

The Imperatives of Successful Policy Implementation: A Case Study of the Hollings National Institute of Standards and Technology-Manufacturing Extension Partnership (NIST-MEP) Program's Implementation in Arkansas

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Accepted: June 24, 2012 Published: July 09, 2012

Doi:10.5296/ijld.v2i4.2072 URL: <http://dx.doi.org/10.5296/ijld.v2i4.2072>

ABSTRACT

The Arkansas Science and Technology Authority established the Arkansas Manufacturing Solutions program to serve as an effective diffusion of innovation delivery system, via interagency cooperation, for the small-to-medium sized manufacturing sector in Arkansas. The policy analysis considers the extent to which imperative elements exist to encourage interagency cooperation in the program environment.

The Janet Weiss (1987) cooperation framework is applied as a single exploratory case study. The results indicate that multiple factors contributed to the participation of state agencies. Those factors include: (1) random external influences; (2) systematic external influences; (3) shared problems/goal congruence; (4) resources; and (5) capacity.

Introduction

During the 1970s, U.S. competitive downturns, including the United States' inverted position in the trade of petroleum and competitiveness in other industries, led to economic stagnation and inflation, or "stagflation" (Hughes, 2003). Ultimately, this led to increased job loss and interest rates in the early 1980s (Hughes, 2003). Hughes (2003) argues that such focusing events served as an impetus for increased research and development (R&D) initiatives sponsored by government. These efforts were directed at helping private firms transfer research results from the laboratory to product development, thereby increasing manufacturing opportunities. It is believed by economists that governments are concerned with making sure that a market structure is as close to perfect as possible, as an optimum market

structure provides the best chance for society to experience social benefits. Thus, to assure that markets are moving in this direction, government intervenes through public policy initiatives in the form of incentives (e.g., R & D) or regulations to promote competition by encouraging more firms to enter and compete in a particular market (Vaillancourt-Rosenau, 2000; Shaffer et al., 2004).

Stakeholder demand for government intervention has resulted in the enactment of direct funding and cooperative initiatives. Two specific direct funding initiatives were the Small Business Innovation Development Act of 1982 and the Omnibus Trade and Competitiveness Act of 1988 (OTCA). Two specific cooperative initiatives were the National Institute of Standards and Technology-Manufacturing Extension Partnership (NIST-MEP), authorized in 1988 by OTCA, and the Partnership for a New Generation of Vehicles program, authorized by Congress in 1993 (Vaillancourt-Rosenau, 2000, p.54). This study focuses on the implementation of a cooperative initiative, the Arkansas Manufacturing Solutions-Manufacturing Extension Partnership (AMS-MEP), which was established by Arkansas manufacturing stakeholders in 1995 through funding provided by the NIST-MEP.

NIST-MEP legislation mandates agency cooperation as an approach to the diffusion and deployment of new technologies and improved business practices among existing industrial firms (Shapira, 1997). This is not to say, however, that Congress provide state programs with sufficient resources necessary to carry out policy mandates. Due to NIST-MEP funding regulations, resources (i.e., people and money) are often in short supply (National Institute of Standards and Technology-Technology Administration [NISTTA], 1998; Shapira, 1998; Schacht, 2008). For instance, the OTCA requires that resources provided to states be reduced from 50% to 40% after the first three years, and 33% in the fifth and sixth years (NISTTA, 1998). In the seventh year and thereafter, the state program receives support based on performance metrics established by the federal government; metrics include: cost per impacted client, bottom line client impact ratio, investment leverage ratio, customer satisfaction score, and survey response rate (Voytek et al., 2004, p.180). According to Voytek et al., (2004) these measures were developed to “provide regular and valid information on program outcomes” (p. 178). However, these criteria may cause MEP centers to lose the ability to establish the strength in technical personnel, programmatic resources, full-time staff, facilities, equipment, and linkages to external sources of technology (i.e., interagency cooperative partners) to deliver services effectively (NISTTA, 1998). That is, reducing the federal subsidy drives down state funding; for example, states attempt to leverage their investment and will shift funds to cost-share programs that can attract other federal funds (NISTTA, 1998). Centers tend to respond to the loss of revenue by implementing strategies that may consist of reducing the variety of services provided to smaller manufacturing firms, increasing billing rates, increasing the dollar values of projects, and reducing the amount of work brokered to third-party service providers (NISTTA, 1998).

The specific purpose of this implementation case study is to determine whether the NIST-MEP initiative was implemented as intended by Congress. The variables for this study were chosen from the program implementation literature and AMS-MEP performance/implementation evaluation literature. AMS-MEP served as the point of observation for this study, and Weiss's (1987) process model of cooperation served as the analytical conceptual framework. The study focused on whether the required steps were taken to support cooperation, and whether influences to encourage cooperation, as identified by

Weiss (1987) below, existed in the AMS program environment. Therefore, the study addressed the following questions:

- 1) To what extent do systematic external institutional influences exist to encourage AMS-MEP interagency cooperation?
- 2) In what ways do the targeted agencies respond to requests for cooperation during the implementation of AMS-MEP initiatives?
- 3) To what extent are there impediments to or promotion of AMS-MEP diffusion of innovation efforts through interagency cooperation?

Janet A. Weiss's (1987) Process Model of Cooperation served as the operational tool which I used to assess the implementation of NIST-MEP's primary objectives, (i.e., cooperation between governmental agencies to enhance the diffusion and deployment of new technologies at small-to-medium sized manufacturing firms). The model fundamentally explains that local agencies must undergo a three-step process driven by external influences, systematic or random, to be encouraged to engage in the level of cooperation necessary to achieve the maximum implementation of an initiative. The steps in the process include (Weiss, 1987):

Step 1: Perceived problem must be shared across agencies

Step 2: Resources must be available to handle problem cooperatively

Step 3: Institutional capacity has to be established to mount cooperation

Of particular importance to me, this model has a great respect for obstacles to cooperation, such as the following: each agency seeks to preserve its autonomy and independence; organizational routines are difficult to synchronize, goals overlap but are not identical; constituents bring different expectations and pressures to bear on each agency; and managers try to minimize the uncertainty for others.

From a theoretical standpoint, the research sought to determine if the Weiss (1987) model helps predict the process of executing interagency cooperation legislation. The results from the empirical case study were used to determine if the elements outlined in the model were existent in the program environment. By making comparisons between the case study results and the Weiss model, I sought to either validate the proposed model, or provide refined theory for future testing.

The article begins with a traditional overview of interagency cooperation in the United States, and then set out how the Weiss (1987) process model of cooperation, via the research methodology, will be applied by this study. The study utilizes the four part Weiss model (external forces, shared problems, resources, and capacity) as a guide to analyze variables presumed to be essential to encourage interagency cooperation. Last, I provide the results of the case study, and then discuss the conclusion and implications.

Interagency Cooperation

Although the literature on interagency cooperation is sparse, there is no deficiency of related terms and definitions, which include: interorganizational relations, intergovernmental cooperation, intragovernmental cooperation, inter-sectoral cooperation, and

interorganizational coordination (Aiken, Dewar, DiTomaso, Hage & Zeitz, 1975; Rogers & Whetten, 1982; Gargan, 2000; Oliver, 1990). Terms relevant to this evaluation are defined below.

For this study, Weiss's (1987) definition of interagency cooperation, as it most closely reflects the interagency cooperative process of AMS-MEP, is used. Weiss says that interagency cooperation exists when two or more organizations that share a problem area agree to deal with the issue by establishing a link via a formal contract that provides for resources and for the adjusting of internal and/or external procedures to adequately support the new arrangements.

Even in well-designed political systems, the responsibilities of authorities will overlap, which means that a certain amount of cooperation must already exist (Hudson, Hardy, Henwood, & Wistow, 1995). Hence, development and implementation of public policy often requires multilateral cooperation that blurs or eliminates traditional boundaries or jurisdictions. However, diverging organizational goals and operational routines can make policy implementation difficult and, therefore, a more formal cooperation process is required. Interagency cooperation becomes necessary when a single agency cannot adequately address a policy objective, such as the eradication of poverty. Thus, stakeholders such as the local constituency, clients, street-level bureaucrats, industry managers, local senior public officials, and legislators (state and federal) must work together to achieve successful implementation.

Mechanisms of Interagency Cooperation

Interagency cooperation becomes necessary when large and diverse organizations that represent government agencies, such as AMS-MEP, must collaborate on a broad front to implement policy objectives presented by formal policy makers (Scharpf, 1978). A joint response must be presented to implement policy objectives in an optimal manner, decide what role will be played by collaborating agencies, what resources will be allocated by each agency, and what tasks will be performed. Clearly, federal agencies acting to implement policy on a nationwide basis face a huge undertaking when designing cooperative initiatives.

Serrano (2003) has argued that devices for interagency coordination vary and that the use of these devices for coordination determines the level of cooperation and collaboration achieved. Informal coordination mechanisms include interpersonal contacts and informal channels for communication that may result in ad-hoc meetings, telephone contacts, or exchange of letters. Informal mechanisms often compensate for a lack of formal coordination mechanisms for two or more agencies that are interdependent. Approaches for effecting formal coordination between agencies include implementation of organizational structures and job definitions that support coordination, together with managerial instruments that include joint plans, agreements, contracts, and budgetary allocations.

In the discussion of the practical workings of interagency cooperation processes, the terms cooperation, collaboration, and coordination appear interchangeable. It is important to note, however, that policy implementation measures result in the identification of agencies that will collaborate (i.e., be willing to discuss issues collectively to find a solution). Additionally, it is assumed that an established network will employ a coordinating body or a coordinator that will ensure that the agencies involved interact cooperatively to implement policy.

Policy makers have the option to try to force agency cooperation by legislating when cooperation should occur. However, there are obstacles that prevent agencies from engaging in successful cooperation relationships. These obstacles include but are not limited to difficulties arising out of the lack of capacity for synchronization, differences in organizational goals for agencies, and differences in what constituents expect from each agency in terms of priority in performance (Serrano, 2003).

Methodology

Data Collection

The MEP was originally created through Public Law 100-418 as part of the Omnibus Trade and Competitiveness Act of 1988, by which the NIST established Manufacturing Technology Centers (MTCs) across the country. As a result, the AMS-MEP initiative was established and fully implemented in Arkansas in 1995. Thus, data for this study come from the time period between Business Quarter 1, 1996 and Business Quarter 4, 2009 ending on December 31, 2009.

