The Usefulness of Psychological Research in Creating a Better World

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Abstract

Mid-career shifts are common for psychologists. Often the shifts involve the application of knowledge and skills obtained in the earlier portion of the career to a new domain (e.g., a psychotherapy process researcher who creates and implements a new form of therapy; an organizational psychologist who later consults with CEOs regarding organizational issues; etc.). This article considers a psychologist who transitions from research and writing on decision making and environmental problems to helping to build a company that develops solar installations. The company's approach to marketing solar installations is grounded in research in cognitive and environmental psychology. Finally, the problems encountered in balancing issues of profitability with making a positive impact on society are discussed.

Laboratory research obtains knowledge of human behavior in artificial (to varying degrees) environments. It is therefore always an important question to ask how laboratory findings transport to real world applications. Conceptually, we think of this question as an issue of external validity (Campbell & Stanley, 1963;Cook & Campbell, 1979). There have long been various statistical approaches (e.g., Cronbach, et al, 1972;Shadish, Rindskopf& Hedges, 2008) to obtaining estimates of the external validity of laboratory studies.

If the research question is of sufficient importance (e.g., Does psychotherapy work?) psychology has always approached the question from both (i.e., basic and applied) directions. Thus, the findings of research on psychotherapy effectiveness conducted in artificial settings have always been compared to and contrasted with what has been learned regarding psychotherapy effectiveness via the practice of psychotherapy. Of course, it is not readily apparent exactly how knowledge from the two domains is to be integrated.

This paper demonstrates how psychologists might test the ways that knowledge, obtained primarily from research in artificial settings in cognitive and environmental psychology, might be applied in the crucible of developing businesses designed to foster the purchase of solar technologies. A spin-off benefit of such efforts is the furthering of our environmental values by creating movement toward a clean, renewable energy future.

A recent, thorough review of psychological research on environmental issues has been conducted by an APA Presidential Task Force (Swim, et al, 2011). Most of the research reviewed in the Task Force report is closer to the basic processes end of the basic — applied research continuum. Similarly, our understanding of human cognitive processes comes predominantly from studies of basic human capacities (as opposed to straightforward, real world applications of knowledge in cognitive psychology). These areas of basic research were used over the past four years to create and mold the marketing strategies of a solar development company.

One faces an extremely difficult decision when one considers purchasing a solar installation. Thaler and Sunstein (2008) summarize the findings from cognitive psychology on the making of difficult decisions. Briefly, they label choices which are difficult to make as "fraught choices," and their opposites are easy choices. If a choice involves: Costs Now/Benefits Later; difficult versus an easy choice; rarely made versus a choice frequently made; offering feedback only slowly versus immediate feedback; and involves situations where our likes and dislikes are not well known, these represent "fraught choices." Choosing to purchase a solar installation (instead of buying grid-produced electricity) lands on the more difficult end of all five of the "fraught choice" dimensions above. Thaler and Sunstein see deciding to purchase a solar installation as an extraordinarily difficult decision to make— even in instances where it is in the business's, (or homeowner's) economic best interest to do so.

Thus, Thaler and Sunstein (2008) see decision makers needing multiple "nudges" to choose what is in their economic best interest regarding the purchase of solar.

One can counteract the Costs Now/Benefits Later problem by offering the decision maker the "nudge" of a Power Purchase Agreement (PPA). With PPAs, the decision maker never puts up a cent to have the solar system installed on their building—the decision maker simply pays a monthly bill that is slightly less than what the utility currently charges for the electricity produced. This benefit is purchased at the cost of not owning the solar system on your building and not benefiting from the incentives typically offered by the government for solar installations. However, a PPA does neutralize the Costs Now/Benefits Later problem, and thus makes it easier for the building owner to say "yes" to solar — when doing so is in her/his best economic interests.

Similarly, to deal with both the difficulty dimension and the offering feedback slowly dimensions, an ROI (Return on Investment) calculator was developed by Inovateus Solar to provide decision makers with almost instantaneous feedback on decisions to purchase (or to not purchase) a solar system. Work with the ROI calculator on a variety of settings (i.e., New Mexico without state incentive; New Jersey with incentives) was a standard part of Inovateus Solar's discussions with potential customers.

Methods

Inovateus Development is a company that builds energy efficient (e.g., greener, more environmentally friendly) homes and office buildings in the South Bend, Indiana area. In 2005, because of my background in environmental research (Howard, 1993, 1997, 2000, 2002, 2006), I was asked to consult with Inovateus Development on a variety of environmental problems and their solutions. By 2008, a new company (Inovateus Solar) was spun off from Inovateus Development to speed the adoption of solar energy in North America (and perhaps to make a little money also). The solar company employed sales strategies built around the cognitive principles described above.

Inovateus Solar's Psychoeducation Model

The Inovateus Solar team exposed potential customers to extensive experience using the ROI calculator to obtain immediate feedback on the economics of hypothetical solar installations in various parts of the country. Once an ROI calculation (e.g., 6.2 years, 12.1 years, etc.) was obtained, the trainers worked backwards to show how the three factors that determine the economic viability of a project interacted to yield the ROI figure. For example, a residential installation in Albuquerque, NM returned a good ROI value of 5.8 years. Working backwards, this value consisted of the finest solar insolation (i.e., amount of sunlight) values in the nation (thus, enormous amounts of electricity would be produced). However, New Mexico also has some of the lowest electricity rates in the country (thus lowering the value of the solar-produced electricity) and a moderately good market for RECs (renewable energy credits) that were mandated by the New Mexico state legislature.

