

2015 EVALUATION AND ECONOMIC IMPACT OF THE MONTANA MANUFACTURING EXTENSION CENTER

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EXECUTIVE SUMMARY

The Montana Manufacturing Extension Center (MMEC) works with manufacturers to create and retain jobs, innovate, reduce costs, increase profits, and save time and money. MMEC employees typically make on-site visits to manufacturing clients to assess the problems, suggest appropriate solutions and assist with implementation.

MMEC closely monitors its performance through feedback and by following an evaluation procedure developed by the National Institute of Standards and Technology (NIST).

Clients are surveyed six months after a project is completed and questioned about their satisfaction with the services received. The respondents are also asked to quantify certain economic impacts and outcomes associated with MMEC project. This report summarizes the responses associated with MMEC visits made during 2015.

NIST has developed a standardized questionnaire that specifies when manufacturing clients are to be interviewed. This is the seventh year that this evaluation procedure has been used to gather the data. Responses can be compared for the entire 2009-2014 period.



SURVEY FINDINGS

- ▶ Montana manufacturing clients were very satisfied and would be very likely to recommend MMEC to other firms.
- ▶ About 56 percent of the respondents said they relied exclusively on MMEC as a business service provider during 2015. This percentage decreased from 2009 to 2013. The trend toward using other external providers may have stabilized because there is no statistical difference between the 54 percent that reported exclusive reliance on MMEC in 2014 and the 56 percent in 2015.
- ▶ The professionalism and knowledge of the MMEC staff continues to be the major strength of the center and several of the evaluations mentioned specific staff members.
- ▶ The 2015 Net Promoter Score (NPS), a quantitative measure of satisfaction, was calculated to be 80. The 2015 value for NPS was below the high of 91 reported in 2013. But the percentage of respondents awarding MMEC a “10” (the most favorable mark) was the highest ever reported.
- ▶ The most important challenges faced by surveyed MMEC clients were ongoing continuous improvement/cost reduction strategies, product innovation/development, and employee recruitment and retention.
- ▶ The perceived challenges mentioned by MMEC clients have changed over the business cycle. Cost reductions, product innovation and identifying growth opportunities ranked high during the entire 2009-2015 period. Personnel issues (employee recruitment and retention) have risen as the labor market has tightened. Fewer respondents are mentioning financing as a challenge, as the economic recovery has strengthened.
- ▶ The most reported outcome of the 2015 MMEC visits was an increased investment in workforce development and employee skills. Second place was a tie between increased investments in plant/equipment and retaining otherwise lost jobs.
- ▶ Quantitative estimates of the outcomes of MMEC visits are volatile from one year to the next. The only consistent pattern was that they all increased significantly after recession lows in 2009. Thereafter, sizable increases and decreases alternated from one year to the next with no discernible pattern, but within defined ranges.
- ▶ MMEC visits during 2015 resulted in 388 new and retained manufacturing jobs and directly or indirectly added approximately \$1,996,700 to the Montana Individual Income Tax revenue.
- ▶ The Montana return on investment (ROI) for MMEC during 2015 was 8.0 to 1. The state received about \$8.00 in income tax revenue for each dollar invested in MMEC.



MONTANA MANUFACTURING EXTENSION CENTER

The Montana Manufacturing Extension Center (MMEC) is the state's affiliate to the National Institute of Standards and Technology (NIST) Hollings Manufacturing Extension Partnership. The mission of MMEC is to work with Montana manufacturers to create and retain jobs, accelerate innovation, increase profits and save time and money.

MMEC provides a variety of services – from innovation and business management strategies to process improvements – and works with manufacturers to attract new customers, develop new products and expand into new markets.

MMEC is located within the College of Engineering at Montana State University. The MMEC director and the administrative offices are located in Bozeman. There are five field offices across the state: Missoula, Kalispell, Helena, Billings and Bozeman. Each office is staffed by a field engineer who works directly with manufacturing clients in the area and connects them with additional business services. The Billings office was re-opened in 2015 after being closed due to budgetary factors. Paddy Fleming continues as the Director of MMEC.