Data were collected through the following methods:

1. Structured open-ended interviews with NIST/AMS-MEP stakeholders.
2. A follow-up survey questionnaire developed after the analysis of the interviews to validate those data (See Appendix A for Follow-Up Survey).
3. Review of documents containing information relevant to NIST/AMS-MEP such as program planning documents, completed program ledgers, legislative material (state, and federal), budget information, AMS-MEP annual reports, AMS-MEP governing body minutes from meetings, NIST/AMS-MEP handbooks, forms required to initiate the service delivery process, and federal and state legislative material were used for content analysis.

Analytic Framework

The analytic framework for this evaluation is provided by Weiss (1987). The Weiss framework encompasses both bottom-up and top-down approaches to interagency cooperative implementation evaluation. Mazmanian and Sabatier (1983) defined top-down policy evaluation as beginning with the initial policy decision enacted by formal policy makers, usually in the form of a legislative enactment, and investigating how, why, and to what degree the legally mandated objectives of the legislation are met. Conversely, a bottom-up approach is used to obtain a sense of how policy is interpreted and put into practice by workers at the service delivery level. Table 1 provides an illustration of how a specific group of AMS-MEP variables were analyzed utilizing Weiss's framework of broad variables:

Table 1. Variables investigated by applying the Weiss Process Model of Cooperation

Weiss Variables (1987)	AMS-MEP Implementation Variables
External Forces	Local, state, and federal regulations
Perceived Shared Problems-Goal Congruence	Bureaucratic interpretation of AMS-MEP and policy goals Inter and Intra agency goal congruency AMS-MEP and formal Congressional policy goal congruence
Resources	Adequacy of agency influence, meeting NIST resources requirements
Institutional Capacity	funding relationships and adequate human capital Adequacy of technology Adequacy of communication and information systems Professional personnel Willingness of personnel to cooperate Appropriate infrastructure to integrate all components

Analysis of Interviews

Data gathered from the respondent interviews were content coded using an interpretive analysis. While in some cases, an interpretative analysis requires a researcher to first establish initial codes or categories based on theoretical perspectives, it allows the investigator flexibility to refine categories, add new categories, and establish subcategories based on an exploration of the data. In this research, an inductive and iterative emergent coding process produced new categories and subcategories from the initial information analysis. The four variables that Weiss (1987) distinguishes as important to cooperation served as a priori codes:

- (i) External forces: What measures were utilized to induce the implementation process? What was the consequence of the measures?
- (ii) Goals: Are the personnel well-informed of the agency goals? Are the staff goal interpretations congruent with formal agency operational goals? If not, how do they differ? How do the organizations accomplish their goals? Do the goals of the agencies within the network converge or diverge? Do agency personnel feel that cooperating with other agencies will provide them an advantage in achieving their goals?
- (iii) Resources: Are there adequate fiscal resources existing to mount the cooperation effort? What assets are wanting, if any?
- (iv) Capacity: Are there funding relationships to sustain the effort? Are personnel adequately educated to perform the duties associated with providing service to the AMS-MEP clients? Are the organization communications and information mechanisms sufficient to launch and sustain the cooperation effort? Are agencies adequately staffed with professional personnel to mount the

cooperation effort? Are personnel supplied clear substantive information about the program curriculum so that they can cooperate effectively? Are technologies compatible across the AMS-MEP network? Do agency personnel see the AMS-MEP initiative as being burdensome?

Interviewees are identified by type of position (e.g., superscript- (1) executive state level personnel; (2) managers, (3) direct service personnel, (4) dual/other). For example, an interviewee's response would be coded as AMS-MEP¹—meaning that the respondent works for agency X at the executive state level. Respondent answers were categorized by agency, grouped in common category headings, and analyzed. The credibility of subcategories was determined by testing them with new information until all relevant information had been assigned a category. This allowed for common codes to be identified and dissimilarities to be determined within and between organizations from the perspective of external, intra-agency and interagency influences. It was expected that themes or patterns would develop from this emergent thematic process to determine current program implementation practices and the viability of the AMS-MEP cooperation process. Thus, the ranking measurement was those themes receiving the highest number of respondents offering the experience; these were labeled as “significant and highly relevant themes.”

Criteria Establishing Implementation Success

The NIST legislative implementation criteria outlined below provides adequate guidance for measuring the extent to which a MEP Center has engaged in the cooperation process. The complete set of data collected for this study was utilized to flesh out a representation of the AMS implementation process and activities relative to the components outlined in Weiss's model and weighed against the legislative criteria to develop the implementation assessment of interagency cooperation. The following criteria define an effective methodology for the delivering of advanced manufacturing technology to small- and medium-sized manufacturing, according to MEP: (15CFR290.6):

- 1) Identification of target firms in proposed region. Does the proposal define an appropriate service region with a large enough population of target firms of small- and medium-sized manufacturers which the applicant understands and can serve, and which is not presently served by an existing Center?
- 2) Technology resources. Assure strength in technical personnel and programmatic resources, full-time staff, facilities, equipment, and linkages to external sources of technology to develop and transfer technologies related to NIST research results and expertise in the technical areas.
- 3) Technology delivery mechanisms. Development of effective partnerships or linkages to third parties such as industry, universities, nonprofit economic organizations, and state governments who will amplify the Center's technology delivery to reach a large number of clients in its service region. Program leverage. Provision of an effective strategy to amplify the Center's technology delivery approaches to achieve the proposed objectives, i.e., a Center should build on unique solutions developed for a single company to develop techniques of broad

applicability. It should seek wide implementation with well-developed mechanisms for distribution of results.

- 4) Management and financial plan. Does the proposal define a management structure and assure management personnel to carry out development and operation of an effective Center

Research Results

If manufacturing stakeholders wanted to establish a MEP Center in their respective state, they had to meet all of the criteria set out in the NIST-MEP legislation. At the core of the NIST-MEP criteria is the requirement to establish formal interagency cooperative relationships. The following three research questions are designed to establish the extent to which the AMS program was in alignment with NIST-MEP legislative implementation criteria. These three questions also address the extent to which Weiss's four variables—external forces, share problems/goal congruence, resources, and capacity—predict the success of interagency cooperation.

Demographics

Respondents included one executive state level employee, two managers from a coordinating agency, one manager from a formal partnering agency, one respondent designated as other/dual roles multiple agencies, and three direct service delivery personnel from three formal partnering agencies. One out of the eight respondents was a female, two out of the eight held terminal degrees. All respondents held baccalaureate degrees.

Research Question 1): To what extent do systematic external institutional influences exist to encourage AMS-MEP interagency cooperation?

Weiss argues that interagency cooperation is most likely to occur when external influences are present to compel agencies to collaborate, coordinate, and ultimately cooperate. She explains that random and systematic external influences not only influence agencies to cooperate, but provide them with the means for sustainability. Thus, I attempted to determine whether adequate external influences were present in the program environment to influence the cooperative effort.

External Influences

Both systematic (e.g., legislative mandates to cooperate) and random (e.g., sudden flow of external funding) external influences can be seen in the guiding principles of the NIST-MEP legislation. States are mandated to engage in cooperative relationships to acquire federal resources to supplement internal resources available for outreach assistance.

While the NIST-MEP legislation provides for systematic (e.g., legislative mandates to cooperate) and random (e.g., sudden flow of external funding) influences on cooperation, the State of Arkansas itself has enacted legislation that serves as systematic influences for state agencies to cooperate. Specifically, between 1987 and 1995, there were numerous pieces of legislation enacted to move the State of Arkansas toward cooperative transfer practices. For example: ACT 859 OF 1983, which established ASTA, originally called for the organization to

“provide leadership, direction, incentives, and technical assistance to enable Arkansas and its people to gain the advantage and benefits of advanced technology; and for other purposes” [Act 859 OF 1983, H.B. 496, Introduction, 2003]. I also determined that after the NIST-MEP legislation was enacted, the state legislation began to change. For example, ACT 210 OF 1987, an ACT to amend sections of ACT 859 OF 1983, specifically gave ASTA the authority to [ACT 210 OF 1987, H.B. 1327, § 15 (b), (c), (d), (e), 1987]:

- stimulate applied research partnerships between private industry and Arkansas colleges and provide universities and matching funds from private sources for proposed applied research projects;
- assist small businesses in identifying and applying for funds to conduct research and development work on innovative technical ideas;
- transfer knowledge and technology from college, university and government laboratories to private industry; and
- create, in cooperation with Arkansas colleges and universities, facilities to foster the growth of technology-based enterprises.

Furthermore, ACT 803 OF 1989 explicitly set out to influence greater collaboration for the diffusion of innovation. Section one, sub-section (a) of the ACT reads [ACT 803 OF 1989, H.B. 1235, § 1 (a), 1987]:

SECTION 1. Centers for Applied Technology

In order to encourage greater collaboration between private enterprises and Arkansas colleges and universities in the development and application of new technologies, the Arkansas Science and Technology Authority is authorized to designate technological areas as having significant potential for economic growth in Arkansas, or in which the application of new technologies could significantly enhance the productivity and stability of Arkansas enterprises.

The ultimate influence of the NIST-MEP legislation can be seen in the purpose statement of the AMS-MEP 2010 recipient/sub-recipient agreement it uses to formally contract with network partners; one passage reads:

... the Authority on behalf of AMS has the primary purpose to assist the state’s small and medium sized manufacturers (SMEs) with economic development activities. One method of accomplishing this programmatic objective is for recipients to identify and pursue with other business partners cooperative efforts that will both benefit and increase the availability of project expertise and training, and the distribution of products and services to SMEs (p.1).

There were two questions asked of all eight respondents to determine the extent to which systematic or random external influences existed to encourage AMS-MEP interagency cooperation:

Interview Questions

- 1) What was the motivation behind your organization’s participation in the AMS-MEP program?

2) Will you describe a particular event/s that generated these motivations?

For AMS respondents, the influences for movement toward cooperation are more frequently external and in the category of limited service resources (i.e., lacking the internal support resources to address constituency technology transfer needs and demands). Thus, the limited service resources theme was accepted as the most significant and highly relevant theme emerging from the content coding analysis. Therefore, the theme was noted in the narrative analysis.

Theme of Significance: Limited service resources

Respondent AGENCY-AF³ suggested that personal satisfaction is attained by membership in the AMS-MEP program when s/he stated that,

...there's also, uh, a great deal of satisfaction that you can, you can, uh (pause) spend some tax dollars and, and, and move that forward, move that to the manufacturing sector (AGENCY-AF³).

