Resting on Laurels:
A Theory of Inertia in Organizations

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Abstract

We present a model where the employees of a firm have to search for profitable business projects in a changing environment. Employees who have found a successful project in the past period are shown to be reluctant to search for new and better projects leading to corporate inertia. This reduces the firm’s profits in the present period. Still, inertia can in some situations increase overall profits, because it raises the employees’ initial incentive to find successful projects. Reorganization and reducing control over the employees’ search efforts are means to overcome inertia. However, it is shown that without commitment time consistent policies cannot be implemented. This leads to too much reorganization and to too little control reduction.
1 Introduction

Business history is full of examples of successful firms that faced with a new challenge were unable to change and lost their market leadership. To mention but two examples: At the end of the sixties Firestone was one the leading tire producers in the US. As Michelin introduced the superior radial tire, Firestone was too slow to leave bias tires behind and fell into deep financial trouble before finally being bought by Japanese Bridgestone (see Sull 1999). Laura Ashley had initially great success with its romantic garb, but experienced declining demand as more women joined the workforce. Also Laura Ashley waited too long to adjust its business concept and entered a decade of red figures on the bottom line.

Researchers confirm the importance of entrants for innovation. Scherer (1980) writes that "... new entrants contribute a disproportionately high share of all really revolutionary new industrial products and processes. [p. 438]" Tushman and Anderson (1986), Ghemawat (1991), and Christensen (1997) argue that incumbents are able to exploit incremental improvements but often miss opportunities outside their core businesses.

Reinganum (1983) points out that this may be explained by profit maximizing behavior of the firms. Incumbents have smaller marginal benefits from innovating than entrants since doing so cannibalizes existing profits. As a consequence, incumbents invest less in R&D than entrants and are thus less likely to innovate. Gilbert and Newbery (1982) claim, however, that incumbents may actually find it optimal to overinvest in R&D in order to preempt entry.

Whereas the economics literature on the persistence of leadership is concerned with the incentives to invest in R&D created by the market situation, the management literature looks at how success or failure changes the behavior inside the firm taking the incentives created by the market as given. This literature attributes inertia frequently to insufficient information processing of organizations and the subsequent failure to pursue new courses of action. A prominent argument presented here revolves around the idea that individuals do not maximize utility but are content with a satisfying level of achievement (Simon, 1957, pp. 204-205, and Simon, 1959). As long as a satisfactory level of performance is achieved, no search for new alternatives of action is induced. The levels of aspiration are not chosen to maximize utility, but are determined by what is deemed practically attainable at the time. The change of an organization is then mainly an adaptive process rather than one in which improvements are constantly and actively pursued (Cyert and March, 1963). It is
also argued that even if search occurs bounded rationality of employees leads, among other things, firms to improve matters only locally (for example, Nelson and Winter, 1982, and Levinthal and March, 1993). Firms then make small adjustments to current projects rather than undertake major new ones. As a consequence, firms often fail to react optimally to changes in their environments.

Henderson (1993) attempts to disentangle the components of R&D investment and organizational effects on innovation for a branch of the photolitographic industry. She finds that organizational effects play a significant role in explaining innovativeness by documenting that incumbents’ R&D is less productive than entrants’, at least if the new products involve a significantly innovative design.

In this paper, we present a theory of inertia based on inefficient actions within organizations. Whereas the above organizational arguments for explaining inertia rely on boundedly rational behavior on the side of the employees, our approach builds on standard agency theory and does not make use of any behavioral assumptions. We consider a setup where a firm hires an employee for two periods to look for and to implement a profitable business project. The employee receives a private benefit from running a business project, so in the first period she invests effort in finding a good one. If the employee is unlucky in the first period and finds no good project, she will search for one again in the second period. We show that the situation is different when the employee finds a profitable project. Then, the outcome depends on how volatile the environment is. If the environment is stable and the project found in period 1 is likely to be profitable also in period 2, the employee does not search in period 2. Instead, she hopes that the first period project is worth implementing again. Success breeds in this situation inertia: even if a superior project exists, this will not be known to members of the organization. If the environment is sufficiently volatile or there is sufficient pressure from competitors, the employee always searches in the second period and there is no inertia.

Inertia is costly. We show that it is important to distinguish between the ex-ante and the ex-post cost of inertia. Once the firm and the employee are in the second period (ex-post), the firm will find that the employee tends to invest too little in information acquisition. This means there are circumstances in which the employee does not search even if the firm would prefer her to. The problem of inertia is less severe from an ex-ante perspective. The reason is that when the employee foresees that she can use a good project
in both periods, she will search more extensively in period 1. As a consequence, inertia increases under some circumstances overall profits even if it reduces second period profits. In other words, inertia may be optimal.

In the second part of the paper we turn to the question of how and when to avoid inertia. We first consider policies that put pressure on the employee to innovate. Specifically, we explicitly analyze reorganization as a means of overcoming inertia. In a reorganization the employees’s tasks are restructured in the second period. This forces all employees, including those who were successful in the first period, to look for a profitable project in their new area of responsibility. Microsoft, for example, reorganizes the corporation every second year to change outmoded structures and to challenge ‘comfortable people’ as Bill Gates puts it (Executive Excellence, Dec. 2000). We show that the firm can benefit from reorganizing in the second period. Still, if the firm cannot credibly promise to not reorganize, it risks changing the organization too often. This dilutes the employees’ incentive to find a good project in the first period and may reduce profits.

