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U.S. NSF IUCRC Program Redesigned: Multi-Level Evaluation Questions about Outcomes and Impacts

Eric Sundstrom, University of Tennessee

Lindsey McGowen and Denis O. Gray, North Carolina State University

Type: Practical experience analysis

Purpose

Among the longest-lasting exemplars of government-university-industry cooperation encompassed by Triple Helix (Etzkowitz, 2008) – the U.S. NSF (National Science Foundation) IUCRC (Industry-University Cooperative Research Centers) Program – initiated a major re-design in 2016. The redesign raises evaluation questions at several levels for the NSF IUCRC Program, and for Triple Helix research more broadly.

This paper has a three-part purpose, to: 1) overview the IUCRC Program and its evaluation; 2) identify key redesign changes in 2016-18; and 3) frame evaluation questions about their outcomes and impacts.

Overview of the IUCRC Program & Evaluation Database

The NSF IUCRC program – designed to "develop long-term partnerships among industry, academe and government" – has an annual budget of ~\$18M, four program directors, and one staff associate. It offers annual seed-grants to cooperative research Centers, renewable up to 15 years, for pre-commercial, industry-funded research. In a franchising arrangement, an average IUCRC operates at 2.9 university sites, with 17 member organizations, which pay average annual dues of \$47K to support the research, for total member funding of \$645K per Center (McGowen, Leonchuk & Stoica 2019). The program solicitation defines governance and membership requirements, including Center semi-annual meetings of member representatives (reps), faculty scientists, graduate students, and Center evaluator (Gray, 2008). Since 1986 the program's evaluation unit at North Carolina State University (NCSU) has built an IUCRC multi-source database, with annual reports of Center structural

information; evaluator reports; and surveys of member reps, faculty, and students (McGowen & Leonchuk, 2019).

The Program today has **71** active IUCRCs, operating at 182 university sites, involving 810 research scientists, with 1,787 graduate students, and funding from 1,164 memberships by private-sector ("industry") and government organizations, totaling \$45M in annual member funding, with total average Center budget of \$1.2M.

A major policy report judged the program highly successful (Atkinson & Mayo, 2010), but it may be paying a price for success. Contrary to Atkinson and Mayo's suggestion that IUCRC program funding be quintupled, and notwithstanding the fact that from 2010 to 2015 the program expanded from 42 to 73 centers (McGowen et al., 2019), program budget and staffing have not kept pace with growth.

Program Redesign 2016-18

NSF issued new solicitations in 2016 (16-504) and 2017 (17-516) making significant changes, apparently intended to streamline NSF administration, tighten program requirements, incentivize center growth, and increase management control. Changes were made to Center funding rules and levels, roles of Program Director, Center Director, and Center Evaluator, and a contractor to manage the evaluators. Changes in the solicitation have been accompanied by changes in Program Directors.

The role of PD was streamlined by: 1) reducing travel – from having a PD at many Center meetings to limiting PD visits to planning / launch meetings, onboarding new PDs, and problems; 2) having 20+ evaluators report to a contractor instead of a PD; and 3) simplifying Center funding by reducing sources of supplemental awards (and review cycles), eliminating extra lead-site funding in favor of co-equal site funding; prohibiting University "cost sharing"; and defining member funding as program income, to be spent in the award period or returned to NSF.

The role of Center Director (CD) changed in two primary ways. The change to co-equal funding, combined with entrepreneurship focused “member discovery” training for new center directors, tightened membership requirements, and increased base award that facilitates greater administrative support shifted the center director role from as technical

leadership role (Rivers, 2012) to a more entrepreneurial, recruitment focused role. National, annual CD meetings were discontinued after 2015, and replaced with a meeting every few years

Multi-Level Evaluation Questions about Impacts and Unintended Consequences

While a large and robust literature examines the impacts of new and established triple helix programs, we found little about the impacts and consequences of redesigning established programs with demonstrated effectiveness. Against this background, we propose to address the following:

Center level questions concern changes to the CD role and Center operation.

1. What have been the impacts of program changes on Center coordination across sites, recruitment, membership management, administrative performance, and other Center operations?
2. What impacts have program changes had on CD peer networking and information sharing?
3. What impact have program changes had on Center fidelity to the IUCRC program model?

Program level. A second set of questions concerns outcomes across all 71 current IUCRCs.

1. Since redesign, how if at all, has CD longevity and/or turnover changed?
2. How have program-wide membership, member funding, and member turnover changed?
3. How has funds leveraging changed for NSF, for Centers, and for members?

Organization level. Questions for NSF – beyond the scope of IUCRC evaluation – concern the intended consequences of the redesign:

1. To what extent did redesigning the PD role reduce PD workload?
2. Has the program office operated more efficiently, as reflected by PD response times to IUCRC queries or turnaround times for reviews? These questions can be addressed via variety of quantitative and qualitative methods. First, at the program level, the IUCRC evaluation program at NCSU has used the same, **basic longitudinal evaluation design** over the life of the IUCRC program: annual tracking of key structural, process, and outcome

variables with before-and-after comparisons and sub-group comparisons about variables archived in the database.

While some center-level questions can also be addressed via the basic longitudinal design with tailored comparisons – using new measures and data-collection, others cannot. In this case, we will rely on the observations and judgments of the evaluators who continue to be embedded within each center. This paper details evaluation approaches related to each of the questions posed, and presents some preliminary analyses of available data and informal interviews with Center stakeholders.

References

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