The core strength of MMEC is its employees – they are experienced, committed to Montana and knowledgeable about all aspects of manufacturing. MMEC field engineers interact directly with manufacturing clients and bring a wealth of expertise, tools and techniques to help solve the production, technical and management issues companies face today. MMEC specialists travel to manufacturing workplaces to observe and evaluate problems. They then collaborate with management and staff to develop workable, cost-effective solutions consistent with the company's goals.

MMEC hosts a “Compete Smart” statewide biennial conference for manufacturers and other interested parties, which offers an opportunity for learning and networking with peers, suppliers and colleagues. This conference also showcases the diversity of manufactured goods from across Montana.

THE EVALUATION PROCESS

The MMEC evaluation process follows the guidelines developed by NIST as part of its management information reporting procedures. The evaluation is conducted by an independent analyst. NIST specifies the timing of the evaluation and provides a standardized questionnaire distributed to manufacturing firms served by MMEC.

These manufacturing clients are asked to evaluate the effectiveness of MMEC and to quantify the economic impact of its activities on their business and its effect on the Montana economy. MMEC sent the independent analyst preparing this report 46 questionnaires for the 2015 evaluation period. After careful review, five were judged to be incomplete or otherwise unusable because of the large number of questions unanswered. Consequently, there were 41 questionnaires representing completed projects during 2015. This sample size is consistent with past years. The MMEC evaluations from 2009 to 2014 were based on 41 to 47 completed questionnaires.

This is the seventh year that the evaluation process utilized the same questionnaire and timing. Earlier data from 2009 to 2014 evaluations are presented in many of the following tables.



OVERALL SATISFACTION

Manufacturing clients said they relied heavily on MMEC and were very satisfied with the services received. In 2015, about 56 percent of the respondents said they relied exclusively on MMEC and did not consult with any other provider of business performance services.

Until 2014, there had been a trend toward using additional providers. The percentage of respondents who said they relied only on MMEC dropped from 68 percent to 37 percent from 2009 to 2013 (Table 1, page 9). The 2014 and 2015 values are not statistically different, which suggests the downward trend may have stabilized.

Montana manufacturers were asked if they would recommend MMEC to other potential clients (Table 2, page 9). They were asked to rate the likelihood of a positive recommendation, with 1 being the least likely and 10 being the most likely. About 83 percent of the 2015 respondents chose 10 (the most likely), approximately 2 percent chose 9 and 10 percent chose 8. About 5 percent of the respondents chose a value of 7 or less.

The Net Promoter Score (NPS) is calculated by subtracting the percentage of respondents choosing 1 to 6 from the percentage choosing 9 and 10. MMEC's 2015 NPS is 80 (85%-5%= 80). The NPS values



for 2009 to 2014 were 78, 83, 84, 84, 91 and 81 respectively. There was an upward trend in MMEC's NPS score prior to 2014. The 2015 NPS value is a return to the range report in 2009 and 2010.

The trend in the Net Promoter Score should be cautiously interpreted. There was a consistent upward trend in the NPS from 2009 to 2013. The decline during 2014 may be traced to the 10 percentage drop in respondents giving MMEC a 10 rating – perhaps due to the closing of the Billings office. The percentage of respondents awarding a 10 in 2015 jumped to 83 percent, an all-time high. Combined with the few respondents choosing a six or lower, the 2015 NPS suggests that MMEC has probably overcome the minor decline in measured satisfaction noted last year.

Table 2. How likely would you be to recommend MMEC to other clients?

Year	Not At All Likely -----									Very Likely
	1	2	3	4	5	6	7	8	9	
2009	-	3%	-	-	3%	-	-	10%	18%	66%
2010	-	-	-	-	2%	2%	4%	4%	17%	71%
2011	-	-	-	-	-	-	2%	14%	12%	72%
2012	-	-	-	-	2%	-	5%	7%	10%	76%
2013	-	-	-	-	-	-	4%	4%	9%	82%
2014	-	-	-	-	5%	-	2%	9%	11%	73%
2015	-	-	-	-	3%	-	2%	10%	2%	83%

Table 1. Have you used any other external providers for business performance services?