In a second application we analyze the stepwise decrease in restrictions for the employee as a way to fight inertia. The idea is the following: The employee is in the first period only allowed to look for projects that fit well into the firm’s business strategy. These are projects that have a high payoff to the firm but may not be the employee’s most preferred projects. The employee is, if successful in the first period, allowed to search in a wider class of projects, reflecting what we call reduced control. She can therefore look for the projects in the second period that fit her interests best. This could, for example, be projects that allow her to learn a new technology or to signal her ability to other firms. A reduction in control can overcome inertia, because the employee is tempted by the possibility of implementing a favored project. Thus, she searches for a new project in situations where she otherwise would not have. Reduced control in the second period solves the problem of inertia by rewarding the employee in the second period rather than ’sticking’ her, so she searches harder in both the first and in the second periods (unlike is the case with a reorganization). The cost of not keeping the employee on a short leash is that she searches for projects that are close to her interests, but not necessarily to those of the firm. We determine the circumstances under which the firm benefits from reducing the control over the employee’s actions and show that a firm with no commitment technology available tends to keep too much control.
There are a few recent papers that develop complementary theories of inertia in organizations. Carillo and Gromb (2002) study how diverse an organization should be in terms of the characteristics of the employees. They show that homogenous firms are less likely to undertake a radical change in their culture. This makes homogenous firms less flexible, but encourages at the same time culture specific investments. Insofar as the leading firms in the market are the ones with a homogenous culture, well-adjusted to current market conditions, this would be a competing explanation of why successful firms fail to change. Schaefer (1998) explains inertia as the result of influence costs. There are rents up for grabs when an organization changes, so employees get involved in rent-seeking behavior. This leads to inertia by increasing the cost of change. Finally, the paper perhaps closest to ours is Szalay (2001), which we discuss in more detail after presenting the model.

The paper is organized as follows: Section 2 presents the basic model and discusses it. Section 3 presents the analysis of corporate reorganizations to reduce inertia and section 4 studies the effects of reducing control on corporate behavior. Section 5 contains some concluding remarks.

2 A Model of Organizational Inertia

In each of two periods, $t = 1, 2$, a firm can pursue one of infinitely many ex-ante identical projects of one period duration, $\mathcal{F} = \{1, 2, \ldots\}$. The projects we have in mind is not limited to new products but also includes process innovations. In each period only one of the projects is of positive value. This project is denoted by $x^*_t$. All other projects have non-positive values.

An employee is hired to acquire information in order to identify $x^*_t$ and to implement the project, if a project is pursued. It is assumed that the employee is hired for two periods. The employee’s information acquisition yields a signal about $x^*_t$, $\tilde{x}_t$. The signal is correct with probability $q_t$ and incorrect with probability $1 - q_t$. If the signal is incorrect, each of the projects with non-positive values are signalled with equal probability. Since there are infinitely many projects, this means that each of these projects is signalled with probability zero. Information acquisition is costly for the employee. Her private cost depends on the expected quality of the signal and is given by $\frac{1}{2} \gamma q_t^2$.

After the project is selected, both the firm and the employee observe whether the project is of positive value or not. This information is not verifiable. If the project with a
positive value is selected, it is fully implemented. In contrast, a project with non-positive value is scaled down to a minimum (a switch to a different project is impossible at this stage, however). If the project is scaled down to the minimum, the payoffs of both the firm and the employee are assumed to be zero.

The employee is integral to any full project implementation. Therefore, she obtains $b$ as a control rent and/or an informational rent. For example, this could be the employee’s compensation if it is costly to replace her at this point, because of an informational lock-in. Alternatively, it could be that the employee runs the project in a way that is best for her career rather than what is in the best interest of the firm’s owners. The value to the firm of a fully implemented project is $B$. We treat the above parameters $b$ and $B$ as exogenous and identical in each period.

The project that has positive value in period one may not be a positive value project in period two. The optimal projects in the two periods are not identical with probability $\alpha \in [0, 1]$. $\alpha$ thus characterizes the volatility of the firm’s environment. We can think of it as a change in the consumers taste or the technology frontier that requires a major redirection of the firm’s activities. We will refer to $\alpha$ as the ‘volatility’ of the firm’s environment or the ‘external pressure’ for a firm that has implemented a profitable project.

We assume that both players are risk neutral and impose the following parametric restriction on $\gamma$ to exclude any corner solutions:

\[
A.1. \quad \gamma \geq \max\{b + b/\sqrt{2}, b/2 + \sqrt{2B^2 - b^2}\}. 
\]

2.1 The Second Period

At the beginning of the second period, there are two possible states of nature, $j$: the first period project was a success ($s$), i.e. $x_1^*$ was implemented, or the selected project was a failure ($f$). Please note that $x_2^*$ does not have to be identical in the two cases, given there are valuable assets in place. If, for example, $x_1^*$ is the identification and adoption of a new production technology and was implemented in period 1, $x_2^*$ could be the further improvement of that technology. If this technology was not found in period 1 it could be that detecting and adopting it is optimal in period 2.

We denote the employee’s optimal search intensity in the second period by $q_{12}^j$, where $j \in \{s, f\}$ indicates the first period outcome.

Suppose that the first period project was a failure, so the employee does not know $x_1^*$.
When choosing how precise information to acquire, the employee solves:

$$\max_{q_2} \left\{ q_2b - \frac{1}{2} \gamma(q_2)^2 \right\}$$, so $$q_2^f = b/\gamma$$.  \hspace{1cm} (1)

Using $$q_2^f = b/\gamma$$, we obtain the expected utility of the employee in period 2 in case of a first period failure, $$E(u_2 \mid f)$$, and the expected firm profits in this case, $$E(\pi_2 \mid f)$$:

$$E(u_2 \mid f) = b^2/2\gamma$$ and $$E(\pi_2 \mid f) = bb/\gamma$$. \hspace{1cm} (2)

Consider now the problem of an employee that was successful in the first period and knows $$x_1^*$$. The employee receives a signal $$e_2[x_2 \neq x_1^*]$$. This signal indicates the optimal project in the second period with probability $$q_2$$. If $$\tilde{x}_2 = x_1^*$$, the employee knows that $$x_1^*$$ is optimal also in the second period. The problem facing the employee is more difficult if $$\tilde{x}_2 \neq x_1^*$$, as she has two conflicting signals. Here, we have the conditional expectations:

$$\Pr(\tilde{x}_2 = x_2^* \mid \tilde{x}_2 \neq x_1^*) = \frac{\alpha q_2}{\alpha + (1 - \alpha)(1 - q_2)},$$

$$\Pr(x_1^* = x_2^* \mid \tilde{x}_2 \neq x_1^*) = \frac{(1 - \alpha)(1 - q_2)}{\alpha + (1 - \alpha)(1 - q_2)}.$$

