AN OPTIMISED PROJECT REQUIRES OPTIMISED INCENTIVES

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ABSTRACT

Lean projects seek to optimise the project rather than its parts and to maximize value to the customer. Traditional economic incentives can get in the way of that behaviour. To better align the behaviour of project participants with a Lean project delivery model, compensation structures at both the company-to-individual level and inter-company contract level need to better address both the economic and non-economic motives that impact project performance.

Hypothesis: Social science research increasingly shows that non-economic human motives play a key role in job performance, and that they interact in complicated ways with economic incentives. We have identified certain contract incentive principles that we believe should promote non-economic motives. We believe that because Lean projects depend greatly on the non-economic motives of participants, contract incentives that foster such non-economic motives are important for success.

By reviewing and extrapolating from relevant literature, this paper will explore certain key non-economic human motives and their impact on project performance, how these non-economic motives interact with economic incentives, and strategies for structuring effective incentives. The conclusion will suggest areas for further research.

KEY WORDS

Intrinsic motivation; Human motivation; Contract incentives; Performance incentives.

INTRODUCTION

Motivation is the term used to describe the reason why people work. Some work is motivated primarily by the worker's sense of morality, such as people who volunteer at soup kitchens. However, the incentive that motivates most work, at least in part, is financial payment. Since everyone requires motivation to work, and since paid work involves economic incentives, the common wisdom has been that economic incentives drive the motivation to work in paid employment scenarios.

This conventional wisdom is incomplete. Research in economics and psychology increasingly shows that non-economic factors play a key role in job performance. The research also shows that intrinsic motivation interacts in complicated ways with economic incentives for work.

Some key non-economic motives that are implicated by paid work are:

- Desire for fairness and to reciprocate

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- Desire for autonomy/self-determination
- Desire to work for a valued purpose (Fehr & Falk 2002; Pink 2009).

Why bother about the non-economic motives? Few contracts would be able to completely spell out all the details of everything the agent must perform in order to accomplish the purposes of the job. Thus, in order for an employment relationship to operate efficiently, the employed worker (whom we will call the agent) will need to voluntarily do things to advance the employer's interest that are not specified in advance (Gächter et al. 2008), and something is required to motivate agents to voluntarily do things not specifically detailed in the contract.

There are essentially two types of motivation. An employer (whom we will call the principal) can provide *economic motivation* through performance incentives, such as a bonus or a fine, to stimulate voluntary performance. Alternatively, agents may voluntarily act because of their *intrinsic motivation* to do so. Intrinsic motivation arises from the agent's own desires and values (such as autonomy, mastery or fairness) and not because of external motivators such as an offer of more money.

Performance incentives give agents a selfish reason to voluntarily act, but only when a cost-benefit analysis suggests to the agent that the payoff is worth the effort. Intrinsic motivation, on the other hand, often provides agents with non-economic reasons to perform a job beyond minimum requirements. As most job situations involve both performance incentives and intrinsic motivation, project participants should be aware of how these different sources of motivation interact—because when performance incentives undermine intrinsic motivation, the contract relationship will be less productive (Gächter et al. 2008).

Addressing intrinsic motivation is not a minor issue. Recent evidence from many sources shows that people behave altruistically much of the time (Bowles 2008b). Losing the benefit of intrinsic motivation will result in diminished job performance and demoralized workers (Schwartz 2009). Thus, the challenge of designing incentives is to harness the selfish motivations of all agents while preserving the intrinsic motivations that most agents possess (Bowles 2008c).

What does any of this have to do with Lean Construction? The literature, confirmed by our experience, suggests that relational contracts best support Lean Project Delivery (Koskela et al. 2006; Ballard & Howell 2005). Because relational contracts purposefully avoid trying to define too narrowly the output of the contractor, they depend heavily on the contractor voluntarily acting in the interest of the project. These contracts create new governance and commercial structures that make it possible to move money across traditional boundaries – to invest here and now for a greater return there and then on the project. These contracts succeed in part because the incentives create a circumstance where cooperation better serves their economic interest than competing with others inside the project. However, because the correlation between cooperation and economic interest may not always be evident or relevant in varying project circumstances, intrinsic motivation is also highly relevant to the success of Lean projects. Thus, we hypothesize that because Lean projects depend on the non-economic motives of participants, contract incentives that foster such non-economic motives are important for success.

