on knowledge of the optimal allocation of resources u^*, and expected firm capability C^*. This expect or target performance is defined as:

$$P^T = P(u^*, C^*, S = 0) = C^{*\beta} e^{*(1-\beta)}_P$$

$$where\ e^*_P = u^* h$$ (8)

We define the firm's *performance ratio* as the ratio of the firm's actual performance to the target performance. Values of this ratio below 1 imply the firm is performing at a level below the expectations of its environment, and will in turn pressure managers to allocate more resources towards performance-related activities. Combining the above series of expressions gives a general model of firm performance consistent with previous models of decision making under performance shortfalls. This model is visually approximated in the corresponding article to this appendix.

The degree to which organizations respond to the pressure of the performance ratio is a function of the decision processes and time sensitivities of the managers of the organizations. We estimate the managerial decision heuristics by considering first those managers seeking the long term steady state of capability, in which they adjust the performance allocation relative to the ratio of the current capability stock value to the optimal value:

$$u_{LR} = Min\left(1, u^*\left(\frac{C}{C^*}\right)\right)$$ (9)

We can also imagine short-term focused managers as being more concerned with the performance ratio than with the slower-acting ratio of capability to optimal capability. We

further assume that the performance ratio is under the optimal allocation u^* as that is fully observable to both the firm and the environment, while performance shocks S and actual firm capability C is known only to the firm itself.

$$u_{SR} = Min\left(1, u^*\left(\frac{P(u^*, 0, C^*)}{P(u^*, S, C)}\right)\right) \tag{10}$$

This decision rule depends on the inverse performance ratio assessed not at the actual instantaneous firm performance *P* but rather at the value the firm should be performing at under the exogenous shocks the management experiences and the optimal allocation policy *u**. In this manner the short run focused manager adjusts his or her instantaneous allocation to the value necessary to restore firm performance to external expectations, given that external actors can only view *u** and not *S*. We define this performance metric as *P**.

$$P^* = P(u^*, S, C) = C^{\beta} e^{*(1-\beta)}_{P} + S \tag{11}$$

We imagine that managers operated along a spectrum of short-term focused and long-term focused behavior, and define a variable γ to control this focus between the two extremes. We combine both the long and short term managerial perspectives given above into a single decision expression which uses γ to vary from purely long term decision making (at γ = 0) and purely short term (at γ = 1/(1-β)).

$$u = Min\left(1, u^*\left(\frac{P^T}{P^*}\right)^{\gamma}\left(\frac{C}{C^*}\right)^{1+\gamma(\beta-1)}\right) \tag{12}$$

Under this decision rule, managers adjust their performance to match both needed long run capacity building and short run performance relative to the factors that are externally observable.

This decision rule is consistent with previous treatments of managerial decision making in this space (Rahmandad et al., 2010).

In order to validate that our new structure has dynamic implications on our system consistent with our empirical observations, we tested the model both with and without this new reputation building structure. In order to evaluate the effect of this reputation structure in the model above, consider a firm with the following baseline, and purely illustrative, parameter values:

Symbol	Description	Reference Value
ρ	Capability investment productivity	0.05
τ	Average Capability Life	12 months
γ	Short Term vs Long Term Managerial Response	1.5
β	Capability building Cobb-Douglas coefficient *or* Firm sector Overhead Ratio Expectation	0.5
κ	Reputation adjustment time	6 months
λ	Reputation building Cobb-Douglas coefficient	0.25
h_0	Exogenous or baseline firm resources	200

We first look at this hypothetical firm *without reputation building*, as visually represented in **Error! Reference source not found.**. We consider the effects of exposing this firm to a 25% shock in performance at month 10, for a period of 13 months. We next consider the same scenario and the same firm, but *with the effects of reputation building*. Figure 1 summarizes the results for both scenarios.