The response provided by Respondent AGENCY-STA¹ implies that previous successful supplemental funding and history with NIST led to the Authority's desire to participate and champion the cooperative initiative when s/he reported,

...we participated in the early 90s in a couple of NIST grant programs to explore methods for transferring federal technology to companies in Arkansas. One of those projects led to, uh, state legislation and a program called the technology transfer assistance grant program. And the second project, final report, took the form of an application for a Hollings Center funded out of NIST. Uh, so our interest in...participating with NIST and technology transfer dates to the early 90s, and a couple of awards that we have received from them for planning purposes (Respondent AGENCY-STA¹).

Respondents AGENCY-STA¹, AGENCY-SU³, and AGENCY-AL/MC⁴ demonstrate the appeal of additional resources to enhance technology transfer delivery capabilities to higher levels when they stated,

Uh, the expectation was that a lot of defense dollars would be going into American competitiveness, primarily in the manufacturing sector.

The AGENCY-STA had a program manager, and we had the beginning of a technology transfer assistance grant program. But these were small in scale compared to the funding announced for a Center (AGENCY-STA¹).

...universities have strong connections with manufacturing companies in various states where they're located. And doing so, um, the university benefits, um, some, some in-kind, uh, funding and some match monies that work to their benefit (AGENCY-SU³).

Through AMS, you (pause) their motivation and, uh, working with UALR was to partner with, group, with, you know, uh, universities and other non-profits that had

(pause) your outreach programs and similar missions (pause) you know, to serve (pause) manufacturers (AGENCY-AL/MC⁴).

Respondent AGENCY-MC² captured the spirit of the tax subsidized AMS-MEP technology transfer program when s/he stated,
...this was a good vehicle to bring in some federal dollars, and national expertise to support manufacturing (AGENCY-MC²).

While the above responses provide a general idea of the feelings toward cooperation to obtain outreach resources, the next response highlights the most significant aspects of the cooperative endeavor between AMS-MEP partners.

I feel that it's a, I felt, and the AGENCY-AF felt at the time, that it was a, a duty of the AGENCY-AF, in fact, part of our land grant heritage is to move the intellectual property that was being developed on campus out to where it could do the most good. A logical extension of that was to take the Ag extension concept, and apply it to the engineering expertise that was on campus. And of course that's what manufacturing extension partnership is all about. It's, uh, making available (pause) uh, at least initially for no charge and later at a subsidized charge...the engineering expertise at the campus for small business (pause) and for large business too (AGENCY-AF²).

These informants spoke specifically about the need for additional support service resources to help small-to-medium sized manufacturing in Arkansas become more self-sufficient. These comments supply evidence that the lack of resources available in the past served as an influence toward cooperation. The NIST-MEP legislation provides extensive support to small-to-medium sized manufacturing through agency cooperation as an approach to the diffusion and deployment of new technologies and improved business practices among existing industrial firms. Arkansas agencies offer support services, but they were less stable in providing these support services, as indicated by respondent AGENCY-STA¹ above.

Additionally, I was able to ascertain from the respondents' comments that the need for internal resources that were not available to the Arkansas Science and Technology Authority, and the lack of available expert manufacturing consultants were clear influences for the Arkansas Science and Technology Authority to seek a cooperative service delivery system to implement the NIST-MEP initiative. These influences provided the demand for ASTA to look externally for resources to address the requirements called for in the NIST-MEP legislation.

Research Question 2): In what ways do the targeted agencies respond to requests for cooperation during the implementation of AMS-MEP initiatives?

To answer research question 2 the analysis focused on the second step in Weiss's process model of cooperation, that is, identify resources to mount the cooperative effort. Weiss (1987) explains that if no initiative, energy, money, or staff became available for cooperative activities explicitly, the process grinds to a halt (p.111). Therefore, I sought to determine if the NIST-MEP set adequate resource guidelines and whether the involved organizations met the conditions of the NIST and AMS resource participation criteria.

Resources to Institute the Cooperative Effort

The Arkansas Manufacturing Solutions-Manufacturing Extension Partnership Center located in Little Rock, Arkansas is the central entity responsible for the implementation of the NIST-MEP legislation. Establishing partnerships through recipient/sub-recipient contracts does not release the Authority or AMS-MEP from any implementation responsibilities associated with the NIST-MEP legislation. However, the formal contracts established with AMS partners require them to provide at least a 50 % match for funds received. Matching requirements consist of “facilities for the recipient supported project manager including office space, computer, software, shared office equipment, and other resources as necessary to carry out the duties and responsibilities associated with the position” (All AMS, recipient/sub-recipient Agreements, 2010-2011, p. 7-8). Furthermore, partners must allocate 100 % of co-located project manager time, as supported by the recipient’s sub-award, to AMS activities as designed by the AMS-Director (All AMS, recipient/sub-recipient Agreements, 2010-2011, p. 7-8).

Though state legislative matching funds continue to fall short of the 50% required NIST match, AMS-MEP formal service delivery partners have continued to provide at least a 50% match for funds received; matches are mostly in-kind (e.g., office space, computers, and administrative support) (AMS Progress Report 2010; ASTA Annual Reports 2000-2009). These resources along with non-profit contributions, state agency funds and client fees ensure that the state’s pooled match is sufficient to continue to secure the federal NIST subsidy. Collectively, AMS-MEP network affiliates combined have provided more than the 50% required for matching funds. Furthermore, AMS-MEP practiced inter-sectoral or interagency cooperation 100% of the time when providing program services to clients. It was not possible to determine which project manager or sites provided services, as the AMS database does not delineate which partner site or individual provided consulting services (validated through data extracted from AMS-MEP program ledgers, 1996-2009).

Interviews with respondents were used to verify agency activities regarding AMS contractual obligations. Next, examples of respondents’ comments are presented to illustrate the most significant and highly relevant theme, “sufficient funding and resources are provided,” derived from the following interview question:

Interview Question 8:

Do you receive sufficient funding to perform the duties associated with providing service to the AMS-MEP clients?

Theme of Significance: Sufficient funding and resources are provided

Examples of how respondents perceived agency funding are presented below in their own words:

Respondent AGENCY-AF³ clearly illustrated how pooled resources between AMS partners have enabled him to meet programmatic needs when s/he stated,

...so,...the...funding that is, you know, the funding that’s put in from the AGENCY-AF is mostly in-kind, I have an office, I have a place to work out of, I have a

phone, I, I have administrative type, some of those duties now, the, you know the, the basic dollars and cents, you know, my salary, my travel... my supplies, and so forth. Its, it's really that, that NIST-MEP money or state money that...that is uh, collected at the, at the AMS level (pause) alright. So, but (pause) I (pause) our organization, uh, we, you know I, I feel very good that... I've had adequate money to do what I want to do (AGENCY-AF³).

Respondent AGENCY-STA¹ articulates the significance and relevancy of interagency cooperation to establish adequate funding for technology transfer when s/he expressed,

Services to clients are, um, funded by a formula that involves federal, state, and the client participation. So in a way, the answer is, um, we have adequate funds for individual projects. Um...we, through partnerships, again, partnerships are very important. Through partnerships with other entities, but principally with the Economic Development Commission, are able to show... sufficient state expenditures within the domain of manufacturing extension to draw down the federal dollars awarded to Arkansas (AGENCY-STA¹).

In sum, findings show that the AMS-MEP Center and network partners interpret the status of the program resources as positive. The evidence also indicates that monetary enhancement was one of the primary influences in moving agencies toward interagency cooperation.

While the less significant theme, “state legislative match hinders,” deriving from the coding of interview question 8 was only expressed by two respondents, it is noted in the text due to the critical funding factors that it illuminates in the program environment. Additionally, although no themes emerged from the other interview topic guide questions (i.e., 4 and 9) relevant to research question 2; a few respondents’ answers are provided, as they offered a critical overview of what takes place on a day-to-day basis in the program environment.

Theme 2: State legislative match hinders implementation

Though there is a general consensus among program personnel that program funding is adequate, the state legislature’s direct funding match has lagged behind client revenues, state agency grantors, and the collective efforts of AMS partners. This finding presents negative implications for the program’s future execution and in some cases has already proven somewhat problematic for program internal operations. This finding is based on statements provided by two evaluation respondents. The two respondents shared the following:

Well, the way the program is supposedly set up, in the initial concept, was that, uh, it would be a third, a third and a third. And that is, 1/3 of the funds would come from the federal government, 1/3 would come from state match, and 1/3 would come from client revenue. Now, that doesn’t balance out exactly, uh, the state match is not, not anywhere as near a third, and so the client revenues probably has to pick up a bigger piece of that ...the one part that we didn’t consider at the beginning, was that, uh, that when you add programs and people to an agency, that overhead becomes a (pause) entire, you

know things that, uh, the fiscal officer and procurement people have to do (pause) increase, and of course there's no additional funding from the state to do that (AGENCY-STA²).

Our market penetration in the manufacturing sector in Arkansas is probably (pause) smaller than it (pause) could be. Limit, limiting factor, is the number of people in the field doing the work. And that is a function of the size of the federal award, the ability of the state to match, the ability of clients to pay, and, and all of that balancing (pause) uh, cash with in-kind parts of the budget. And with, with more cash, with more in-kind, we could do more (AGENCY-STA¹).

While no direct correlations can be drawn, AMS-MEP state funding limitations are perhaps a result of a minority of state legislators' (i.e., generally Republicans) poor perception of the program. Their perception, according to one respondent, is that the AMS-MEP program is "manufacturing welfare." This sentiment is substantiated in the following respondent's statement.

...there were folks particularly on the Republican side of the isle that called this, uh...manufacturing welfare. And...they tried their dangdist to kill it. Also, there were shake-ups at NIST itself that, uh, had direct influence on whether or not this would, would (pause) persist, would continue and go forward. But, it took (pause) check with (Authority Agency Personnel) on this, but, I, I would think the first seven or eight years, we were...concerned. But it's held (AGENCY-AF²).

Although this may be the position of a few; the federal legislators, the Governor, a majority of state policy makers, and agency executives obviously trust that this program is essential to the economic development of the state, which ultimately translates into a supportive policy environment for the AMS-MEP initiative. Moreover, this may speak to a clear political advantage regarding AMS affiliates ability to secure yearly outreach funding over non-program participants. However, improved budget forecasting, re-strategizing of resource allocation and the use of a diverse group of policy entrepreneurs should be exercised to rectify this finding, as proper staffing is essential to the cooperation process; this will be addressed later.

Interview topic guide question 4 was designed to provide a better understanding of the program's functions in its real life context. The respondent's account of his/her daily tasks provides insight into this matter. The content analysis of interview question 4 produced no themes. The response provided me with an overview of network partner (direct service delivery agencies) personnel day-to-day function within the AMS-MEP program environment.