Moreover, we have identified certain contract incentive principles that we believe should promote non-economic motives. Our investigation into human motivation suggests the following findings:

- An agent's intrinsic motives can be reinforced rather than "crowded out" by carefully structuring the employment relationship.
- In general, incentives for agents are better framed as rewards than as penalties.
- Trust-based incentives tend to motivate higher levels of performance than mandatory incentives tied to a defined level of performance.
- At risk fee pools and other mechanisms for having project participants share the economic result of project outcomes can motivate better project performance without significantly harming intrinsic motivation.

UNDERSTANDING "CROWDING OUT" AND "CROWDING IN"

Many social scientists have observed that performance incentives may either reinforce (termed "crowding in") or impair (termed "crowding out") an agent's intrinsic motivations for performance. Crowding out takes on special importance because social scientists have shown that financial incentives shape an agent's preferences, so that once an agent experiences an incentive system his intrinsic motivations to perform are often destroyed, even if the principal later removes the incentive (Bowles 2008c). Thus, principals may only get one shot at structuring incentives right, at least with a given agent.

At least two psychological processes appear to be at work when financial incentives crowd out an agent's intrinsic motivation to perform. First, the agent may experience an impaired sense of self-determination or perceived loss of autonomy. Rather than acting because the agent "wants to," the agent feels a loss of control or personal responsibility over the action due to the need to meet the principal's imposed incentive standard. Second, the agent's self-esteem may be impaired because the imposition of the incentive signals that the principal believes the agent has insufficient or no internal motivation for the task (Frey & Jegen 2001).

There is good news, however. Intrinsic motivation can also be *crowded in* by use of certain kinds of incentive structures. The following practices, all of which could be incorporated into an incentive program, would tend to reinforce an agent's intrinsic motivation:

- Making agents responsible for the means and outcome of their performance. This reinforces an agent's autonomy and need for self-determination. It also signals the principal's trust and thus improves self-esteem.
- Regular personal communication regarding performance. In-person communication communicates respect to the agent, and thus reinforces autonomy and self-esteem. Communicating periodically about the agent's performance also gives the agent feedback on performance and thus reinforces the agent's sense of personal responsibility. It also supports the Lean goal of continuous improvement.

- Agents participate in mutually setting goals with the principal. By involving the agent in the formulation of project goals, the principal enhances the agent's sense of self-determination and communicates respect for the agent as a collaborator.
- Principals acknowledge the agents' intrinsic motivation as an important part of the economic relationship. This acknowledgment, if sincere and not undercut by other statements or actions by the principal, would reinforce the agent's intrinsic motivation (Osterloh et al 2001; Darrington 2010).

One last point about crowding out of intrinsic motivation. Crowding out has little impact on aspects of job performance where monetary compensation is usual and expected. If agents normally perform a particular task for pay, then there is little or no intrinsic motivation involved and thus little or nothing to crowd out (Fehr & Falk 2002; Bowles 2008c). This is not to say that the structure of economic compensation does not impact human motivation – it clearly does, as discussed below – but that intrinsic motivation to perform is not the psychological mechanism implicated in those contexts. Crowding out matters when an agent normally performs a specific activity for reasons other than pure economics, such as when a contractor cooperates with an architect in a situation where the contract or other economic considerations do not require it.

With this understanding of intrinsic motivation, we will explore some specific human motivation factors.

DO UNTO OTHERS: THE NEED FOR FAIRNESS AND RECIPROCITY

Most people most of the time feel a need to reciprocate the treatment they receive from others. This is as true on the jobsite as anywhere else. Most agents behave in a reciprocal fashion, by which we mean that if a principal treats them well, they will respond with good job performance. The human concern for fair treatment is widespread. In many ways, the need to reciprocate is really about fairness – if you treat me well, it's only fair that I treat you well. There is clearly much overlap between reciprocity and fairness when it comes to job performance.

Despite the widespread human concern for fairness, standard economic theory about efficient incentives assumes that people act on the basis of their own self-interest. Social scientists are now learning that incentives based on this traditional notion are not efficient where there are a substantial percentage of performers who are concerned with fairness and not simply their own self-interest. In fact, studies indicate that at least a substantial proportion, and probably the clear majority, of agents are significantly concerned with fairness (Fehr et al. 2007). However, there is always a substantial fraction of selfish agents who provide minimal effort rather than reciprocate the principal's good treatment (Fehr & Falk 2002).