Year	Yes	No	No Response
2009	32%	68%	-
2010	36%	62%	2%
2011	42%	58%	-
2012	52%	48%	-
2013	63%	37%	-
2014	46%	54%	-
2015	44%	56%	-



CLIENT COMMENTS

The NIST questionnaire provides a number of opportunities for Montana manufacturers to provide suggestions and comments to MMEC. These responses were edited slightly to preserve anonymity and grouped by topic. They are presented in Table 3 (page 11). These comments are overwhelmingly complimentary. Those about the professionalism and abilities of the MMEC staff verify the findings reported in the next section concerning the primary reason why clients chose MMEC. As in the past, respondents made several specific suggestions concerning ways in which MMEC may tailor its services in the future.

The NIST questionnaire provided eight reasons for choosing MMEC and the respondents were asked to identify the two most important (Table 4, page 12). About 85 percent of the respondents mentioned the expertise of MMEC as the most important reason, the highest figure by far.

Approximately 29 percent mentioned the MMEC's reputation for results. About 24 percent mentioned knowledge of the respondent's industry and roughly 20 percent mentioned MMEC's reputation for fair, unbiased advice and services. The least mentioned reasons were the lack of other providers

and the unavailability of services; the former mentioned by only 7 percent of the respondents and the latter by 10 percent.

The 2015 findings are similar to those for 2009 to 2014. The rank orderings of the reasons for choosing MMEC have remained relatively constant, with only a minor switch of second through fifth places from 2009 to 2014. Staff expertise has been solidly in first place all seven years. That figure rose to an all-time high of 85 percent of the respondents in 2015. There has been solid improvement in the score for knowledge of the client's industry, suggesting that MMEC personnel may be learning more about their clients.

Table 3. Comments from respondents.

Professionalism and Relevance
This is an ongoing support organization that I have used for over 15 years at four different companies to improve efficiencies and cut costs. Fabulous organization!
Don't ever go away! Your services are key to improving our business continually!
We always look forward to working with you to meet our goals.
MMEC has always provided prompt excellent service.
Keep up the good work!
We greatly appreciated the services provided by MMEC in 2015. It improved the value of our employees.
Keep up the good work!
I am 100 percent satisfied with the services that I received.
MME was great to work with. Being a small business owner, they were patient during busy times when I couldn't get them info right away.They provided quick simple solutions and great long term solutions to help our facility run smoother. Always got back to us in a timely manner and went above and beyond to help us through the process of laying things out.
Suggestions for MMEC
The survey was very drawn out.
Quarterly email.
Many of the survey questions are based assuming 12 months past the implementation of the services provided by MMEC. We are at the beginning of the implementation process and have no data to adequately answer most of these questions. I do hope there will be another opportunity to respond again once the recommendations are fully implemented. We anticipate the data to reflect a more positive outcome than at present.

Specific Applications
We are looking to move our operations to a larger facility and look forward to the consultation work you provide as we move and expand into the new space.
This year's new endeavor of starting a local "round table" group for business owners was very "meaty" and useful to me as a person, as well as for my business decisions.
Knowledgeable and Helpful Employees
They do a nice job. Keep up the good work.
All of the people that we have worked with at MMEC are outstanding. We are growing very fast right now and if we had the funds available to us we would have MMEC here on location full time. Dale Detrick was an outstanding help to the company.
We loved working with Mark and their initial idea was the most important piece of our puzzle. Thank you!
Todd Daniels was very helpful and went above and beyond to help us implement continuous improvement solutions.
Mark does excellent work.
Bill Nicholson was and is very helpful to us as a company and goes out of his way to make sure the client is well served by MMEC. He has been a great mentor and MMEC should use Mr. Nicholson as an example of who should be representing the best interests of your company.
They were excellent to work with and we appreciate their help with our project.
Other Comments
While we cannot relate to direct benefits to the services of the MMEC have helped our company to build a solid foundation.We are now in our third year and are experiencing double digit revenue growth.