Therefore, the employee follows the new signal iff

$$\Pr(\tilde{x}_2 = x_2^* \mid \tilde{x}_2 \neq x_1^*) \geq \Pr(x_1^* = x_2^* \mid \tilde{x}_2 \neq x_1^*) \Leftrightarrow q_2 \geq 1 - \alpha.$$

Choosing a precision lower than $$1 - \alpha$$ has thus no value, as the signal is ignored whenever it is different from $$x_1^*$$. The optimal precision is either $$q_2 = 0$$ or the solution to the following program:

$$\max_{q_2} \left\{ q_2b - \frac{1}{2} \gamma(q_2)^2 \right\}$$

s.t. \hspace{1cm} $$q_2 \geq 1 - \alpha$$

If she chooses $$q_2 = 0$$, the project $$x_1^*$$ is implemented. Then, the expected period 2 utility is $$E(u_2) = (1 - \alpha)b$$. If she chooses $$q_2 \geq 1 - \alpha$$, $$\tilde{x}_2$$ is implemented. Solving this problem, we obtain:

**Lemma 1** A successful employee searches in the second period only if the external pressure is sufficiently high:

$$q_2^* = \begin{cases} 0 & \text{for } \alpha < 1 - b/2\gamma, \\ \frac{1}{2} & \text{otherwise} \end{cases}$$ \hspace{1cm} (3)

1If $$\tilde{x}_2 \neq x_1^*$$, the probability of receiving the signal $$x_1^*$$ is zero as there is an infinite number of non-positive value projects which are all equally likely to be signalled. Therefore, we have that $$\Pr(\tilde{x}_2 = x_2^* \mid \tilde{x}_2 = x_1^*) = 1$. 

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As mentioned above, $\alpha$ can be understood as the external pressure for an employee that has implemented a profitable project in the first period. For an unsuccessful employee the external pressure is never lower than for a successful employee, since the current project’s probability of being successful in the second period is zero. This implies that an employee who is not successful in the first period always invests in information acquisition. On the other hand, an employee who found a successful business project in the first period does not invest in acquiring new information if the external pressure is not large enough.\footnote{This is consistent with the belief of many management consultants that change requires a sufficient sense of urgency among employees (see, for example, Kotter, 1996, p. 4).} We will in this situation say that the organization experiences inertia. Let us define the critical level of $\alpha$ by $\bar{\alpha}_2 \equiv 1 - b/2\gamma$.

In case of a success in period 1 it follows from (3) for the expected utility of the employee and firms profits in the second period:

$$
E(u_2 \mid s) = \begin{cases} (1 - \alpha)b & \text{if } \alpha < \bar{\alpha}_2 \\ b^2/2\gamma & \text{otherwise} \end{cases} \quad \text{and} \quad E(\pi_2 \mid s) = \begin{cases} (1 - \alpha)B & \text{if } \alpha < \bar{\alpha}_2 \\ Bb/\gamma & \text{otherwise} \end{cases}.
$$

The above analysis shows that the employee either searches with the intensity $b/\gamma$ or not at all. The following proposition shows that the level of external pressure needed to make a successful employee search again is too high from the point of view of the firm’s second period profits. The reason is that the employee carries the full cost of finding a better project but only captures a part of the benefits.

**Proposition 1** Given that the employee either searches with the intensity $b/\gamma$ or not at all, the second period profits of the firm are maximized when the employee searches for all $\alpha$ such that

$$
\alpha > 1 - b/\gamma \equiv \underline{\alpha}_2.
$$

Note that $\underline{\alpha}_2 < \bar{\alpha}_2$. Hence, for $\alpha \in (\underline{\alpha}_2, \bar{\alpha}_2)$ a successful employee does not search even if it would increase the firm’s second period profits.

**Proof.** Whenever the employee searches, she chooses the intensity $b/\gamma$. Hence, the expected profits are $bB/\gamma$ if the employee searches, and $(1-\alpha)B$ if she does not. Comparing the two profits yields the proposition. \[\blacksquare\]

Proposition 1 is the bad news in this story for successful firms: successful employees do not always rest on their laurels, but the level of external pressure necessary to motivate
them to look for ways to reinvent the business is too high from point of view of the firm’s second period profits. This provides a simple, agency based explanation for the notion that success fosters inertia. It is consistent with the empirical evidence cited in the introduction as long as the direction of incremental progress is known and work on it can be monitored more easily while more significant innovation requires a search process as described in the model.

2.2 The First Period

We denote the period 1 intensity of search by $q_1$. The employee faces the following problem when choosing $q_1$:

$$
\max_{q_1} \begin{cases} 
q_1(b + (1 - \alpha)b) + (1 - q_1)\frac{b^2}{2\gamma} - \frac{1}{2}\gamma(q_1)^2 & \text{if } \alpha < \alpha_2 \\
q_1(b + \frac{b^2}{2\gamma}) + (1 - q_1)\frac{b^2}{2\gamma} - \frac{1}{2}\gamma(q_1)^2 & \text{otherwise}
\end{cases}
$$

Solving this problem, we obtain the optimal search intensity, $q_1^*$:

$$
q_1^* = \begin{cases} 
\frac{b}{\gamma} + \frac{2\gamma(1-\alpha)b-b^2}{2\gamma^2} & \text{if } \alpha < \alpha_2 \\
\frac{2bB}{\gamma} & \text{otherwise}
\end{cases}
$$

(6)

Since $q_1^* > b/\gamma$ for $\alpha < \alpha_2$, equation (6) makes apparent that inertia in the second period is not only bad news: an employee foreseeing that a successful project can be reemployed in the next period has a stronger incentive to find the right project in the first period. We show in the next section that inertia might in some situations be optimal for the firm, even if it reduces second period profits, because it increases the employee’s incentive to acquire information in the first period.