What does this have to do with incentives? Social scientists tell us that incentives communicate (or "signal") messages to the agent. By framing an incentive a particular way, principals signal to agents both how the agent should behave and what the principal thinks about the agent. The "framing" aspect of incentives is not meaningless semantics. Framing an incentive as a penalty or fine tends to signal the principal's distrust of the agent, and framing a behaviour in market terms can reduce an agent's intrinsic motivation to perform (Bowles 2008a,b,c).

Tying this back to reciprocity, wise principals have learned that agents can be induced to provide more than the minimal amount of effort if the principal treats them kindly or trustingly. An agent's perception of the good will or hostility of a principal is a key determinant of whether an incentive motivates the desired behaviour. Thus, an incentive that is framed in a way that signals good will or trust will have a better chance of inducing an agent to reciprocate with increased performance than a negatively framed incentive, even if both incentive types would have the same economic effect on the agent for the same level of performance (Fehr & Falk 2002). While bonuses are generally superior to fines in terms of inducing reciprocity, it turns out that all bonuses are not created equal. Consider two interesting findings.

At least when it comes to wages, one study showed that an incentive framed as a mandatory bonus for a defined level of performance did not induce as much reciprocal behaviour as simply paying a high wage with no bonus or fine. Why? It appears that by paying a high wage with no strings attached, the principal signalled more trust to the agent, thus inducing more reciprocal behaviour, than in the scenario where the principal paid a mediocre wage with a mandatory bonus based on certain output. Apparently, the bonus program did not signal as strongly the principal's trust, perhaps because the bonus was conditioned on performance and did not trustingly assume that the agent would provide that level of performance (Fehr & Falk 2002).

In addition, experimental data suggests that an upfront-announced, nonbinding, voluntary bonus program on top of a fair wage will yield higher performance than either a contract based on penalties for failing to meet a specific level of performance or a contract based simply on a generous wage. This kind of bonus program is one that does not obligate the principal to pay a reward based on defined agent outcomes, but awards a bonus based on principal's subject evaluation that the agent performed more than required (Fehr et al. 2007).[3] It seems that by announcing the nonbinding bonus program before performance, the principal is able to signal good will and essentially invite the agent into a trusting relationship with the principal where both parties understand that the agent's good performance will induce the principal's generous reward. This also may signal the principal's respect for the agent's autonomy, since the agent can choose without constraint whether to perform above the minimum standard or not. The end result is that the typical agent reciprocates with higher performance. Of course, this would be undercut for future performance if the principal proved stingy or unfair at the performance evaluation and bonus award.

Stepping back, recall that not all agents are concerned with fairness. Since a substantial number of agents are primarily self-interested, principals have learned that efficient employment relationships must not only be fair but have sufficient incentives to induce self-interested agents to provide more than minimal effort. This balancing often puts downward pressure on the level of the base pay (in order not to overpay selfish agents who provide minimal effort), but induces many principals to offer bonuses to reward more than minimal effort, and those incentives structured as

[3] More generally, experimental data shows that employment relationships structured on the basis of trust (in terms of both fairness of agent's effort and fairness of principal's compensation) support the agent's intrinsic motivation to perform beyond minimum levels and result in better performance than performance incentives tailored to an agent's self-interest, such as mandatory bonuses tied to defined quantitative output (Gächter et al. 2008).

nonbinding bonuses tend to result in better agent performance than mandatory fines or bonuses based on defined quantitative output (Fehr et al. 2007).

Another possible reason for the performance differences under these different kinds of incentive structures may be the theory of inequity aversion, which posits that a substantial percentage of people care significantly about inequity, while others care only about their own material interests. Under trust-based incentive programs (such as the nonbinding bonus program discussed above), fair-minded principals will pay fair wages and provide more than the self-interested amount of bonus, while fair-minded agents will give more than the minimum amount of effort needed. In trust-based scenarios, both parties act fairly because they know that the other will respond negatively toward unfair treatment and that would ultimately hurt project performance. Principals have learned that designing incentives to be fair will appeal to enough fair-minded agents to make the economic payoff more efficient than simply designing incentives that appeal to primarily self-interested agents (Fehr et al. 2007).

For another way of looking at this, consider the perspective of the self-interested theory. Explicit incentives based on quantitative output make a direct appeal to the agent's self-interest and experimental data suggests that the agent will tailor its effort to meet the level of incentive that maximizes the agent's own cost-benefit trade-off. In short, a principal will rarely get performance that exceeds the quantitative level where incentives no longer pay off for the agent (Gächter et al. 2008). Also, quantitative-based incentives in certain scenarios may be harmful because they induce the worker to concentrate on the rewarded tasks and neglect other job tasks (Fehr & Falk 2002).