Interview Question 4:

What are your duties within the agency?

Respondent AGENCY-AF³ illustrates in his/her own words how project managers interact within the AMS network to effectively execute diffusion of innovation services when s/he states,

Uh, my duties are direct, uh, direct service providing and uh...I will identify or meet with a, with a manufacturing company, uh, and try to, to (pause) uh, determine needs Uh, that need may be, may be a service that I can provide myself...with my technical background, that service may be something that uh, we could bring a third party in...and help them with. And so, uh, it can, it can be very, very broad in the sense that...if we can identify a resource to bring that, whether that's internally or externally, we will try to help that manufacturer... (AGENCY-AF³).

It was also important to understand if agencies were interacting within the network as required by the recipient/sub-recipient agreements; interview question 9 was designed to provide this insight. The content analysis of the following question produced no theme, but the respondents' answers provided a critical overview of whether agencies were meeting contractual cooperation obligations.

Interview Question 9:

Would you describe how your agency interacts within the AMS-MEP network?

Respondent AGENCY-AF² illustrates in his own words how the actual relationships held between AGENCY-AF and AMS-MEP are consistent with program guidelines in establishing program managers as co-located assets by saying,

We provide the home; we provide the base, for the engineers in Northwest Arkansas. We provide offices for them, uh; they are officially employees of the University, which means they participate in our insurance policies.

So they are officially AGENCY-AF employees. Just like the people that are located at Jonesboro...UA...UALR...a true collaboration (AGENCY-AF²).

Similar sentiments were expressed by Respondent AGENCY-SU³ when s/he shared that s/he exists in a team oriented environment and that support is not one sided. S/he conveyed that,

The AGENCY-SU team, has really earned meaning and understanding of, what is required of them to support the AMS organization (pause) uh, from a, an administrative standpoint (pause) so that all of the rules, regulations, compliances, documents, are taken care of in a timely manner. And in the 14 years that I've been associated with it, to my knowledge, we have never been, ah, never had any difficulty with that at all. So from an administrative standpoint, AGENCY-SU has complied with everything that has been asked of them (AGENCY-SU³).

The above respondents' answers have provided a window into the program environment. Though sketchy, their accounts are consistent with recipient/sub-recipient requirements.

Research Question 3): To what extent are there impediments to or promotion of AMS-MEP diffusion of innovation efforts through interagency cooperation?

AMS-MEP Interagency Cooperation: Goal Congruence/Shared Problems

According to Weiss (1987), goal congruence serves to promote interagency cooperation. Conversely, Weiss (1987) argues that the lack of a perceived shared problem and high goal conflict will impede the interagency cooperative process. To determine whether these indicators promoted, or hindered interagency cooperation, I evaluated NIST-MEP and AMS-MEP partner operational goals, and sought personal perceptions of goal congruence through open ended semi-structured interviews.

The following provides an overview of how goals diverged or converged between agencies evaluated in this study.

Goal Congruence/Shared Problems

The Universities, NIST, AMS and ASTA had varying goals to achieve their individual agency missions, but through historical document analysis it was determined that NIST, AMS, ASTA and partnering agencies had core goals in common. Goals that were consistent across all agencies included expanding technology transfer outreach services through cooperative partnerships, strengthening state and regional economic development, enhancing the amount of human capital to meet industry demand, and investing in the development of intellectual property (University of Arkansas, Little Rock, Strategic Plan, 2009; Southern Arkansas University-Tech Strategic Plan, 2010; Arkansas State University, Mission and Strategic Plan, 2009; University of Arkansas Transparency and Accountability Plan, pp. i-ii, 2009; ASTA, 2007-2010; 15 U.S.C. § 278k).

Though the historical document analysis established that there is common ground to garner interest in the cooperative process, agency executives and personnel are still less likely to engage in the cooperative process if they are not clear on goals, and if they do not perceive that interagency cooperation will mitigate complex issues and/or demands. Hence, the previously articulated indicators (i.e., goal clarity and perception) were investigated through open ended semi-structured interviews.

In the following examples, respondents' sentiments reflect the charge of their agencies and legislation. Furthermore, respondents' interpretations of policy goals are consistent across agencies. The significant and highly relevant theme that emerged was "Help manufacturing become self-sufficient."

Interview Question 3:

What are your agency's goals?

Theme of Significance: Help manufacturing become self-sufficient

Respondents AGENCY-AF³ and AGENCY-AT³ clearly articulated the core development principle of NIST and AMS partners when they stated,

...our mission again is to help manufactures, help them get better, uh, uh, stay in business, don't lose workers, don't lay off folks , uh grow, you know (AGENCY-AF³).
Uh, I guess to help industry in south Arkansas. In Arkansas, especially south Arkansas. Primarily manufacturing sector (AGENCY-AT³).

The theme presented above, "helping manufacturing become self-sufficient," emphatically establishes that respondents are clear on agency and program operational

outreach goals, thus, I determined that directives have been communicated clearly by agency heads so as to reduce mission drift.

Also, the respondents unanimously perceived cooperation as a benefit to their organization. More specifically, they felt that cooperation was a useful tool in identifying suitable resources to provide assistance to clients. The significant and highly relevant theme that emerged was “cooperation is beneficial.” Additionally, a second theme derived from the follow-up portion of this question: “Cooperation enables partners to readily identify suitable cooperative assistance through partnerships.” Both themes are noted in the text as they are both critical to answering the central question.

Interview Question 5:

Do you believe that cooperation with other agencies will help your organization? If so, how? If not, why not?

Theme of significance: Cooperation is beneficial

An example of participant sentiments is expressed in the ensuing respondent comments. As respondent AGENCY-AF² put it,

Uh, we have since learned that working together is much smarter than working against each other.

(AGENCY-AF²).

Most respondents above felt that cooperation was an added means with which to address the specific demands placed on their agencies. Their responses as to how interagency cooperation helped address their perceived problems, or helped them achieve their goals are covered in the following theme.

Theme 2: Cooperation enables partners to readily identify suitable cooperative assistance through partnerships

All of the following respondents seemed to recognize that interagency cooperation creates synergism.

Respondent AGENCY-AF³ cited an example of how the day-to-day interactions of project managers help with the identification of services for manufacturing clients by saying, ...the cooperation part would be (pause) uh (pause) they may, they may identify uh, a manufacturing client...and not know the particulars of the need but, but see a need, call me and, and I could, I could pick that up from there.

I had a manufacturer that said, “I have a need,” and then I, I tapped into that partnership organization to say, “Hey is there somebody out there, is there some, you know, somebody” (pause) shoot it was almost across the street you know (AGENCY-AF³).

It is clear that AMS personnel perceive that participation in the network will help them address customer concerns in a more expeditious and efficient manner. Additionally, participant comments indicate that AMS affiliates have knowledge of intra and interagency resources available throughout the AMS network. This shows that relationships between agencies are not merely theoretical, but actual.

The following query was posed to better understand if respondents viewed the MEP initiative as a mitigating factor in addressing the complex heterogeneous problems and/or demands of the small-to-medium sized manufacturing sector. The significant and highly relevant theme that emerged was “cooperation enhances the attainment of agency goals.”

Interview Question 7:

Does the AMS-MEP initiative impede or improve the agency’s capability of achieving its goals?

Theme of Significance: Cooperation enhances the attainment of agency goals

All respondents echoed that cooperation enhances the attainment of agency goals. While all respondents expressed how cooperation was a benefit in their own articulate way, respondent AGENCY-STA¹ perhaps summarized all responses provided by respondents when s/he stated,

I think overall, the, um (pause) what you call AMS-MEP, is, um (pause) an advantage for the AGENCY-STA to have. It helps us reach, uh (pause) more (pause) clients than we would otherwise reach. It helps us to reach further into, uh, counties around the state that we might not otherwise... reach. Um, it builds relationships with people we might not otherwise have relationships with. So, overall it’s beneficial and ...it helps us to meet our, Agency mission (AGENCY-STA¹).

Overall, the respondents in this evaluation indicated that the relationships established between the AMS network partners have enhanced their agency’s goal attainment. Specifically, they perceived that cooperation played an imperative role in their successful identification and delivery of services to clients.

Cooperation Capacity to Mount the Cooperative Effort

All eight AMS respondents were asked interview questions regarding AMS network capacity to mount the cooperative effort, following Weiss’s (1987) process model of cooperation. Capacity is the “interaction of human capital, organizational resources, and social capital existing within a given community that can be leveraged to solve collective problems” (Chaskin, 2001, p. 295). Therefore, sufficient capacity is imperative for the promotion of a successful cooperative initiative. Though there are many capacity factors to be considered when attempting to mount an interagency cooperation effort, the implementation logistics of the AMS-MEP program dictated that the evaluation focus on the availability of adequate resources to sustain a cooperative structure, the amount of human capital and professionalism among personnel within the network, and technology-communication and management information mechanisms. These mechanisms are central to the efficacy of the AMS-MEP implementation.

The following provides an overview of how each factor is available and interacts to mount a successful AMS-MEP network interagency cooperative initiative.

Capacity to Mount the Cooperative Effort

Availability of Adequate Resources

Monetary Resources

Monetary resources are clearly critical for any cooperative effort to be attempted. Since I have already talked about this issue previously, here I will talk about the financial relationship between the AMS-MEP Center and network stakeholders.

When asked if there were any additional resources needed to implement the AMS-MEP initiative, answers of AMS personnel varied, but a few respondents indicated that there was “always a need for additional resources to do more.” But respondents mostly alluded to their satisfaction with the status and availability of current resources. This sentiment can be seen in respondent AGENCY-MC²'s comment below.

S/he stated, “Well (pause) uh (pause) I guess there's always (pause) additional things you can do, but (pause) uh, for the most part (pause) uh, our funding gives us the capability (pause) uh, to provide (pause) the resources that we need to deliver what we feel is important for the state” (AGENCY-MC²).

While reduced funding may be the case from a national (i.e., Congressional funding of NIST-MEP) and state agency standpoint, the federal subsidies provided to Arkansas has increased substantially since 1995 (Arkansas Manufacturing Extension Partnership CPR & Annual Review, 1999; ASTA Annual Report 2007; ASTA Annual Report 2008; ASTA Annual Report 2009; ASTA Annual Report 2010). Moreover, the U.S. Department of Energy awarded the program an additional fifty thousand dollars for the 2009 fiscal period, and renewed the funding for the 2010 fiscal cycle (ASTA 2009 Annual Report; ASTA 2010 Annual Report). Additionally, the AMS-MEP program was able to obtain an additional ninety thousand dollars from the Arkansas Energy Office during the same fiscal cycles.