The total expected profits of the firm, $E(\pi)$, are:

$$
E(\pi) = \begin{cases} 
q_1^*(B + (1 - \alpha)B) + (1 - q_1^*)bB/\gamma & \text{if } \alpha < \alpha_2 \\
2bB/\gamma & \text{otherwise}.
\end{cases}
$$

(7)

Figure 1 illustrates the total and the second period profits as a function of $\alpha$. The second period profit is drawn assuming that the employee found and implemented $x_1^*$ in the first period. There is a discrete 'jump' up in profits at $\alpha_2$, where the external pressure becomes so high that a successful employee starts to search in the second period. The figure shows how $\alpha_2$ is defined as the value of $\alpha$ such that the second period profits are the same when a successful employee searches and when she does not. $\alpha_2$ is always strictly smaller than $\alpha_2$.  

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Figure 1: The total expected ex-ante profits (solid) and the expected second period profits given that the employee was successful in the first period (dotted) as a function of $\alpha$. ($B = 1, b = 1/2, and \gamma = 2$).

3 Overcoming Inertia I: Adding Internal Pressure

Since successful firms may display excess inertia if external pressure for the employees is insufficient, it seems natural for the firm to complement it with pressure from within the firm. In the following we analyze reorganization as one policy measure to achieve this. Afterwards we discuss two more policies that increase overall pressure on the employees.

One way of adding pressure on the employees – and hence of overcoming inertia – is to reorganize the firm in the second period and restructure the employees’ tasks. This can, for example, be done through a new organizational structure in which also individual responsibilities and goals change. A change in responsibilities adds internal pressure to the pressure from the environment as it forces the employees to find a way to accomplish their new tasks efficiently. To do this they have to invest in acquiring information in the second period. Thus, a reorganization forces successful employees to search in situations where they otherwise would not have.3

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3 A reorganization creates higher incentives for information acquisition that simply rotating jobs. In an environment of job rotation it is possible for the employees to retrieve the information about the previous course of action, for example, from internal documents or conversations with the former
In our simple framework, a reorganization can be represented as an activity by the firm that renders the probability that a successful project in the first period is also profitable in the second period zero, $\alpha = 1$. We assume that a reorganization does not introduce any costs or benefits except those arising endogenously due to knowledge being destroyed and created.

First notice that a corporate reorganization does not affect an employee who was unsuccessful in the first period. She will search with the intensity $b/\gamma$ in all tasks, so the payoff to the firm and the employee are the same whether tasks are restructured or not. Therefore, the firm will embark on a reorganization if and only if it wants successful employees to search again.

Suppose first that the firm cannot commit to not reorganizing production in the second period. Then, it will reorganize, if doing so increases second period profits. The analysis in the previous section shows that a reorganization will occur for all $\alpha \in (\alpha_2, \alpha_2)$.

Suppose instead that the firm has a commitment technology available. A commitment to not reorganize the production decreases second period profits for $\alpha \in (\alpha_2, \alpha_2)$. On the other hand, it increases at the same time the intensity of search in the first period. The next lemma defines the region of $\alpha$ for which the firm would want to commit to keeping the same organization for two periods.

**Lemma 2** Define $\alpha \in (\alpha_2, \alpha_2)$ as the unique solution to the following equation:

$$\left( \frac{b}{\gamma} + \frac{2\gamma(1 - \alpha)b - b^2}{2\gamma^2} \right)(2 - \alpha) + \left( 1 - \left( \frac{b}{\gamma} + \frac{2\gamma(1 - \alpha)b - b^2}{2\gamma^2} \right) \right) \frac{b}{\gamma} B - \frac{2Bb}{\gamma} = 0. \quad (8)$$

Then, the firm will commit not to reorganizing the production in the second period for all $\alpha \leq \underline{\alpha}$.

**Proof.** The first term on the left hand side (LHS) of (8) is the profits of the firm when the employee does not search in the second period, and the second term is the profits when she does. The LHS is strictly decreasing in $\alpha$. For $\alpha = \alpha_2$, the LHS reduces to $\frac{Bb^2}{2\gamma^2} > 0$, and for $\frac{b}{\gamma} = \alpha_2$ it reduces to $-\frac{Bb^2}{2\gamma^2} < 0$. The proof follows from continuity of the LHS of (8).

Figure 1 illustrates $\alpha$ that is defined as the $\alpha$ such that the firm is indifferent ex-ante whether a successful employee searches in the second period or not. Therefore, $\alpha$ takes incumbent of the position. Any search effort would then potentially be misdirected towards past actions rather than new ones.

4 One can also interpret a restructuring as an event that erases the firm’s memory of past actions, which forces it to ‘reinvent’ itself.
both the effect on second and first period search into account. We are now ready to state the main result of this section.

**Proposition 2 (Excess Corporate Restructuring)** A firm that has a commitment technology available will reorganize the firm in the second period for $\alpha > \alpha_1$. A firm with no commitment technology will reorganize the firm for $\alpha > \alpha_2$. Without commitment the possibility of reorganization strictly reduces profits for $\alpha \in (\alpha_2, \alpha_1)$, because the employee invests less in information acquisition in the first period.

Proposition 2 illustrates the time-consistency problem that the firm may face. The firm will reorganize the production in the second period for all $\alpha > \alpha_2$. However, ex-ante the firm would prefer only to reorganize for $\alpha > \alpha_1$ in order to not dilute period one incentives. Without a way to commit itself, the firm may end up in a situation where there is too much reorganization. That is, inertia is fought excessively and reduces total expected profits.

**Alternatives policies that add internal pressure: Discussion**

Regular reorganizations is one example of how firms can fight inertia by increasing internal pressure. In the following we discuss two alternatives to restructuring that also impose internal pressure on the employee.