Considering this experimental data, it appears that for most purposes quantitative metrics may not be the best way to address the measurement of performance. That does not necessarily mean that principals should avoid tying compensation to performance, however. If a principal used qualitative rather than quantitative metrics (e.g., Agent's quality performance is "satisfactory" or "exceeds expectations", rather than Agent had no quality defects in the reporting period), more trust between the principal and agent is required and each party's sense of fairness comes into play. Also, qualitative metrics may better appeal to an agent's desire for autonomy and respect, since the incentives are less prescriptive in what outcomes are required.

Fairness also impacts the administration of incentives. If a principal is unfair in the determination of incentives, then the agent is likely to feel resentment, loss of trust, diminished interest, and overall job performance will suffer (not simply the specific behaviour addressed by the incentive). Unfair administration could result from arbitrariness of decisions, opaque decision-making, disrespectful communication, distortions of facts, or selective memory of agent's performance.

In short, it seems that incentives work better when they are framed in a way that conveys good will, trust and respect. Bonus programs generally induce more reciprocal behaviour than fines or penalties, and upfront-announced, nonbinding, subjective performance bonuses stimulate agents to greater voluntary effort than mandatory bonuses tied to defined output.

THE HUMAN DRIVE FOR AUTONOMY/SELF-DETERMINATION

The human need for autonomy and self-determination is an important psychological factor in performance, and has been mentioned several times above (Pink 2009). People generally dislike being forced to do something and respond better when they

perceive they are supported in doing something in line with their own desires and values.

Experimental data shows that economic incentives tend to crowd out intrinsic motivation if the agent perceives the incentive to be a form of control, since this reduces the agent's own sense of autonomy. However, economic incentives can "crowd in" intrinsic motivation if the agent feels that the incentive is supportive of the agent's own motives. Crowding in occurs because the agent's self-esteem is bolstered and the agent feels supported in its freedom to pursue its motive, which enhances the feeling of self-determination (Frey & Jegen 2001; Osterloh et al. 2001).

The human need for autonomy thus suggests that incentives ought not to be overly prescriptive in dictating the agent's behaviour or methods, ought to be administered in a respectful way, and, ideally, would involve the agent in both the formulation of the incentive program and in the evaluation of her performance.

WORKING FOR A GREATER PURPOSE

Daniel Pink, in his popular book *Drive*, argues that while the profit motive is an important one, a valued purpose for work is a superior motivator (2009). Pink cites numerous examples of people who worked far harder to serve an important purpose than one would expect from someone working only for pay.

Lean projects seek to orient the project team toward the primary goal of acting in the interest of the project to produce value for the owner. Projects can seek to stimulate project team performance by helping participants feel that their efforts serve a valuable purpose. Some projects may lend themselves to this more than others. Where a project serves a valuable community goal or need, such as a hospital, civic centre or school, project leaders can and should help their workers see that their efforts contribute to a purpose greater than self-interest. Also, every project can create a community among the participants, and acting for the benefit of that community rather than just for oneself, can be an important motivator and a counterweight to the temptation to self-interest provided by the project’s economic incentives.

LOSS FRAMING

Psychologists have shown that people are more likely to act in order to protect against a loss than to act in order to secure a gain – a phenomenon termed "loss framing." At a psychological and perhaps even a neurological level, the displeasure associated with losing money is greater than the pleasure from gaining money (Tversky & Kahneman 1981).

As a result, framing a decision as one to avoid all or part of a loss will generally provide greater motivation to act than framing the same decision as one to win a gain, even if the economic effect is the same. How the status quo is framed matters greatly (Tversky & Kahneman 1981).

Consider the following example. ABC Contractor and XYZ Contractor have had numerous problems on past jobs with the subcontracted finishing trades damaging each other's work. ABC Contractor requires each of the finishing trades to put some of their fee into a common fund to pay for any trade damage to their work, with any remaining funds distributed pro rata among the finishing trades. Alternatively, XYZ Contractor sets aside an amount equal to 20% of the cost typically paid for repair of trade damage to use for bonuses to the finishing trades if they complete their work

with little or no trade damage. Assume that the overall compensation to each finishing trade would be the same under either scenario if the trades cooperated better to avoid trade damage. Which job would more likely have less trade damage?