Table 4. Important factors for your firm choosing MMEC.

Factor	Percent Mentioning							Order (2015)
	2009	2010	2011	2012	2013	2014	2015	
Staff Expertise	55	81	62	71	80	80	85	1
Reputation for Results	29	26	33	33	24	33	29	2
Knowledge of Your Industry	16	11	18	26	26	22	24	3
Fair and Unbiased Advice/Services	34	19	22	19	22	24	20	4
Cost/Price of Services	32	28	29	26	33	22	17	5
Specific Services Not Otherwise Available	16	6	7	12	4	7	10	6
Lack of Other Providers Nearby	7	9	7	2	9	4	7	7

Table 5. Important future challenges facing your business.

Challenge	Percent Mentioning							Order (2015)
	2009	2010	2011	2012	2013	2014	2015	
Ongoing Continuous Improvement/Cost Reduction Strategies	61	66	51	69	54	67	63	1
Product Innovation/Development	53	51	49	59	59	40	56	2
Employee Recruitment and Retention	29	30	20	33	41	38	46	3
Identifying Growth Opportunities	42	47	40	64	52	53	41	4
Managing Partners and Suppliers	11	15	25	10	17	11	24	5
Sustainability in Products and Processes	18	13	24	14	15	16	22	6
Financing	26	23	16	12	15	18	12	7
Exporting/Global Engagement	17	19	9	12	9	13	10	8
Technology Needs	16	8	4	10	15	20	7	9



FUTURE CHALLENGES

The NIST questionnaire provided two opportunities for respondents to identify future challenges they may face. The first opportunity instructed the respondent to pick three of nine categories of potential future challenges and the second was an open-ended question.

As shown in Table 5 (page 12), the most often mentioned future challenges were ongoing continuous improvement/cost reduction strategies (63 percent), product innovation and development (56 percent), and employee recruitment and retention (46 percent). The least mentioned were exporting/global engagement (10 percent) and technology needs (7 percent).

The changes in the challenges businesses face in a deep recession, followed by a sputtering recovery, may be identified by responses for the entire 2009-2014 period. Cost reductions, product innovation and identifying growth opportunities rank consistently among the top challenges during the entire period; indicating they are viewed as important throughout the business cycle. At the other end of the scale are several challenges that appear to increase or decrease over a business cycle. Personnel issues (employee recruitment and retention) has consistently climbed since 2009 and ranked number

3 in 2015. This increase may reflect the tightening labor market. Similarly, there were fewer respondents mentioning financing as a future challenge, perhaps because financial conditions have improved as the economic recovery strengthened. About 23-26 percent mentioned financing as a future challenge in 2009 and 2010, but this figure dropped to 12 percent in 2015.

The NIST questionnaire also provided an open-ended question that allowed each respondent to identify challenges not on the list. The two 2015 responses were “survival” and “growth.”

OUTCOMES OF MMEC VISITS AND SERVICES

Ten potential outcomes of the MMEC visit were listed on the NIST questionnaire and Montana manufacturers were asked which of those were experienced by their firm. The tabulations of outcomes are presented in Table 6 (page 15).

The most reported outcome was increased investment in workforce or employee skills (59 percent). Second place was a tie between increased investment in plant/equipment and retained lost jobs (both at 53 percent). At the other end of the scale, increased investment in information systems or software and avoiding unnecessary investments were mentioned by 39 and 28 percent of the respondents, respectively.

The seven years of survey data sheds light on the changing pattern of outcomes of MMEC visits. Almost all of the outcome categories have ranked high or low at one time or another during the period. A listing of the years in which each ranked first through fourth follows.



Table 6. Outcomes of MMEC visits and services.