One measure of avoiding repetition of the same project is simply excluding the status quo. The firm asks the employee to propose a project different from the currently implemented one, $x_1^*$. Szalay (2001) develops an elegant model of delegation along these lines. He considers a situation where an advisor has to recommend which action to take. Szalay shows that it is optimal to exclude advice close to the prior belief about the right action. This has a cost when the optimal action is close to the prior, but in Szalay’s framework it induces the advisor to search harder, because the mistakes she can make become larger. Translated into our framework this means that if the prior belief is based on previous search a) for a successful employee $\alpha$ is artificially rendered 1 in period 2 and b) even if the signal obtained in period 2 is the status quo it cannot be chosen. We show in this paper that in a dynamic context there is an additional cost that needs to be taken into account: excluding advice around the prior reduces the advisor’s incentive to search for the best

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5 Notice that the informational requirements to implement this strategy is higher than for a reorganization, because the management of the firm needs to know $x_1^*$.

6 Since in this case the advisor’s utility is lower, it requires the possibility to commit to such a policy.
possible advice in the periods before, because accumulated knowledge is usable for fewer periods.

Another alternative is to require a certain percentage of sales to stem from recent innovations. For example, 3M requires that 30% of sales have to come from products introduced within the last four years (see von Hippel, Thomke and Sonnack (1999)). This gives employees a strong incentive to innovate as established product lines might be scaled down or closed. This policy is essentially a milder form of the application discussed above: $\alpha$ is increased and new products might have to be introduced without being superior to old ones. Again, this way of fighting inertia has its costs. First, the bias towards new products is costly when the existing products have the most promising prospects. Second, it reduces the employees’ incentives to find good products in the first place. Any organizational measure that increases $\alpha$ suffers from the problem of reducing ex ante incentives. Thus, the measure will be applied inefficiently often, if intertemporal commitment is impossible.

4 Overcoming Inertia II: Limiting Control

Applying additional pressure on the employee is one way to reduce inertial tendencies within the organization. After a success, where the employee would prefer to rest on her laurels, she is forced to invest in information acquisition again. In the absence of intertemporal commitment, however, the negative effect on the employee’s initial effort causes this policy to be imperfect. In the following we analyze a policy that rewards success rather than penalizes it. As one would expect, such a policy does not suffer from the drawback of stifling initial effort; to the contrary, it facilitates initial effort exertion. Rather than studying the effects of monetary rewards we uphold the assumption of payo

\footnote{We comment on monetary incentives below.}n non-verifiability and focus on the consequences of organizational policies for employee behavior.\footnote{We comment on monetary incentives below.} Specifically, we study the effect of a stepwise increase in the employee’s liberties (or reduced control over the employee). By this we mean that in the second period the employee has the opportunity to search in an expanded set of projects.

Being allowed to search in an expanded set of projects changes employee behavior only if the additional projects are more attractive to her than the initial set. If this is the case, expanding the project set allows the employee to channel her search towards the new set of projects. This increases her willingness to expend effort searching for a new profitable
project. Expanding the project set may then increase profits even if the added projects are less profitable than the projects in the original set.

To formalize this notion consider the following variation of the model. In addition to the initial set of projects $F$ there is a second group of alternatives that the agent can search in, $E$. There exists a profitable project in each of the two sets of projects in each period. The optimal projects in $E$ and $F$ in period $t$ are denoted $x^*_t,E$ and $x^*_t,F$, respectively, $t \in \{1,2\}$. Again, $x^*_{1,i} \neq x^*_{2,i}$ with probability $\alpha$, $i \in \{E,F\}$. The two sets differ in their payoffs to the employee and the firm. When $x^*_t,F$ is found and implemented it pays $B$ to the firm and $b$ to the employee whereas $x^*_t,E$ pays $\hat{b}$ to the employee and $\hat{B}$ to the firm ($b > \hat{b}$ and $B > \hat{B}$). Thus, $F$ contains a project that is very profitable for the firm but provides only modest utility for the employee; in $E$ it is the other way around. We can think of $F$ as the projects that fit well into the firm’s business strategy whereas $E$ are projects that allow the agent to learn a new technology, to signal her ability to the outside world, to pursue a project in which she has intrinsic interest in or to enjoy other perks.8

In addition, we assume that the overall surplus of the profitable project in the new set is lower than in the original one, $\hat{B} + \hat{b} < B + b$. To simplify notation we will, however, be more specific regarding parameters and assume that $\hat{b} = b$ and $\hat{B} = \phi b$, where $\phi < 1$.

We assume that the principal can ensure that the agent searches only in $F$.9 The CEO can, for example, attend preliminary meetings and make sure that the proposed products can be sold using existing distribution channels or be produced in existing plants. An employee who searches in $F$ with the intensity $q_t$ in period $t$ will find $x^*_t,F$ with probability $q_t$. On the other hand, there are ways to (credibly) give up control and allow the employee to search in both $E$ and $F$. The CEO might oversee many projects and be too busy to interfere, or the employee might be given the formal authority to make decisions in her business area. An employee who is allowed to search in both $E$ and $F$ focuses on $E$ and thus finds $x^*_t,E$ with probability $q_t$. The set of assumption implies that allowing the employee to search in both sets is suboptimal for the firm in a one-period setting.

We will compare two organizational forms: one where the firm keeps control in both

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8 Before 3M established the rule that a certain percentage of sales had to come from recent innovations its R&D efforts were characterized by significant liberties for researchers. As one manager noted: “There is clearly less freedom in the labs than there was 10 of 15 years ago, and it means that it’s less fun for researchers. As a result, there are more motivation and morale issues to deal with today.”

9 Our the setup is therefore different from, for example, Aghion and Tirole (1997) where the employee and the firm search in $E$ and $F$, respectively.
periods and restricts the employee to search in \( \mathcal{F} \), which we call control, and another where the employee is allowed to search in both \( \mathcal{E} \) and \( \mathcal{F} \) after a success in the first period.\(^{10}\) We term the latter case for lack of a better characterization limited or reduced control. The analysis in section 2 corresponds to the case of control. In the following we thus analyze the case of reduced control. The results obtained when the firm follows an limited control policy are indicated with a diamond superscript. Afterwards, we compare the two organizational policies.

### 4.1 Limiting Control and Inertia: The Second Period

As before we proceed backwards and start with the analysis of period two.