Psychology suggests that ABC Contractor's job would likely do better. Even though the finishing trades under either job have the same economic incentive to avoid trade damage, the trades with a portion of their fee at risk are more likely to try to avoid trade damage than the finishing trades who stand to gain a bonus.

How does this relate to incentives? In certain contexts, an incentive that puts money at risk may motivate an agent to perform so as to avoid the loss of that money more than an incentive that provides a reward. But tread carefully here, because as shown above, penalties or fines communicate that the principal distrusts or disrespects an agent, and could result in the agent reciprocating less effort.

What kind of incentive would implicate the human motivation to avoid losses and yet not significantly harm an agent's motive to reciprocate best effort? One possibility would be an "at risk fee pool," in which multiple agents put all or a portion of their fee in a pool to fund the costs of any problems resulting from the group's performance, with remaining funds distributed to team members (Darrington 2010). By placing some of their compensation at risk, agents are stimulated to better performance in order to avoid losing money. However, the principal is not penalizing any one agent for its mistakes, but is providing a mechanism that shows both good will (by putting in place a mechanism for losses to be spread among many) and respect (by appealing to the agent's autonomy by making it responsible to help manage a common fund). Thus, loss framing could provide added economic and psychological motivation without significantly diminishing the intrinsic motivation to reciprocate high performance.

Another possible incentive would involve a "painsharing/gainsharing" program involving the principal and agent(s). This program requires the principal and agent(s) to agree upon an estimated cost of the agent's services, with the principal and agent sharing any cost overruns or underruns on a predetermined basis (Darrington & Lichtig 2010). The motive to avoid losses thus motivates all parties to perform more than the minimum effort and cooperate, while the principal's participation in bearing a share of cost overruns and offering a share of the cost savings signals the principal's good will, trust and respect toward the agent(s).

CONCLUSION

All projects involve incentives. Incentives can be implicit because they are inherent in the way the commercial terms operate, or they can be explicitly stated and addressed in an incentive program. But the choice is not between having incentives or not, it is between which incentives operate on the project team members.

Given that there will be incentives, it only makes sense to be thoughtful in choosing incentives that will actually support the owner's goals, rather than passively accepting the incentives inherent in traditional contracting. Social science research increasingly shows that traditional incentives provide less motivation to agents than incentives that activate both economic and non-economic motivation factors. While this is true for all projects, Lean projects in particular require incentives that will add value to the customer through enhanced motivation for project-optimised behaviour.

We have identified certain contract incentive principles that we believe should promote non-economic motives for optimised project performance.

Finally, while this paper has focused on non-economic human motives, we are not suggesting that the profit motive is unimportant. Clearly, agents want to make money, and that motivates them to work. In fact, the power of that truth drives the above discussion. If unchecked, the human motivation to make money can wreak a project and even hurt the agent's actual accomplishment of that goal. By fostering agents' intrinsic motivations, and aligning incentive structures with non-monetary motivations, projects can ultimately be more successful for principals while also rewarding agents both economically and psychologically.

SUGGESTIONS FOR FURTHER RESEARCH

Our investigation has suggested several interesting areas for further study:

- The literature we reviewed focuses on behaviour and motives of agents who are individual persons. However, many incentives operate at the level of contracts between companies. Because firms act only through human agents, it seems rational to assume that at least to some degree, human motivational principles are relevant to contract incentives and company performance. To what extent do these motivational principles apply to business entities, who largely are the ones entering construction contracts? What implications would any motivational differences between individuals and firms suggest for relational contracts?
- We note that in many studies repeat employment situations fare better in terms of agents' performance than one-time employment situations. Construction projects involve many repeated interactions between principal and agent. To what extent do/could construction projects benefit from structuring incentives to replicate the benefits of repeat employment situations? For example, we suspect this effect may be triggered by periodic performance reviews tied to incentive determinations.
- The literature indicates that social approval is another key non-economic motivator for agents. Further research is needed on how projects can use the desire for social approval to improve project performance. We see implications for peer reviews and at-risk fee pools.
- Daniel Pink argues that mastery is an important intrinsic motivation (2009). Mastery fits in well with the Lean goal of continuous improvement. Are there incentive structures that harm or enhance an individual's desire for mastery?
- These theories beg for empirical testing. Some intrepid researcher needs to conduct a survey of construction projects using the suggested incentives and determine the extent of impact on job performance and project success. We know that several Lean projects are underway with contracts containing at-risk fee pools and other trust-based incentives. Case studies of these projects, when complete, would also provide important evidence for our hypothesis.

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