The New Mexico residents in the above example bought a 10 kw system in part because they remortgaged their home with the solar panels serving as a home improvement. Because the remortgaging rate was quite a bit lower than their original mortgage rate, their monthly mortgage payment was essentially unchanged. Thus, the short term costs of solar were minimal for this family. Contrast that scenario with the situation in South Bend, Indiana. Because South Bend is in the snow belt of Lake Michigan, it has one of the lowest insolation values in the country. Further, because their electricity is almost all (96%) produced by low cost (and dirty) coal, the monetary value of the little electricity produced is small indeed. Finally, Indiana offers no incentives for solar. Thus, it would take more than 20years (according to the ROI calculator) to recoup the cost of a solar installation. That is the primary reason that most Inovaetus Solar employees do not now have solar cells on the roofs of their own homes in Indiana — it would be a bad economic choice for one to make.

Currently, New Jersey is the best state for solar. Their insolation rate is only moderate (somewhat below average for the country) but they pay among the highest electricity rates in the nation. The state also has an extraordinarily good REC market with prices frequently over $.30/kwhr (per kilowatt hour of electricity produced). The REC market was mandated by the New Jersey state legislature. A residential ROI of 3 years can frequently be obtained. Finally, a business in New Jersey can obtain ROIs in the 2.0 years range—as businesses can also easily use the federal, 1-year accelerated depreciation solar incentive. Depreciation can almost never be used on an individual's tax return, which is why installing solar on homes requires 3 years to recoup the initial investment in New Jersey.

Potential customers love playing with Inovateus Solar's ROI and PPA calculators once they see how easy they are to use. Inovateus sales people encourage potential customers to submit data for many scenarios, as decision makers soon learn how to make educated guesses as to likely ROI rates under various circumstances. Rather quickly, their decision regarding the economic feasibility of solar for their home/business goes from being a difficult decision (and one that was never made before) to an easy/frequently made decision. With a PPA to eliminate the Costs Now/Benefits Later problem, the choice of whether or not to purchase solar has gone from a psychologically difficult, fraught choice to a psychologically much easier decision. When the ROI figure is small (suggesting that purchasing solar is economically feasible), we find people frequently choose to purchase solar. In locales where ROI figures are quite high, almost no one buys solar systems. All of the above decisions appear to be economically rational choices, in our judgment, which is the goal of a psychologist/solar development professional. Such a value system stands in stark contrast to the values of a typical salesperson, who always wants to make a sale. Inovateus Solar's personnel are psychoeducators rather than typical salespersons.

Results

Starting any business in 2008 was perhaps the most unlucky decision anyone could make. Like all building companies, Inovateus Development suffered especially badly, finally going out of business in 2011. In 2008, investors put up $2.5 million to carry Inovateus Solar LLC through to profitability. While not as bad as for builders, solar development companies also suffered through the Recession of 2008-2013. By most estimates, more than half of the solar development companies in the United States went bankrupt during this period. Virtually all solar manufacturing companies also went bankrupt.

Table 1 presents the sales, profits/losses, and megawatts installed for Inovateus Solar for the years 2008-2014.

Table 1: Sales, profit/loss, and Megawatts installed by Inovateus Solar

Year	Sales	Profit/Loss	MWs
2008	.3	-.20	.02
2009	2.6	-1.20	.00
2010	23.8	.2	1.13
2011	18.0	-.1	4.36
2012	21.8	.2	4.27
2013	10.3	.2	5.91
2014*	40.0	1.1	24.8

*Based upon first 6 months of 2014.

In 2008, Inovateus Solar had revenues of $300,000 and a loss of $200,000. By the end of 2014, the company will have 40 million in sales and achieve $1.1 million in profits.

In the beginning of January 2010Inovateus Solar was working on $0 in signed contracts. By January 2011it had $2 million in signed contracts. By January 2012 Inovateus Solar had $27 million in signed contracts. Finally, by January 2014, the company had $30 million in signed contracts. Thus the company's future looks very bright.

Discussion

Dividing this paper into research report sections (e.g., Methods, Results, etc.) was done to emphasize that this represents an N of 1 study. Because the success or failure of a company in the real world is dependent upon so many factors (e.g., the financial strength of its investors, the business conditions at the time, the cost of solar versus grid produced electricity, the skill of the company's workforce, the existence of government incentives for solar, and so forth) it is difficult to know what lessons can be learned from this N of 1 study. However, it won't require many replications to lay to rest most of the alternative, plausible explanations (mentioned above) for Inovateus Solar's success. In fact, psychologists have long appreciated the robustness of a series of single subject studies (Kazdin, 1982; Shadish, Rindskopf & Hedges, 2008) in controlling for threats to validity in psychological studies.

Since cognitive principles are not uniquely suited for the needs of solar companies, all of us need not think about starting solar development companies. One can open cigarette companies, alcohol companies, gambling companies, pay day loan companies, weapons manufacturing companies, and the like, to test the import of sales strategies based upon cognitive psychological principles.

However, since the companies we start will help to create the world that our children inherit, I hope you will work for companies that enhance solar (or education, or therapy, or social justice) initiatives. Testing the external validity of cognitive strategies, while one helps to create a better world, sounds like good work to me.

The model proposed herein for assessing the external validity of psychological principles is closer to the bidirectional model currently practiced in psychotherapy research than it is to traditional approaches to assessing external validity in psychological research. That is, what we have learned from the practice of psychotherapy speaks as clearly to the external validity of laboratory research on psychotherapy as do the studies designed to test the external validity of basic studies in real world settings. Practices derived from basic research, when successful in real world applications, speak to the usefulness of underlying principles as clearly as do studies designed to assess the principles' external validity. In addition, successful practices (when chosen judiciously) serve to create a better world for all who will follow. Sancho Panza long ago claimed that the proof of the pudding is in the tasting (de Cervantes, 1615). A successful solar development company based upon cognitive psychological principles tastes pretty good to me.

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