Suppose first that the employee was unsuccessful in the first period. Then, she has to search again in \( \mathcal{F} \) and chooses the intensity \( b/\gamma \). Suppose instead that the employee was successful in the first period and is allowed to search in both project sets. The expected utility if the employee searches is \( B^2/2\gamma \). If she chooses not to search, she has to implement the old project in \( \mathcal{F} \), which gives an expected utility of \( (1 - \alpha)b \). It follows that

\[
q_{f2}^* = \frac{b}{\gamma} \quad \text{and} \quad q_{s2}^* = \begin{cases} 0 & \text{if } \alpha < 1 - \frac{B^2}{2\beta \gamma} \equiv \hat{\alpha}_2 \\ \frac{B}{\gamma} & \text{otherwise} \end{cases}.
\]

If we compare how much the employee invests in information acquisition in the second period under control and reduced control, we obtain:

**Remark 1** There is less inertia and a higher intensity of search in period 2 if success is rewarded with a reduction in control.

Allowing the employee to search in both \( \mathcal{E} \) and \( \mathcal{F} \) in the second period gives her a greater incentive to acquire information, since she has the possibility to find a project yielding a higher utility than the one found in the first period. On the one hand, this increases the intensity with which the employee searches, \( B/\gamma \) instead of \( b/\gamma \). On the other hand it also implies a larger region of \( \alpha \) for which she undertakes search, \( \alpha \in [1 - \frac{B^2}{2\beta \gamma}, 1] \) instead of \( \alpha \in [1 - \frac{b}{2\gamma}, 1] \).

While reducing control increases search activity, it is directed towards a less profitable set of projects in period two. In order to compare the policies of control and limited control

\(^{10}\) There are, of course, other possibilities such as allowing to employee to search in \( \mathcal{E} \) and \( \mathcal{F} \) in both periods or only after a failure in the first period. It can be shown that these other possibilities are never optimal.
we have to include also differences in search activity in period one. Before we do this, let us compare the effects of reducing control and monetary incentives on search.

**A comment on monetary incentives**

Suppose that it would be possible to contract on the outcome of the employee’s search. At first glance, it seems that reducing control is equivalent to increasing the bonus from $b$ to $B$ in such a complete contracting framework. Indeed, if the employee searches, she would in both cases choose the intensity $B/\gamma$. However, if the employee does not search, the outcome is different. In our model, the employee has an expected utility of $b(1 - \alpha)$ whereas she would have $B(1 - \alpha)$ with a bonus of $B$. The employee would thus search with the same intensity but in a smaller range of the parameter space if a success was rewarded with an increased monetary bonus instead of more freedom.

**4.2 Limiting Control and Inertia: The First Period**

Analyzing the employee’s period one decision under limited control takes her optimal period two choices into account. The employee solves the following problem in the first period:

$$\max_{q^1} \begin{cases} q_1(b + (1 - \alpha)b) + (1 - q_1)^{\frac{\gamma}{2}} - \frac{1}{2}\gamma(q_1)^2 & \text{if } \alpha < \bar{\alpha}_2 \\ q_1(b + \frac{b^2\gamma}{2\gamma}) + (1 - q_1)^{\frac{\gamma}{2}} - \frac{1}{2}\gamma(q_1)^2 & \text{otherwise} \end{cases}$$

Solving this problem, one obtains:

$$q_1^\diamond = \begin{cases} \frac{b}{\gamma} + \frac{b(1 - \alpha) - b/2\gamma}{\gamma} & \text{if } \alpha < \bar{\alpha}_2 \\ \frac{b}{\gamma} + \frac{b^2/\gamma}{2\gamma} & \text{otherwise} \end{cases}$$

$$E(\pi^\diamond) = \begin{cases} q_1^\diamond(B + (1 - \alpha)B) + (1 - q_1^\diamond)^{\frac{bB}{2}} & \text{if } \alpha < \bar{\alpha}_2 \\ q_1^\diamond(B + \alpha b B) + (1 - q_1^\diamond)^{\frac{bB}{2}} & \text{otherwise} \end{cases}$$

For $\alpha < \bar{\alpha}_2$ the employee’s actions are identical under control and limited control. $\alpha$ is too small to induce search of a successful employee in period two even under limited control. This also implies that search in period one is unaltered if the firm reduces control over the employee in the second period. As a consequence, profits are the same under control and limited control in this parameter range (see (7) and (11)).

To exclude this less interesting area of the parameter space we make the following assumption:

**A.2. $\alpha \geq \bar{\alpha}_2$.**

Comparing equations (6) and (10) makes it evident that:
Remark 2 Under A.2, there is a higher intensity of search in period 1 when success is rewarded with a reduction of control.

Since success is rewarded with more freedom under reduced control, initial search incentives increase. In contrast to period two, these are not directed towards projects with a lower profitability, but to the original project set \( \mathcal{F} \) and, thus, constitute an additional benefit of reducing control for the firm.

Albeit Remarks 1 and 2 taken together document that reducing control leads to more search in both periods, this does not imply that reducing control is the optimal policy. Under reduced control the employee chooses to channel her search towards less profitable projects. This negative effect of limiting control has to be weighed against higher search activities in both periods.

4.3 The Optimal Level of Control

Suppose first that the firm has no commitment technology available. Then, the firm reduces control over the employee’s search only if it increases second period profits.

Lemma 3 Suppose that \( \phi \geq 1/2 \). Then, reducing control maximizes second period profits in the following regions of the parameter space:

i) for all \( \alpha \in [\bar{\alpha}_2, \bar{\alpha}_2) \) if \( B^2/2b^2 \leq \phi \) and

ii) for \( \alpha \in [1 - \phi b/\gamma, \bar{\alpha}_2) \) if \( B^2/2b^2 > \phi \).

If \( \phi < 1/2 \), reducing control is not profitable in the second period.

Proof: See Appendix.