It is impossible to account for all the factors, outside of Congressional criteria, that may have caused reduced funding from any particular entity. However, it is obvious that the program has clearly met NIST metric criteria and made a positive impact on clients served, as the AMS-MEP Center was allotted an additional \$217,740.00 by the Energy Clearing House for the 2010 fiscal period, and NIST has consistently funded the program's cause (ASTA 2010 Annual Report). Given that the AMS-MEP's combined state funding match has increased by \$1.6 million or 78% since 1996, and there has been no overall shortfall in resources, I believe that AMS has established the adequate funding relationships required to support the AMS interagency cooperation initiative in Arkansas. However, long-term funding is certainly not assured.

Human Capital

Fundamentally, it is believed that a well-staffed, well-trained team will most often be responsible for attaining and sustaining exceptional performance within cooperative networks (Weiss, 1987). As noted in Chapter III, the measure for training adequacy was contingent upon the respondent's codified knowledge (i.e., completion of a B.A. or B.S. degree) and the relation of that codified knowledge to the duties being performed (e.g., management, business, scientific, financial-accounting, computer sciences, engineers, research analyst, and sales/marketing).

Each agency affiliated with AMS-MEP is very lightly staffed, as the agency with the most number of personnel has only five staff members. Most agencies that provide direct services only have between one and two project managers on-site. Project managers are responsible for direct consulting services, some marketing of program services, and project data reporting. Given the above mentioned internal staffing limitations resulting from state funding limitations, project managers may find themselves performing tasks that they may not necessarily have been trained to do. For instance, respondent AGENCY-SU³ responded to a resource question by stating, “Without sales and marketing assistance (pause) our services are left up to us as individual project managers to tell and sell our story. And we’re not generally qualified sales people.” However lacking their expertise is in marketing, 100% of the assessed and un-assessed personnel responsible for the administration of the initiative have at least a bachelor’s degree related to their responsibilities (validated through follow-up survey-See Appendix A), which strongly suggests that AMS-MEP affiliated personnel possess the adequate credentials and training required for effective program implementation (Schacht, 2010-11).

Personnel Professionalism

The level of professionalism is not only dependent upon one’s codified knowledge gained through traditional means (university/college programs), but it also consists of the advanced training and professional organizations that further contribute to one’s knowledge base and social capital (Moynihan & Pandey, 2005). Professionalism is important because it may contribute to, or detract from the development of interagency cooperation. Specifically, I believe that the external professional associations, trainings, and networking of AMS-MEP personnel would contribute to the community’s perceived legitimacy of AMS and the dissemination of contemporary practices of innovation diffusion. Hence, the greater the number of professional association memberships and/or external professional training/networking affiliations, the more often learned values or best practices are adopted and the more attractive the network is to likely clients and potential new partners.

The results of the content coding produced no theme that would support professionalism serving as an influence for enhanced interagency cooperation. However, it can be shown that managers and direct level service personnel believe that external training and networking enhance services delivered to clients. This determination is supported by the following responses.

Interview Question 9:

Would you describe how your agency interacts within the AMS-MEP network?

Respondent AGENCY-MC² conveyed how their training and external associations with other MEP Centers provide for helpful benchmarking to address Arkansas manufacturing needs when s/he articulated that,

Well (pause) one of the advantages of being a part of the MEP network, there are 59 Centers located around the country. And, uh, we meet quarterly (pause) we, uh, share best practices (pause) uh, we’re always upgrading (pause) uh (pause) different services, if, so when a Center is trying something different, or, say to change (pause) to, uh, lean operating, or something were going on green, or sustainability, we’d know about it (pause) and we share that information. And so as a result, there’s a strong

continuous improvement (pause) uh (pause) philosophy, and (pause) that's around the MEP network, and we all benefit from what each other learns what works and what doesn't.

Uh, and when we have our annual meeting once a year in April or May (pause) um, there are probably (pause) I don't know, 200 different sessions around different service offerings, changes (pause) approaches to (pause) changes initiatives, strategic (pause) activities within MEP, uh (pause) so (pause) we uh (pause) we have the opportunity to go and focus on things that are important to us in Arkansas and select those. Uh (pause) so, there's, there's a lot of information transfer, a lot of sharing of best practices, there's a very strong continuous improvement in methodology. And we also (pause) gain really good understanding around what's going on in, in manufacturing, because we get to hear what's going on in other states, they hear what's going on in Arkansas, and as a result, we (pause) the MEP Centers, including ours in Arkansas, probably are the best, uh (pause) up-to-date as to what manufacturing needs, what the issues are, what's going to drive (pause) manufacturing in the future, and better able to help our clients. And being part of the largest (pause) consulting network, that's MEP, for manufacturers in the U.S., has a lot of benefits (AGENCY-MC²).

Above, the respondent has clearly articulated how communication and affiliation with external MEP resources (i.e., networks & professional development conferences) help facilitate greater understanding of theoretical and professional grounding, but s/he does not clearly specify how this affects interagency cooperation. In this case, the respondent did not discuss how external interactions and development seminars established the social capital and professional legitimacy to draw additional clients to utilize services or attract new agencies to join the network. Therefore, no conclusions could be made as to how professionalism has affected the interagency cooperation process of the NIST-MEP legislation in the State of Arkansas.

Technology-Communication Flow and Information Systems

As discussed previously, a contributing factor to the sparse state resource distribution, pre-dating NIST, was the adversarial nature of technology transfer entities. This finding was substantiated by AGENCY-AF² when s/he stated,

...when I came here, though, the history was that all the higher education institutions in Arkansas fought against each other. They competed with each other, there, they, called each other names, I'm, I'm exaggerating of course, but the net result was that none of us were funded very well. Uh, we have since learned that working together is much smarter than working against each other. Because when we were working against each other, um, I feel like the legislatures of Arkansas didn't take any of us seriously. And so they just allowed us to fight rather than fund us" (AGENCY-AF²).

Basically, respondent AGENCY-AF² expressed that, the more similar the programs offered by agencies, the more adversarial agencies became in securing support resources. But the comment also implies that the introduction of external resources, through NIST-MEP funding,

has changed this culture and influenced agencies to cooperate to deliver technology transfer services to SME's more effectively.

Formally, the easing of these tensions have come through the efforts of the Arkansas Science and Technology Authority's Board of Directors. Under the NIST-MEP legislation, the role and responsibilities of the Authority have become more complex. Not only does the Authority serve as the chief research agency in the state, but it also has acquired the role of champion for cooperation and broker of funds to adequately establish accountability. The excerpt from the Authority minutes provides some insight:

(Agency Official) stated that in the past, the Authority had focused on four basic programs: research, seed capital, technology development and TTAG. As the years have passed, the Authority has become involved in additional programs/projects, such as EPSCoR, Ventures in Education, manufacturing extension and telecommunications. These programs/projects are hardly ever brought to the Board's attention, but are playing an important role in the Authority.

(Agency Official) stated that as the Authority deals with the changes in the agency, the staff will need the Board's involvement. (Agency Official) made the following suggestions. Because of the size of the Manufacturing Extension Network, the new Board members from the manufacturing sector should be appointed to a newly formed committee, the Industry Committee. This committee will be able to provide oversight to the Manufacturing Extension Network and to its Manufacturing Resource Advisory Committee (Minutes of the 71st Meeting of the Arkansas Science & Technology Authority Board of Directors Little Rock, Arkansas March 15, 1996, pg. 6).

The ASTA Board of Directors established an Industry Committee to provide oversight and enhance the communication between service delivery partners (i.e., Manufacturing Resource Advisory Sub-Committee—MRAC), which consequently mandates communication between resource agencies and industry leaders. According to AMS-MEP operational plans, the MRAC is obligated to meet on a quarterly basis and is charged with providing “operational advice and resources for client assistance” (1999-Cooperative Agreement N0. 70NANB6H0020). Additionally, the NIST-MEP and recipient/sub-recipient agreements require formal electronic reporting on program activities and results. Thus, the communication regulations established by the ASTA Board and NIST-MEP dictate the development of effective communication practices and the establishment of an information management system to facilitate efficient program monitoring.

In order to better understand how attitudes of AMS personnel may detract from the cooperation process, question 13 was posed. The significant and highly relevant theme that emerged was, “program personnel attitudes are positive.”

Interview Question 13:

How would you describe you and your associate's attitude concerning the AMS-MEP clients you serve?

Theme of Significance: Program personnel attitudes are positive

Respondents' perceptions of partner attitudes displayed a link between agencies and the existence of a team oriented environment. As Respondent AGENCY-AF³ stated it,

I think, you know, and, and I think this is, I think this is universal across all MEPs, um, that, I mentioned earlier there's a, there's a two-fold; there's a two-fold desire to do what we do. Uh, there's, you know, you have to make a living, you have to get paid, but there's also a, there's also, this, this drive to help folks, and you see that very, very strong throughout the whole MEP system, um, and, and... it's a feel good, believe it or not it is a feel good...(AGENCY-AF³).

Participant AGENCY-SU³ added,

I, I would most emphatically state that from its inception, I have, I have never... heard of a project manager or anyone who has not been interested in helping the client. Uh, we have, we've helped hundreds (pause) companies (pause) of clients throughout our, our existence. Uh, everybody that has been on the team, including those today, have a, in my mind, a sincere interest (pause) in helping clients in any way possible (AGENCY-SU³).

With respect to AMS personnel possessing a positive attitude towards clients and having an optimistic mind-set regarding program economic impact, participant AGENCY-STA² expressed,

Oh, I'd (pause) yeah, I think they're, uh, I think the attitude is, is good that everyone believes they're an integral part of the (pause) economic development in the state.

And (pause) I, I think most of the people in this Agency as I believe, that uh, you know if we're not (pause) If we're not making things, were probably not going to compete globally very well (AGENCY-STA²).

Many of the respondents in this evaluation viewed their role in the AMS program as a frontline team representative who is responsible for the economic development of the manufacturing sector. These respondents took this interview opportunity to reflect on how imperative their team oriented approach is to the successful diffusion of innovation throughout Arkansas. It was important to describe the attitudes existing within the AMS-MEP program environment, because it sets the context for the results presented relative to the program's technology-communication flow and use of information systems.