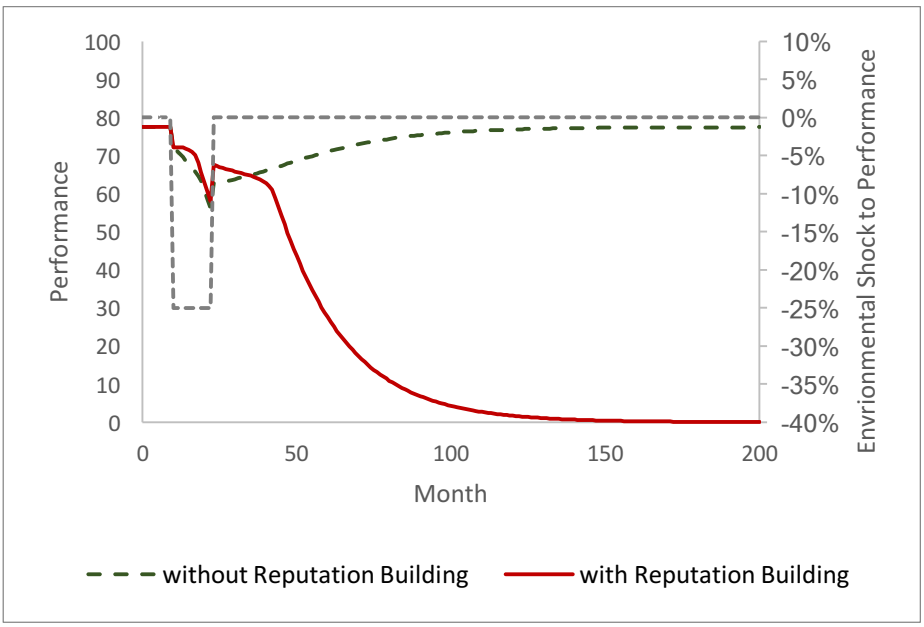

Figure 1: Performance in response to a 25% shock – without Reputation Building

Without reputation building, the firm suffers a reduction in performance over this period, but is able to recover once the shock abates. Under the extended model of performance, the firm fails to recover from the shock. After a brief improvement in performance immediately after the shock is relieved, the performance continues to drop until the firm is effectively out of business. To consider exactly *why* one firm fails while the other succeeds, we examine the value of the stock of Capability and the degree of resources the firm is dedicating towards performance (versus capability building) as represented by u, shown in Figure 2

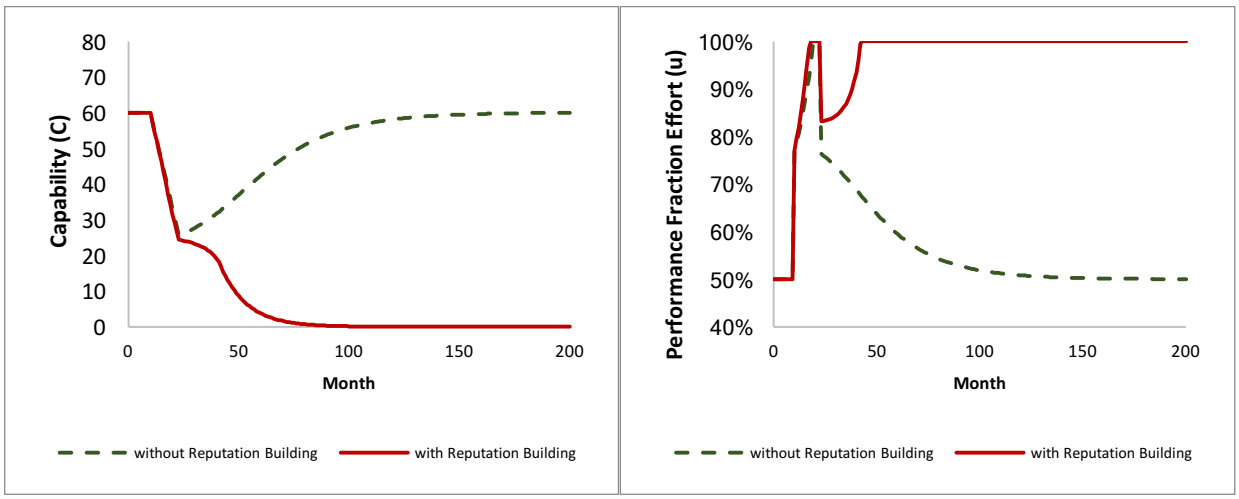

Figure 2: Stock of Capability and Firm Resource Allocation over time

Here we see that the firm recovers if and only if the value of capability stock does not dip below a critical minimum value. Below this critical value, the firm is unable to rebuild capability faster than it is depleted. In this zone, performance continues to degrade and a firm with any value of γ other than 2 (i.e., other than totally focused on capability building) will continue to focus on meeting increasingly difficulty performance goals while realizing worse performance returns.

Both scenarios discussed above occur for the same general firm parametrization, only with and without the additional reputation building structure. To consider how this structure effects that critical value of capability, we examine the Recent Reputation as discussed directly in the article that this appendix supports.

References

Dierickx, I., Cool, K., & Constance, B. De. (1989). Asset Stock Accumulation and Sustainability of Competitive Advantage. *Management Science*. https://doi.org/10.1287/mnsc.35.12.1504

Rahmandad, H., Repenning, N., & Henderson, R. M. (2010). Making the Numbers? 'Short Termism' & the Puzzle of Only Occasional Disaster. *Ssrn*, (June). https://doi.org/10.2139/ssrn.1680599