In our setup, it reduces the second period profits to let the employee search in \( \mathcal{E} \) and \( \mathcal{F} \) if she would search also in \( \mathcal{F} \) only. In particular, the profits are \( Bh/\gamma \) under control but only \( \phi Bh/\gamma \) under reduced control. Hence, without commitment the firm does not reduce control over the employee’s search for \( \alpha > \bar{\alpha}_2 \), since there is no problem of inertia. This means, reduced control is potentially profit maximizing if there is no period two search under control and search under reduced control. This is given for \( \alpha \in [\bar{\alpha}_2, \bar{\alpha}_2) \). Whether limited control indeed maximizes period 2 profits, depends also on the level of profits possible under this policy, parametrized by \( \phi \). For very low potential profits \( \phi < 1/2 \), control leads to higher period two profits for all \( \alpha \). Reduced control yields higher profits in
period two for the complete range of potential \( \alpha, \alpha \in [\tilde{\alpha}_2, \overline{\alpha}_2] \), if \( \phi \) is large, \( \phi \geq B^2/2b^2 \). For \( \phi \) between these two extreme ranges, reduced control leads to higher period two profits for part of the potential range of \( \alpha, \tilde{\alpha}_2 < \alpha < \overline{\alpha}_2 \).

A firm without the possibility to commit to a certain policy ex ante will choose between the them governed by the result described in Lemma 3. To compare the firm’s choice under non-commitment to the ex ante most profitable one (the strategy that is selected if commitment is possible), we compute the optimal policy from an ex ante perspective. This is done by comparing \( E(\pi) \) and \( E(\pi^0) \), the expected ex-ante profits under control and reduced control, respectively. These are given by (7) and (11).

**Lemma 4** Compare the ex-ante profits under control and reduced control. Irrespective of the size of \( \phi \), control maximizes ex ante profits for all \( \alpha \) outside of \( [\tilde{\alpha}_2, \overline{\alpha}_2] \). For \( \alpha \in [\tilde{\alpha}_2, \overline{\alpha}_2] \) there are four cases to consider:

i) For \( B^2/2b^2 \leq \phi \) reduced control maximizes ex-ante profits for all \( \alpha \in [\tilde{\alpha}_2, \overline{\alpha}_2] \).

ii) For \( B^2/2b^2 > \phi \geq 1 - B^2 \gamma/b(2b \gamma + B^2 - b^2) \) define \( \alpha(\phi) \) as the unique solution to the equation \( E(\pi^0) = E(\pi) \). \( \alpha(\phi) \) belongs to \( [\tilde{\alpha}_2, \overline{\alpha}_2] \) and is strictly decreasing in \( \phi \). Then, reduced control (control) maximizes ex-ante profits for \( \alpha \in [\alpha(\phi), \overline{\alpha}_2] \) (\( \alpha \in [\tilde{\alpha}_2, \alpha(\phi)] \)).

iii) For \( \phi < 1 - B^2 \gamma/b(2b \gamma + B^2 - b^2) \) control maximizes ex-ante profits for all \( \alpha \in [\tilde{\alpha}_2, \overline{\alpha}_2] \).

iv) Reduced control maximizes ex-ante profits for \( \alpha \in (\overline{\alpha}_2, 1] \) iff \( \phi \geq 1 - (B^2 - b^2) \gamma/b(2b \gamma + B^2 - b^2) \).

Proof: See Appendix.

The analysis requires more case discriminations, since it includes the intertemporal effects of the two policies. Again, the optimal outcome depends crucially on the potential profit in period two under reduced control, \( \phi \).

We are now in a position to state the main result of this section:

**Proposition 3 (Excess Control)** A firm that has no commitment technology available will limit control over the employee’s search in the second period for \( \alpha \in [\min\{\tilde{\alpha}_2, 1 - \phi b/\gamma\}, \overline{\alpha}_2] \) to avoid inertia. A firm with a commitment technology will reduce control for a strictly larger set of the parameter space than without commitment.

\(^{11}\)This requires that \( B \leq 2b \), since \( \phi \leq 1 \).
Given the analysis in the previous section it is not surprising that reducing control is a policy that is applied too seldom. Reducing control in the second period increases the investment in information acquisition in the first period, and it may thus increase total ex-ante profits even if it reduces second period profits. This positive effect exploited if the firm cannot commit ex ante to a policy of reducing control over a successful employee. At each time the firm will base its decision solely on its expected payoffs in the upcoming period(s).

Figure 2 illustrates the equilibrium outcome with and without commitment. Reduced control is the outcome in region II when the firm does not have access to a commitment technology. Here, reducing control solves the problem of inertia that arises if the firm keeps control in the second period. Furthermore, $\phi$ is sufficiently high that reduced control does not diminish the profitability of a new second period project by too much. In regions I and III it is optimal to reduce control over a successful employee even if doing so reduces second period profits. The reason is that limited control serves as a carrot in the first period, and induces the employee to search more extensively. In regions I and III the firm thus faces a time-consistency problem, and reduced control is the equilibrium outcome only if the firm has a commitment technology available. Outside the regions I-III the firm always keeps control. $\phi$ is here so low that the loss of profits in the second period outweighs the benefits from a greater investment in information acquisition.

As long as the external pressure is not sufficiently high, employees in successful firms have to be continually motivated from within the organization to search for new opportunities. This analysis documents that rewarding employees with increased liberties is a sensible policy if the environment is not too stable even when no intertemporal commitment is possible. The absence of commitment, however, induces this policy to be applied too seldom, since positive ex-ante effects on search effort will not be factored into the decision.

**Limiting control if the overall surplus increases: Discussion**

We have in this section chosen to focus on the case $\phi < 1$. Under these circumstances, reducing control is suboptimal for the firm when the employee would search under control as well. What if the overall surplus increases rather than decreases if the employee is allowed to search in both sets of projects? Then, the question is whether it is not always best to provide the employee with the freedom of search in both periods. This is, however,
Figure 2: The organizational choice of the firm. Without commitment, the firm chooses limited control in region II of the parameter space and control everywhere else. With commitment, the firm chooses limited control in regions I, II, and III. ($b = 3/4$, $B = 1$, $\gamma = 2$. )
not the case, since it may be the case that the firm wants to keep control in the first period to induce the employee to search harder in the first period and/or to fight inertia in the second period.