Technology-Communication Flow

The "working together" mentality established by ASTA has had a critical impact on technology-communication flow among network partners. Without ASTA intervention, agencies more than likely would not be involved in a high level of cooperation, as agencies that have a strong presence of professionals may obstruct the cooperation process (Rainey & Steinbauer, 1999). Maynard-Moody et al., (1986) explain that these individuals are so focused on professional autonomy that they become inflexible to external oversight, therefore rendering their agencies less adaptive to their environments. Given the enhanced communication and positive attitudes established as a result of cooperation, the AMS-MEP

network has been able to establish an efficient technology-communication flow that has enabled them to electronically transfer information with minimal time lag. According to Granovetter (1983), such links provide access to organizationally-useful information, improve problem solving, and strengthen links to networks (as cited by Pickering and King, 1995).

With the use of traditional (e.g., phones, e-mail, and fax) and more contemporary communications technology (e.g., digital text, interactive websites, video conferences, and SKYPE webinars), network members are able to conduct monthly staff meetings from remote locations, engage in webinar off-site training, and disseminate information to multiple actors in an instant.

While no themes derived from the interview questions in the technology-communication flow and information system segments, the responses below indicate that AMS affiliates utilize communications technology on a daily basis to conduct AMS-MEP business:

Interview Question 16:

Are you aware of existing communication mechanisms in your agency used as linkages to accommodate the AMS-MEP initiative?

The sense of how contemporary electronic communications devices affect cooperation and the many roles that it plays in the successful transfer of imperative information was discussed. In support of this, Respondent AGENCY-AF³ stated that,

Well, you know, um, short of the cell phone...we do some conference calling, uh, we will, we will have staff meetings where maybe everybody can't be there (AGENCY-AF³).

Respondent AGENCY-STA¹, underscored the use of contemporary communication devices for information sharing and interaction by saying,

We have a senior staff meeting weekly which includes all of our senior staff, including the Director of AGENCY-MC. Um; the AGENCY-MC staff has its own monthly meeting with field staff who are out around the state doing the day-to-day work. Uh, those are face-to-face channels of communication. Uh, we of course use, uh, e-mail extensively which supplements that (AGENCY-STA¹).

Similarly, Respondent AGENCY-MC² reported,

Um, I am always e-mailing back and forth between other Center directors about different things that work, that we're doing, that are common...uh...and so there is, uh...a lot of day-to-day, and week-to-week, month-to-month communications. Uh, and we share, we do conference calls, there's...webinars on different, different aspects of things that we're doing and things that are coming up. So, uh...all the typical vehicles are being utilized and there's a lot of activity (AGENCY-MC²).

Though the above replies paint a picture of how technology is utilized to communicate between external and AMS-MEP partners, the ensuing response seems to be the most

significant example of how technical means are manipulated to strengthen cooperation and assist small-to-medium sized enterprises in becoming more self-sufficient.

Interview Question 17:

What communication mechanisms were developed by the AMS-MEP network partners collectively to assist with information sharing?

...one of the things that we are doing with universities, we have the innovation market place, which is a web based (pause) uh (pause) vehicle (pause) uh (pause) where (pause) universities and individuals and companies can go and put intellectual property, and the objective with that is to try to make connections. So if a university has some intellectual property they would like to license, or if they're looking for, uh, investment, then they can, uh, input that in the market place and identify what they're looking for, and that has national and global visibility. Uh...we do (pause) do work (pause) with (pause) them, and usually vehicles that MEP develops is to help technology transfer (AGENCY-MC²).

The responses by the state, management, and direct service delivery personnel suggest the technology-communication flow in the AMS-MEP network has been sufficient. Therefore, I summarized that the AMS-MEP network's technology-communications flow is adequate for effective program operations, thus resulting in a positive effect on AMS-MEP client flow.

Communication Information Systems

The AMS-MEP Center operates a data base to manage client information and the matriculation of client projects through the service delivery process. The data base is used network-wide by personnel associated with the delivery, monitoring, and analysis of client projects, so there are no incompatibility issues within the data transfer process. However, some respondents did mention that protocols associated with gathering the data did in fact hinder the process. This issue does not illuminate to discount the data reporting process, but rather to provide some understanding that the AMS-MEP data reporting system is not entirely electronic (i.e., requires manual front-end data collection) and to some extent may impede a more seamless reporting and delivery process. For example, respondent AGENCY-SU³ mentioned that the accountability requirements which trickle down and precipitate in the form of documents and reports, hinders program delivery, and in some cases does not provide them with service flexibility.

Still, it seems to be a sound decision for NIST-MEP to require electronic data storage, analysis and transfer, as information systems infrastructure allows organizations to more easily organize, group, analyze and electronically transfer information. Quite simply, effective electronic data systems help "reduce the uncertainty in organization operations by improving the availability of appropriate information for decision making" (Premkumar, 2000, pp. 2-3). According to the historical document analysis of the AMS-MEP Operational Plans (Arkansas Manufacturing Extension Partnership CPR & Annual Review, 1999, p.24), the following steps are used to stay in compliance with NIST-MEP reporting guidelines.

- Project analyst collects data input by field project managers (i.e., activity by field staff, financials, time reporting by field staff, billing receivables, complaint analysis,

impact data, market penetration information, client satisfaction survey summarized, semi-annual report activity data log and needs assessment survey).

- Activity data log is forwarded to the U.S. Census Bureau
- Finance program manager compiles and forward to NIST
- NIST sends the reports generated to ADL
- AMS needs assessment is completed by the AMS Marketing Manager and Institute for Economic and Assessment
- The Management Project Analyst extract the network Performance Measures.
- The Vice President of Manufacturing Extension, the Operations Administrator, and the Management Project Analyst analyze these Performance Measures to identify trends. In addition, they analyze the measures themselves to ensure continuity with federal requirements. Furthermore, a third party, Synovate, evaluates the data to determine the impact of AMS work on client bottom line profitability. Synovate is hired by NIST.

Even though some respondents expressed dislike of reporting guidelines, it is a necessary process, as formal reports based on these data sets are used in the policy evaluation process to convince policy makers of program success and/or needs. This consequently leads to more efficacious policy (Weatherly & Lipsky, 1977). It is obvious that this reporting protocol has served the AMS-MEP network very well, as the adequacy of available monetary resources has continued and even been enhanced, as discussed earlier. The following respondent's statements demonstrate AMS-MEP personnel understanding of the need for this presumed "necessary evil" (reporting process).

So, you know, life would be easier if some of the (pause) surveying and reporting wasn't required. However, being part of a governmental organization, you have to expect that so you can (pause) uh, you know (pause) justify your existence to show that you're getting results. So (pause) um, it's kind of a necessary evil (AGENCY-AL/MC⁴).

The AMS-MEP accountability process enhances the Central AMS-MEP office's ability to stay compliant with federal guidelines. This is done in several ways: (1) ensures that clients make adequate steps toward established goals, (2) helps determine programming balance, (3) ensures proper planning, and (4) avails stakeholders of resources needed to institute future programmatic efforts. The collection of required information enables the AMS-MEP Center to make these determinations.

With evidence of an efficient information system, and a means of addressing information sharing obstacles, evidence shows that the AMS-MEP has the adequate capacity to mount a successful cooperative initiative between agencies.

Conclusions

In this evaluation, I explored whether the AMS-MEP has implemented technology transfer services to the small-to-medium sized manufacturing sector as intended by Congress.

Additionally, the evaluation sought to confirm or refine interagency cooperation predictors for the given program environment. The results of this evaluation were based on the examination of historical documents, interview content coding analysis and a follow-up survey. A variety of factors emerged from the data demonstrating different elements, which influenced the AMS program delivery process.

In this segment, I first provide a review of the results, and then discuss the significance of the research. Next, I present insights regarding limitations. Last, implications for future practices are offered.

External Influences

External influences can be seen in the protocols guiding the AMS program implementation, and in the answers provided by respondents. The state legislation, AMS recipient/sub-recipient agreements, and respondents' comments clearly show that they were influenced by the NIST legislation. ACT 803 OF 1989 of the Arkansas General Assembly explicitly set out to establish a more cohesive effort among relevant agencies to address technology development in the industrial sector. This amendment of ACT 210 OF 1987 of the Arkansas General Assembly went into effect immediately after the NIST-MEP initiative was enacted in 1988. Given these findings, it is assumed that this change of policy language was influenced by the desire to secure federal resources to supplement state technology transfer programs. An example supporting this assumption was expressed by Respondent AGENCY-STA¹, a high ranking state executive, when s/he stated that,

We watched very carefully (pause) the defense re-investment ACT in the early 90s after the collapse of the Soviet Union. Uh, the expectation was that a lot of defense dollars would be going into American competitiveness, primarily in the manufacturing sector. There was a program announcement (pause) for, uh, establishing Centers under the Manufacturing Extension Partnership. Arkansas at that time was looking at technology transfer through universities (AGENCY-STA¹).

It is obvious that the State of Arkansas aligned state legislation and program steering mechanisms with federal legislative criteria to provide a more conducive NIST implementation policy environment. And it was further found that an influx of resources associated with the NIST legislation was a key motivational factor in agencies partnering with AMS to address internal limited resource issues. This sentiment was confirmed by most respondents as they generally expressed the desire for additional resources to raise technology transfer delivery capabilities to higher levels. These systematic and random elements influencing agencies to participate in the AMS-MEP program are reflective of Weiss's (1987) depiction of external influences.

Shared Problems/Goal Congruence

To better understand if agencies were likely to succeed in working cooperatively, I incorporated questions based on Weiss's (1987) study regarding shared problems/goal congruence. From the analysis of the data (i.e., historical documents, interviews and follow-up survey) I found that agencies did not partake in a formal cooperation process until incentives

were offered. This suggests that preexisting problems abound (i.e., declining industrial sector and limited internal resources), the formal cooperation process was not enticing until it was deemed fruitful to each partnering agency. “Carrots” relative to this research included monetary resources attached to the legislation, in-kind resources gained through matching agreements, and professional resources gained through cooperation. I interpreted the findings to imply that incentives attached to legislative initiatives, with low conflicting mechanisms, which are designed to meet an agency’s goal, are a strong influence to engage in the cooperative process. However, respondents genuinely seemed to be concerned with providing assistance to help manufacturers become more self-sufficient. As they generally expressed, self-sufficiency breeds proficiency. This was confirmed through their many insightful responses to those inquiries related to their agency and network goals.

In sum, the analysis revealed that NIST, AMS and network partners’ goals were not congruent in totality, but did have multiple core goals in common (e.g., expanding technology transfer outreach services through cooperative partnerships, strengthening state and regional economic development, enhancing the amount of human capital to meet industry demand, and investing in the development of intellectual property). Furthermore, the AMS also established a transparent mutually agreed-upon mechanism that established protocols regarding resource sharing and delivery of program services, thus reducing a high stakes perception of program involvement (Matland, 1995). Moreover, respondents’ answers showing goal clarity, similar interpretation of goals across agencies, and a four out of five consensus that “cooperation and collaboration with other agencies will enhance attainment of our agency goals,” clearly established that there was a shared perception that declining manufacturing issues could be addressed through cooperation.

