



It Isn't Peanut Butter – An Open Letter to the NSF about Innovation

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1. Overview

The National Science Foundation (NSF) reviews an impressive variety of projects: most are planning-oriented and some are service-oriented.

- **Planning-oriented** projects are predominately the execution of up-front planning (e.g., the construction of a complex machine).
- **Service-oriented** projects require some up-front planning but are predominately the execution of micro-plans in reaction to demands that are difficult to accurately predict (e.g., the growing of a tomato plant outside).

I inadvertently participated in a case study that offers some insight into how the NSF's preference for planning-oriented projects affects service-oriented projects: For the past few years, I have been involved in the development of one of two very similar projects.

- Both implemented an electronic field guide on the topic of birds.
- Both were primarily software projects targeting the same hardware platform (i.e., Palm OS devices).
- Both started about the same time.
- Both released products about the same time.
- Both were considered for NSF funding.
- Both projects required some up-front planning but one was executed as a planning-oriented project (e.g., market study, supplier commitments, infrequent updates) and the other was executed as a service-oriented project (e.g., active user forum, frequent updates).
- The project that resulted in the National Geographic Handheld Birds application conformed to the NSF's project planning and received \$1.1 million in NSF funding.¹ On the other hand, the Peck bird information manager application did not conform, did not receive funding, and gathered a rather unimpressive overall score of 1 out of 14 from the NSF reviewers.

Although the similarities of these projects were coincidental, it turned out to be an interesting experiment on the affect of NSF planning requirements on service-oriented projects. This open letter documents some of the results of that coincidental experiment and attempts to explain how the unfunded project ended up having more of an impact than the funded project.

¹ The National Geographic Handheld Birds project was funded by NSF awards #0232945 for \$99,968 and #0422158 for \$1,042,427.

2. Requirements and Consequences

2.1 Supplier Relationships

As part of the up-front planning, the NSF prefers getting early commitments from project suppliers. Although early commitments are beneficial to projects when suppliers are large and monopolistic, they are not beneficial when suppliers are fragmented and competitive. Supplier competition is a fundamental strategy that has been addressed by business authorities such as Michael E. Porter (Harvard Business School professor and author of 'Competitive Strategy') and is a primary focus of companies such as Walmart. In the case of birding, where there are many suppliers of photographs and recordings, it makes little sense to lock into commitments from multimedia suppliers up-front.

The consequence. The up-front multimedia commitments preferred by the NSF have been a disadvantage in price, quality and quantity to the National Geographic Handheld Birds application.

On the other hand, setting up a competitive environment for the submission of photographs and recordings has resulted in continuing improvements in the quality and the quantity of the Peck application's multimedia. For example, in 2008 the number of photographs included in the Peck application will surpass the number of images (all drawings) included in the National Geographic Handheld Birds application.

2.2 Market Research

The NSF prefers up-front market research. Understanding the market is key to a project's success. Geoffrey Moore (senior member of Regis McKenna Inc and author of 'Crossing the Chasm: Marketing and Selling High-tech Products to Mainstream Customers') describes communication as the salient feature of a market segment: People within a market segment talk with each other. An understanding of that communication helps define project deliverables and offers an efficient distribution channel for product information. Unfortunately, market research does not necessarily lead to market understanding. For example, rote market research exercises performed as a proposal requirement can easily lead to a misunderstanding of the market.

The consequence. A focus group is a valuable research tool when the group participants have a sufficient understanding of the product and the alternatives. For example, focus groups are great for taste testing familiar food. However, a field guide isn't peanut butter. It is difficult to imagine how the focus group that discussed the National Geographic Handheld Birds application, comprised of people who had not used the guide, could lead to a better understanding of the market.

On the other hand, the Peck application did not rely upon the results of an up-front focus group. Instead, a forum² was setup to discuss the Peck application and therefore enhance communication within the market segment.³ The forum continues to be a valuable source of suggestions about the Peck application.

² The Peck application user group is at <http://groups.google.com/group/peckpalm>

³ It is worth noting that the National Geographic Handheld Birds project could easily have offered open user support but instead uses a private implementation of user support that does not allow users to communicate with each other. Private support costs more due to having to handle each support item individually, even if it is a duplicate. The advantage of private support is that it avoids the possibility of giving a platform to negative comments.

3. Recommendations

The NSF has significantly automated the proposal review process. The fact that service-oriented projects are more difficult for a bureaucracy to review explains NSF's preference for planning-oriented projects. However, service-oriented projects can be a source of significant innovation and should not be overlooked. Here are a couple of recommendations that might help the NSF advance in their review of service-oriented projects.

- Start accepting demonstrations of prototypes in project proposals: perhaps a short video followed by an email question and answer session between the NSF reviewers and the project developers. In my case, I had a working prototype when I submitted the project proposal but the reviewers apparently did not believe it. Prototypes are very helpful. Even if they are not working prototypes, they can be used as props while brainstorming.
- Value an implemented process as much as an easily planned and tangible deliverable. In the cases mentioned in the previous section, the process of supplier competition turned out to be more valuable than up-front supplier commitments, and the process of on-going communication with users in a forum turned out to be more valuable than the up-front recommendations from a focus group.

4. Conclusion

To use a boat analogy, the NSF funded bird field guide project operated like a power boat, with \$1.1 million in fuel, initially able to power through the swift current of market forces. On the other hand, the unfunded bird field guide project operated like a kayak: required from the beginning to work with the market forces. And when the power boat inevitably ran out of fuel, the kayak had no trouble passing it ... in terms of the number of users, the number of innovations, and the project impact.