We can capture the situation of an increasing overall surplus by assuming that $1 < \phi < B/b$. Suppose first that the firm has no commitment technology. Then, it will always allow the employee to search in $E$ and $F$ in the second period, as it increases second period profits. This eliminates the possibility of limiting control as a reward, so it has no effect on the first period search. Reduced control may still be used to avoid inertia in the second period. To see this, suppose that the employee is allowed to search in both sets already in period one and found a successful project (in $E$). The employee only searches in the second period for $\alpha \geq 1 - B/2\gamma$. On the other hand, she would search again for $\alpha \geq 1 - B^2/2b\gamma$ were the project in $F$, so limiting control reduces the external pressure necessary to induce search. When the firm can commit to not relaxing control over unsuccessful employees, reducing control can be used in certain circumstances even more profitably. Then, rewarding success only, which increases the initial investment in information acquisition.

5 Conclusion

We present in this paper a theory of inertia in organizations. It builds on the simple, intuitive idea that employees that were successful in the past are reluctant to search for new and better ways of doing business, because they carry the full cost of the search but only get a part of the benefit.

We show that the volatility of the environment, or the external pressure, plays a crucial role. Inertia arises only when the external pressure is not too high, so yesterday’s success is likely to be successful again today. Inertia may reduce the profits of a firm that was successful in the past, but even then it is not necessarily bad news. The employees invest more in finding a good project when there is inertia, because it can be employed in more than one period. It is shown that inertia therefore increases total profits as long as the environment is stable. However, if the environment is relatively volatile, but not enough to stop a successful employee from resting on her laurels, inertia reduces total profits.

In the second part of the paper it is discussed how and when to avoid inertia. In the first application we consider the possibility of a corporate reorganization where the employees are assigned new tasks in the second period. We demonstrate that the firm can benefit
from a reorganization, but without commitment it risks reorganizing too many times. As an alternative way of fighting inertia, we analyze limiting control. Here, if the employees are successful, they are allowed to search for new opportunities in an extended and, for the employees, more favorable set of alternatives in the second period. On the upside, this policy induces the employees to search again in future periods. Furthermore, since reducing control works like a carrot rather than a stick, the employees also search more extensively in the initial periods. On the downside, the projects found are less valuable to the firm. We show that limiting control is profitable as long as the difference between profitability of the firm’s and the employees’ preferred projects is not too large. It is also shown that, absent a commitment technology, the firm tends to keep control too often and to reduce control the employees too seldom.

Our results imply that organizational policies are dynamic in nature. Successful firms require more changes than unsuccessful ones from a pure organizational standpoint (increasing internal pressure or increasing freedom) even though these measures are suboptimal from a one-period perspective. As a firm becomes unsuccessful it reverts to the optimum organizational structure for near-term search. Assumed that this structure is known to the firm it stays in place until success arrives.

The basic framework developed in this paper is very simple and has potentially a number of applications. It could, for instance, be very interesting to embed it more explicitly into a market and study industry dynamics. We leave these and other possible extensions for future work.
Appendix

Proof of Lemma 3

We first consider $\alpha \geq \bar{\alpha}_2$ such that a successful employee searches both under limited control and control. The expected second period profits are $Bb/\gamma$ under control and $\phi Bb/\gamma$ under limited control. Since $\phi < 1$, the firm always chooses control in the second period. Consider thus $\alpha \in [\bar{\alpha}_2, \alpha_2)$. The profits are $B(1 - \alpha)$ under control and $\phi Bb/\gamma$ under limited control. Hence, limited control maximizes second period profits iff $\alpha \geq 1 - \phi b/\gamma$. The proof follows from computing the intersect of the set $\alpha \geq 1 - \phi b/\gamma$ with $\bar{\alpha}_2 \leq \alpha \leq \alpha_2$.

Proof of Lemma 4

Consider $\alpha \in [\bar{\alpha}_2, \alpha_2)$. $E(\pi)$ is continuous and strictly decreasing in $\alpha$ whereas $E(\pi^0)$ is constant. Since $E(\pi) \mid_{\alpha = \bar{\alpha}_2} \leq E(\pi^0) \mid_{\alpha = \bar{\alpha}_2} \iff B^2/2b^2 \leq \phi$, the first part of the proof follows. The second and the third part follow from $E(\pi) \mid_{\alpha = \bar{\alpha}_2} \leq E(\pi^0) \mid_{\alpha = \bar{\alpha}_2} \iff \phi \geq 1 - B^2\gamma/b(2b\gamma + B^2 - b^2)$ and $d\alpha/\phi = (\partial E(\pi)/\partial \alpha)/(\partial E(\pi^0)/\partial \phi) < 0$. Finally, for $\alpha \in [\bar{\alpha}_2, 1]$ $E(\pi)$ and $E(\pi^0)$ are both independent of $\alpha$, and proof follows from comparing the two profit functions.

Proof of Proposition 3

We need to show that there is limited control for a strictly larger set of the parameter space with commitment than without. For $\alpha \in (\bar{\alpha}_2, 1]$ this follows immediately from Lemmas 3 and 4. For $\alpha \in [\min\{\bar{\alpha}_2, \alpha_2\}]$ and $B^2/2b^2 \leq \phi$ there is limited control with and without commitment. Finally, consider $\alpha \in [\min\{\bar{\alpha}_2, \alpha_2\}]$ and $B^2/2b^2 > \phi$. There is limited control for $\alpha \in [\max\{\bar{\alpha}_2, \alpha(\phi)\}, \alpha_2)$ with commitment and for $\alpha \in [\max\{\bar{\alpha}_2, 1 - \phi b/\gamma\}, \alpha_2)$ without commitment. Since $E(\pi) \mid_{\alpha = 1 - \phi b/\gamma} < E(\pi^0) \mid_{\alpha = 1 - \phi b/\gamma}$ and $E(\pi)$ is decreasing in $\alpha$, it follows that $\alpha(\phi) < 1 - \phi b/\gamma$. Hence, there is limited control for a larger set of the parameter space with commitment than without. This proves the claim.
References