Resources to Institute the Cooperative Effort

Centrality represents the degree to which an actor occupies a strategic position in the cooperative effort by having an advantage of establishing substantial relationships with multiple stakeholders and partners (Gnyawali & Madhavan, 2001). Such a position provides the central entity with authority over, and access to, the mechanisms necessary to mount an effective service delivery process. The Arkansas Manufacturing Solutions-Manufacturing Extension Partnership Center located in Little Rock, Arkansas is the primary central entity responsible for the implementation of the NIST-MEP legislation.

While a couple of respondents expressed concern with how state funding has affected internal staffing, it was found through document analysis and interviews that the AMS-MEP Center strategically secured partnerships to provide regional program coverage across the state, and have met NIST criteria to establish beneficial partnerships to deliver program services. Thus, the AMS is consistent with the centrality concept posed by Gnyawali and Madhavan (2001). Explicitly, the Authority, on behalf of the AMS-MEP Center, has instituted clear accountability protocols with network affiliates to ensure that they meet their formal agreement responsibilities to the AMS-MEP program.

Factors of AMS accountability can be found in the recipient/sub-recipient agreements that are established between the Authority, on behalf of AMS-MEP, and state agencies. The elements of accountability listed in the recipient/sub-recipient agreements are not included in

the NIST-MEP legislation, but are included in the recipient/sub-recipient agreement to ensure that the small-to-medium sized manufacturing sector in Arkansas receives the intended congressional support in an effective manner from network partners. Consistent with the Ansell and Gash (2007) contingency model of collaborative governance, it is logical to assume that a legally binding contract, tied to a windfall of monetary resources, serves as a strong incentive for agency follow-through. Furthermore, it would not particularly serve the best interest of any agency, at any level, to provide soft and/or hard in-kind matches up-front, and risk not seeing some return on their investment.

AMS network partner follow-through on the recipient/sub-recipient criteria was established via document analysis of the 2010 Arkansas Manufacturing Solutions Center Progress Report (AMSCPR), 2007-2010 ASTA Annual Reports, and the 1996-2009 AMS program ledgers. While the document analysis provided evidence that shows 100% of programs were delivered through cooperation, and entity matches met or exceeded NIST requirements, it was important to determine the AMS-MEP program personnels' perception of whether the program was adequately or inadequately funded. This is because the idea of resource adequacy is normative for a given community and cannot necessarily be established by presenting agency fiscal budgets. Therefore, a grounded or actual perspective on resource adequacy was provided.

It is believed that a grounded perspective of resources enables formal policy makers to develop policy that: enhances goal attainment, reduces frontline discretionary practices (i.e., staffers deciding who should receive the help), improves proper staffing and enhances positive attitudes, establishes criteria that fits agency capabilities, and enhances communication practices between agencies and formal policy makers) (Sappington, 1991; Weatherly & Lipsky, 1977). Based on document analysis, content coding results and descriptive statistics supporting those qualitative results, the evaluation suggests that sufficient funding and resources exist to institute the cooperative effort. Given this outcome, the findings are consistent with conceptual models that say sufficient resources are necessary to encourage agencies to participate in the collaborative and cooperative process (Weiss, 1987; Ansell & Gash, 2007; and Imperial, 2005).

Capacity to Mount the Cooperative Effort

Availability of Adequate Resources

While a couple of respondents perceived that lagging state funding limited their ability "to do more," the evidence (historical document analysis, interviews, follow-up survey) has revealed that cooperation has enhanced AMS network partners' access to resources to more readily identify suitable assistance for clients. This is primarily due to NIST federal subsidies, state agency subsidies, in-kind partner matching, direct staffing (AMS Central office staff), and indirect staffing (co-supported staff) that was made available to the AMS network to support the cooperative effort.

Though adequate resources have been established to address Arkansas's manufacturing innovation and productivity issues, it appears that the AMS is restricted to NIST's interpretation of what manufacturing economic development should look like. This is to say that the federal government, via implementation criteria (i.e., addressing specified NAICS firm

needs), takes away some controls to address what local stakeholders may define as a problem. For example, clients are only eligible for services through AMS-MEP if they meet the North American Industry Classification System codes (NAICS) identified by NIST-MEP. According to Respondent AGENCY-STA², some start-up firms in Arkansas are novel, and do not meet NIST-MEP funding criteria. Therefore, their need for support may go addressed. This is problematic as such initiatives could be seen as being out of touch with local constituency demand. But, given the publicity regarding the lack of competitiveness nationwide and statistics identifying specific problem industries, federal legislation is mostly consistent with Arkansas's local industrial concerns. However, this not to say that the AMS network partners should not be wary of the strict specialized criteria established by NIST, because "the incentives for making investments will be tempered by the fact that the more specialized these investments and governance structures become, the more difficult it becomes to deploy them in alternative ways when the collaborative effort ends" (Imperial, 2005, p.305).

Professionalism

Evidence (i.e., personnel education, MEP seminar quarterly participation and training) confirmed that AMS affiliates, coordinators, and direct delivery service personnel have received the necessary preparation to hone theoretical and professional grounding. However, the lure of social status and intellectual authority as the primary purpose for joining the network, as suggested by Weiss (1987), could not be determined. Therefore no conclusions were provided for this element.

Technology-Communication Flow and Information Systems

The Arkansas Science and Technology Authority's Board consist of stakeholders from Arkansas's industry, science and technology community. For example, the Board is made up of "three directors who are scientists or engineers, two directors who are representatives of academic institutions, five directors who represent the private sector, three directors who represent the private sector and have knowledge and experience in the field of manufacturing, and the Director of the Department of Higher Education" (ASTA, 2011). The President of ASTA, along with Board members is appointed by the Governor. From this group, the Industry Committee, a standing committee of four Board members, oversees the AMS network. Further, a Client Advisory Committee, composed of the Industry Committee and ten members of the states manufacturing community, provides strategic direction to the network. Additionally, a Manufacturing Resource Advisory Committee (MRAC) is used to provide operational advice and resources for client assistance (Arkansas Manufacturing Extension Partnership CPR & Annual Review, 1999, p.5). Frontline staff is also included in this advisory process.

The Board and subcommittees compositions increase their ability to establish perceived community inclusiveness, therefore enabling them to better navigate political, community, and day-to-day obstacles (Ansell & Gash, 2007). Hence, ASTA has been able to effectively establish formal communications protocols between AMS network affiliates, thus creating an environment that facilitates organizational learning.

Though Weiss (1987) did not specify infrastructure types, she mentions that agencies may have to "build new infrastructure" to augment the cooperative effort. I interpret this to mean that, if necessary, networks must develop coalitions, legal resources, and electronic

means to establish the required capacity to operate a successful network. The evidence in the current study revealed that the AMS program has indeed established such an infrastructure.

Taken together, my findings suggest that the NIST legislation was implemented as intended by Congress and that this implementation was mostly consistent with the elements presented in Weiss's (1987) model. While the Weiss (1987) model does not account for the influence that stakeholder collective planning, pre-external influences and contingent elements, has on new cooperative endeavors, she generally captures the essential influences existing in the program environment. Contingent elements consist of existing conditions in a given community to include resources and capacity factors referenced in this evaluation. However, this does speak to the flow of the model, which seems to be out of order. That is, Weiss (1987) only provides a depiction of cooperation from a local agency perspective, or only accounts for agencies becoming involved after the federal and state decision making processes. As such, it does not consider how prior relationships and interaction between stakeholders at all levels (i.e., ASTA Board members and principles) factor into program participation. This was confirmed during the interview phase of this evaluation. Specifically, respondent AGENCY-STA¹ expressed that previous successful joint endeavors and developmental interactions with NIST played a role in encouraging the Authority's participation in the cooperative initiative.

This may speak to how trust established by prehistory affects cooperative endeavors. Imperial (2005) suggests that trust, built through time and effort, is an "important precursor to joint action." The case study findings in the present evaluation revealed that the following encouraging elements were present: (1) random external influences (agencies were influenced by the additional net resources that were attached to the NIST legislation); (2) systematic external influences (the NIST legislative criteria mandates agencies to cooperate if they are to be considered for program participation); (3) shared problems/goal congruence (the staff shared the goal of cooperation with external entities); (4) resources (participants gained political advantage over non-participants regarding outreach funding, yearly line item funding for transfer projects was obtained; internal budgetary shortfalls were reduced to enhance transfer effectiveness), and (5) capacity (the ability to reduce manufacturing uncertainties related to employment, productivity, and competitiveness was enhanced through capacity).

Based on the evidence in the current case study, I argue that no conceptual process model can accurately capture all elements and causal relationships that factor into a successful interagency cooperation initiative, as the reality of day-to-day network functions in a given community tend to be diverse, iterative, and non-linear (Ansell & Gash, 2007). However, Weiss's model appears helpful in predicting factors that encourage cooperation in Arkansas. Thus, this evaluation will hopefully offer assistance for policy-making and provide operational level AMS-MEP affiliates insight into comprehending network elements which impede or help facilitate their cooperative effort.

Significance of Research Findings

Based on the evidence presented in this case study, I found that the most significant contribution of this implementation evaluation is a refinement to the causal factors credited for the influence of interagency cooperation.

The evidence shows that there was a discrepancy between the Weiss (1987) model and the study findings. Specifically, the order in which Weiss (1987) depicts interagency cooperation occurring did not apply to AMS-MEP.

To reiterate, Weiss (1987) explains that local agencies undergo a three step process driven by external systematic and random influences to be motivated to engage in the level of cooperation that leads to implementation of an initiative. The steps in the process include (Weiss, 1987):

Step 1: Perceived problem must be shared across agencies

Step 2: Resources must be available to handle problem cooperatively

Step 3: Institutional capacity has to be established to mount cooperation

The model does not consider how a collective desire and planning to address complex issues, pre-external and contingent elements, factor into encouraging agency participation in a cooperative endeavor. The case study provides evidence that the manufacturing stakeholders' (ASTA Board) collective actions, pre-external influences and contingent elements, was as compelling an influence on cooperation as the criteria to cooperate by the NIST-MEP legislation (external systematic force). Specifically, the collective planning by ASTA, despite an adversarial environment, sought a systematic approach to address manufacturing competitiveness and productivity in the State of Arkansas. This in-itself established that individual agencies had already identified external entities that perceived cooperation as a tool to mitigate complex manufacturing issues. A systematic approach consists of "embedded multi-agency governance based on a shared vision and institutionalized joint working to the extent that self-governing networks emerge" (Lindsay et al., 2008, p. 716). Thus, ASTA's exploratory activities can be perceived as a resource and capacity building endeavor that occurred before the influence of the systematic (cooperative criteria) and random (influx of resources) external influences associated with the NIST-MEP legislation.

