

Andrea Contigiani
03-02-14

Application to **2014 Russell Ackoff Doctoral Student Fellowships for Research on Human Decision Processes and Risk Management**

Research Proposal

Goal of Research

I would like to apply to the Ackoff Doctoral Student Fellowship to perform an experimental study of the impact of financial and nonfinancial elements on individual innovative behavior.

My study is primarily in the academic discussion of business strategy. In today's global economy, innovation is the heart of value-creating strategies. A wide literature suggests that strategy is effective not only when it is correctly formulated, but also, and critically, when it is correctly implemented. Strategy implementation relies on people. In the context of innovation, strategy implementation depends on employees being innovative. Hence, a fundamental question is, how can the firm make its employees innovative? My study attempts to answer this question.

Given skills, an individual pursues innovation if she is motivated to do so. Hence, the key matter is how to motivate people to be innovative. Hence, I seek to test how different motives affect motivation for innovation, and thus innovative behavior and innovative performance.

The literature on individual decision-making distinguishes between intrinsic and extrinsic motivation. Intrinsic motivation refers to the motivation of doing an activity because it is inherently pleasant or enjoyable. Extrinsic motivation refers to the motivation of doing an activity because it leads to a separable outcome. There is no clear understanding about how these two classes of models affect motivation.

In fact, the psychology research (primarily, the work on creativity) has mostly stressed the role of intrinsic motivation. Instead, the economics research (primarily, the agency theory view on experimentation) has highlighted the importance of correctly structuring financial incentives.

Some recent literature has been attempting to put these elements together, and so to fill the gap between these two views. My study goes exactly in this direction.

I seek to study how the combination of extrinsic rewards and intrinsic motivators affect innovative behavior and innovative performance.

I focus on the simplest forms of extrinsic reward (money) and intrinsic motivator (autonomy). I vary structure of extrinsic reward (flat, piece-rate, failure-tolerant) and degree of autonomy (low autonomy, moderate autonomy, large autonomy). Then I measure how each combination affects innovative behavior (distance between actual behavior and given reference point) and innovative performance (profit generated by innovative behavior).

Methodology of Study

I plan to study the above question using an experimental approach. My experimental design is inspired by the recent contribution by Ederer and Manso (Ederer F., Manso G., 2013 "Is Pay-for-Performance detrimental to Innovation?, Management Science) on this topic.

My study, however, is more complex, in that it includes the role of intrinsic motivation. In fact, I seek to explore the interaction between extrinsic rewards and intrinsic motives.

The experiment simulates a business strategy context, in which agents are asked to solve a dynamic problem by using either standard techniques (efficiency) or new techniques (innovation).

More specifically, the experiment will include the following steps:

- Step 1
 - 50 participants (UPenn undergrads, neither Economics nor Psychology)
 - participants will be asked to be perform a given task over 10 periods (1 hour total time)
 - the task will be a business strategy problem
 - participants will be randomly assigned different extrinsic reward structures (flat wage, piece-rate, failure-tolerant)
- Step 2
 - 50 participants (UPenn undergrads, neither Economics nor Psychology)
 - participants will be asked to be perform a given task over 10 periods (1 hour total time)
 - the task will be a business strategy problem
 - participants will be randomly assigned different intrinsic motivator degrees (low autonomy, moderate autonomy, large autonomy)
- Step 3
 - 100 participants (UPenn undergrads, neither Economics nor Psychology)
 - participants will be asked to be perform a given task over 10 periods (1 hour total time)
 - the task will be a business strategy problem
 - participants will be randomly assigned different extrinsic reward structures and different intrinsic motivator degrees

The first two sessions test the two variables in isolation, and so prove the key findings suggested by the extant literature. The third session, the key part of the experiment, tests the interaction between these two classes of motivators.

After each session, participants will be elicited their risk aversion and ambiguity aversion using the standard survey techniques, as these elements need to be included into the analysis. Finally, the data generated will be analyzed econometrically.

The advantage of this study is that the two dependent variables – structure of extrinsic reward and degree of intrinsic motivator – will be assigned randomly. This will allow me to measure an unbiased causal effect.

The next step – outside of the scope of this application – will be to corroborate those findings through a randomized field experiment.

Use of Funding

I need funding to run the laboratory experiment. I will be applying to run the experiment at the Wharton Behavioral Laboratory (WBL). I explain the specific expenses in the Budget section. I do not need any additional expense. As I mention above, there will be a next step, a field experiment, but I plan that to be entirely budget neutral.

Budget

Assumptions

- Number of participants is 200 (divided across 3 sessions), in order to ensure statistical power
- Expense is estimated as follows
 - Base Cost per participant is 1.5\$
 - Expected Bonus per participant is ~15\$ following Ederer and Manso – the bonus is the money that participants actually earn by playing the business strategy game, so naturally the best I can do is to provide an estimate
- Timing is approximate, since it will depend on WLB availability

Item	Unit Expense	Sample	Total Expense	Timing
Lab Experiment - Session 1	\$16.50	\$50.00	\$825.00	Sep 2014
Lab Experiment - Session 2	\$16.50	\$50.00	\$825.00	Oct 2014
Lab Experiment - Session 3	\$16.50	\$100.00	\$1,650.00	Nov 2014
Total	\$49.50	\$200.00	\$3,300.00	Fall 2014