As noted above, the evidence revealed that an adversarial relationship existed among the technology transfer entities in the State of Arkansas pre NIST-MEP. As communicated by Respondent Agency-STA¹, it was believed that,

...if the Governor didn't pull all of the tech transfer folks together and say, I want the state to propose one Center to NIST, that every university engaged in technology transfer would submit its own proposal...the effort would be diffused, and we probably would not get an award for a statewide (pause) technology Center under Manufacturing Extension. So we (pause) pooled our resources, we put together a proposal (pause), and in that round, the state proposal did not get funded. The metalworking connection proposal (proposal submitted by other universities and non-profits in the state) did get funded, and that created a certain level of tension between the (pause) managers of the successful project and those of us associated with the losing project.

The quote establishes, and the evidence substantiates, that even though the ASTA group was not funded and there was still a presence of tension within the community, stakeholders continued to work together to eventually secure the resources and capacity to address manufacturing competitiveness and productivity in Arkansas. By working together, the collective efforts of manufacturing stakeholders associated with ASTA were able to secure the

NIST-MEP subsidy to establish the AMS Center in Arkansas. This is verified by Respondent AGENCY-STA¹ when s/ he states,

The group that was involved in the proposal that was not funded, continued to work with program managers at NIST. The Industrial Development Commission actually provided a small working grant for us to continue that work and to dedicate a single person to writing the next proposal for the next round (pause) making all of the, kind of improvements in the proposal that were pointed out by NIST, as shortcomings.

...and our proposal, uh, was subsequently funded and established what was then called the Arkansas Manufacturing Extension Network (AGENCY-STA¹)

Though the Weiss (1987) model does not provide for a component that directly addresses how collective planning factored into predicting cooperation, it was still helpful in identifying the possible impediments of interagency cooperation faced by AMS-MEP. Additionally, the model was helpful in illuminating imperative elements that serve to help facilitate the interagency cooperative effort in the State of Arkansas. Given these findings, I would argue that insight into impediments to and influences on cooperation is critical, as it is operationally (resources and capacity building) advantageous for NIST-MEP and AMS-MEP (principle and implementer) to better understand how and why agencies respond to cooperation the way they do. It seems that this information would be useful to determine what influence patterns apply to promote cooperation. Hence, the evaluation provides a research design that can be replicated and used to investigate encouraging factors to cooperation in states that seek manufacturing technology transfer through cooperative initiatives.

Limitations

I found that not being able to interview all program personnel associated with the delivery of program services and the failure to survey all eight (5 out of 8) phase one respondents served as a limitation. I realized by missing additional interpretations and perceptions, critical alternative information on the AMS-MEP interagency cooperation process was probably lost. The small sample size, in both cases, limits the evaluation in a couple of ways due to the nature of the study. First, the evaluation depends mostly on a self-report inventory to ascertain perceptions and interpretation toward AMS-MEP network cooperation. Secondly, when respondents are requested to self-report, social desirability bias can occur. However, I do not suspect that social desirability bias was an issue in this case study.

Implications for Practice

The ultimate test of AMS-MEP's viability will ultimately depend on the "identification of opportunities for cooperation that create public value while simultaneously minimizing problems" (Imperial, 2005, p.312). Evaluating the implementation functions of the AMS-MEP was central to this evaluation. The findings imply that community stakeholders engage in collective planning strategies to identify optimal solutions to mitigate complex shared problems in a given program environment. The findings suggest that this mode of collective planning and interaction with principles enables stakeholders to better understand what cooperation requires, gauge to what extent cooperation addresses local issues, and establishes

trust that program participants can follow-through on their contractual commitments. For example, the State of Arkansas established legislation to facilitate the diffusion of innovation, but state stakeholders did not respond to these pressures by engaging in formal cooperative relationships. As an alternative, a select number of stakeholders worked together through ASTA to identify resources and capacity to effectively execute the cooperative effort. Later, they developed recipient/sub-recipient agreements between AMS-MEP partners to ensure participant follow-through.

Garnering manufacturing community support amidst the adversarial program environment, pre NIST-MEP, was facilitated by ASATA's publicizing of Arkansas's need for support to address the lack of manufacturing competitiveness and productivity. For instance, when asking one respondent what was her/his agency's motivation behind participating in the NIST-MEP program, s/he stated, "ok, initially we...uh, saw the solicitations (pause) uh, for the MEP program and the opportunity to set up a Center. And we tried to (pause) get some different parties in the state interested in pursuing that opportunity...we thought it was a great opportunity for the state" (AGENCY-STA²). Given the NIST-MEP participation criteria and ASTA operational goals, I was able to determine that ASTA sought to secure agency participation and support by highlighting defining principles such as manufacturing economic issues in Arkansas. Consequently, ASTA was able to secure a core group of agencies who contributed their expertise and resources to help AMS meet NIST-MEP implementation criteria.

In sum, the findings of this study may offer manufacturing stakeholders on the federal and state level additional strategies for implementing technology transfer policy through cooperation. This is provided in the following depiction of ASTA's initial steps in establishing a cooperation program : (1) there was a sincere desire by stakeholders to address manufacturing issues; (2) ASTA developed defining principles surrounding manufacturing economic issues; (3) the Authority coordinated a collective planning group (established a diverse base of community contributors by publicizing and pressing defining principles); (4) the collective planning group identified the resources and capacity to execute the cooperative endeavor- additional agency, and NIST-MEP support; and (5) ASTA established trust among potential regional partners and in NIST-MEP through planning activities and understanding legislative benefits through co-proposal development . Ultimately, the collective planning process coupled with the five factors pointed out in the conclusion segment, contributed to AMS-MEP program enactment, agency participation, and successful program implementation. This protocol is not presented to suggest a causal process to encourage cooperation, but it does offer practices that may play a role in establishing a successful technology cooperative effort.

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Appendix A**AMS Respondent Follow-Up Survey****The Imperatives of Successful Policy Implementation**

1. Sufficient funding and resources are provided to efficiently and effectively deliver Arkansas Manufacturing Solution's program services to small-to-medium sized manufacturers

Response	Percent	Response Count
Strongly Disagree	20%	1
Disagree	20%	1
Neutral	20%	1
Agree	40%	2
Strongly Agree	0%	0
Answered question		5
Skipped question		0

2. A goal of our agency is to help manufacturers become more self-sufficient

Response	Percent	Response Count
Strongly Disagree	20%	1
Disagree	0%	0
Neutral	0%	0
Agree	40%	2
Strongly Agree	40%	2
Answered question		5
Skipped question		0

3. A goal of our agency is to increase the number of college educated Arkansans

Response	Percent	Response Count
Strongly Disagree	0%	0
Disagree	20%	1
Neutral	40%	2
Agree	40%	2
Strongly Agree	0%	0
Answered question		5
Skipped question		0

4. A goal of our agency is to increase the number of college educated Arkansans in the science, technology, engineering, and mathematics field

Response	Percent	Response Count
Strongly Disagree	0%	0
Disagree	20%	1
Neutral	40%	2
Agree	0%	0
Strongly Agree	40%	2
Answered question		5
Skipped question		0

5. Cooperation and collaboration with other agencies will enhance attainment of our agency goals

Response	Percent	Response Count
Strongly Disagree	0%	0
Disagree	0%	0
Neutral	20%	1
Agree	20%	1
Strongly Agree	60%	3
Answered question		5
Skipped question		0

6. Cooperation with other agencies is a benefit to our agency

Response	Percent	Response Count
Strongly Disagree	0%	0
Disagree	0%	0
Neutral	0%	0
Agree	40%	2
Strongly Agree	60%	3
Answered question		5
Skipped question		0

7. Cooperation with other agencies helps me to readily identify suitable resources for clients

Response	Percent	Response Count
Strongly Disagree	0%	0
Disagree	0%	0
Neutral	0%	0
Agree	80%	4
Strongly Agree	20%	1
Answered question		5
Skipped question		0

8. Partnerships with universities and other educational entities are beneficial to our agency

Response	Percent	Response Count
Strongly Disagree	0%	0
Disagree	0%	0
Neutral	0%	0
Agree	0%	0
Strongly Agree	100%	5
Answered question		5
Skipped question		0

9. Partnerships with non-profits and other third parties are beneficial to our agency

Response	Percent	Response Count
Strongly Disagree	0%	0
Disagree	0%	0
Neutral	0%	0
Agree	80%	4
Strongly Agree	20%	1
Answered question		5
Skipped question		0

10. I understand the mission of the Arkansas Manufacturing Solutions program as it relates to the National institute of Standards and Technology- Manufacturing Extension Partnership

Response	Percent	Response Count
Strongly Disagree	0%	0
Disagree	0%	0
Neutral	0%	0
Agree	40%	2
Strongly Agree	60%	3
Answered question		5
Skipped question		0

11. I understand the mission of my agency as it relates to the goals of the Arkansas Manufacturing Solutions program

Response	Percent	Response Count
Strongly Disagree	0%	0
Disagree	0%	0
Neutral	0%	0

Agree	40%	2
Strongly Agree	60%	3
Answered question		5
Skipped question		0

12. The college educated personnel existing within the Arkansas Manufacturing Solutions Network is sufficient to carry-out the duties associated with the implementation of the AMS program

Response	Percent	Response Count
Strongly Disagree	20%	1
Disagree	0%	0
Neutral	0%	0
Agree	40%	2
Strongly Agree	40%	2
Answered question		5
Skipped question		0

13. Arkansas Manufacturing Solutions Network personnel hold college degrees that are relevant to their roles and responsibilities regarding program implementation

Response	Percent	Response Count
Strongly Disagree	0%	0
Disagree	0%	0
Neutral	20%	1
Agree	40%	2
Strongly Agree	40%	2
answered question		5
skipped question		0

14. Federal goals are not consistent with the state of Arkansas's goals

Response	Percent	Response Count
Strongly Disagree	20%	1
Disagree	80%	4
Neutral	0%	0
Agree	0%	0
Strongly Agree	0%	0
Answered question		5
Skipped question		0