Outcome	Percent Mentioning							Order (2015)
	2009	2010	2011	2012	2013	2014	2015	
Increased investment in workforce or employee skills	50	66	67	65	63	42	59	1
Retained otherwise lost jobs	50	53	60	55	63	56	53	2
Increased investment in plant/equipment	53	57	57	60	58	44	53	3
Cost savings realized	68	70	64	57	70	42	51	4
Increased investments in other areas	34	45	48	43	42	24	46	5
Created new jobs	34	51	52	42	58	42	41	6
Increased sales	42	47	48	60	60	38	41	7
Retained otherwise lost sales	40	51	38	40	53	44	39	8
Increased investments in information systems or software	42	28	36	29	43	38	39	9
Avoided unnecessary investments	29	51	48	40	39	24	28	10

Table 7. Top outcome categories of MMEC visits and services.

Category	Rank #1	Ranked #2	Ranked #3	Ranked #4
Workforce Investment	2015	2013	-	-
Retained Lost Jobs	2014	2015	2012	-
Plant/equip. Investment	-	2014	2015	-
Cost Savings	-	2009	2010	-
Other Investments	2011	-	2013, 2009	-
New Jobs	-	-	2012	-
Increased Sales	-	-	-	2013
Retained Lost Sales	2012	2014	-	-
Info Systems Investment	-	-	2013	-
Avoided Investments.	2009, 2010, 2013	2011	-	-

In terms of numbers of times ranked in the top four, avoiding unnecessary investments was first followed by increased investments in other areas. All of the categories ranked in the top four during at least one year of this seven year period.

QUANTITATIVE ESTIMATES OF MMEC VISIT OUTCOMES

The NIST survey asked Montana manufacturers to quantify certain outcomes of the MMEC visit. They were asked the number of new and retained jobs, the amounts of cost savings, new and retained sales, capital and workforce investments and avoided unnecessary investments. Starting in 2009, the respondents were queried regarding four detailed investment categories.

The 2015 respondents said there were 388 new or retained jobs as a result of the MMEC visit. New and retained sales were about \$71.9 million. Cost savings totaled approximately \$5.0 million, and capital and workforce investments were roughly \$21.4 million. Avoided unnecessary investment totaled \$796,000.

There are seven years of consistent data in Table 8 (page 17) that could potentially reveal trends and/or cyclic patterns. Unfortunately, extreme year-to-year volatility in the outcome categories masks trends and other patterns. For example, the number of new and retained jobs dropped from 880 in 2011 to 440 in 2012 and then rebounded to 660 in 2013.

An examination of the responses revealed a number of cases where value of the estimated outcomes were dominated by a few (mostly one, but at most two very large) responses. These few responses

can skew time series analysis and obscure long-run trends. Consequently, there are two entries for each category starting in 2010. The first includes all responses as reported and the second excludes the distorting entries.

Unfortunately, the edited values are almost as volatile as the original. For example, the edited figures for new and retained jobs still bounce from 248 in 2013 to 168 in 2014 and then to 230 in 2015.

The one pattern that is present in all the categories are sizable increases from recession lows and then stabilization within a range during the post-recession years. For example, the value for new and retained sales was \$8.9 million in the recession year 2009, but never dropped below \$25 million in the following years.

The lower portion of Table 8 (page 17) presents detailed data for subcategories of capital and workforce investments. The reported and edited values for these four detailed categories display the same volatility as the major categories in the upper portion of the table. But once again, all show significant increases from the recession lows in 2009, but then alternating increases and decreases within a range.

ECONOMIC IMPACTS OF MMEC VISITS AND SERVICES

MMEC clients were queried about the number of new jobs created and the number of jobs retained as a result of their visit. The 2015 respondents said that there were 67 new jobs created and 321 jobs retained for a total of 388 jobs.

Table 8. The 2010-2015 ranges for edited values of the quantitative outcomes in each category.

Category	Range
New and retained jobs	160 - 290
New and retained sales	\$25 - \$37 million
Cost savings	\$1.3 - \$3.5 million
Capital and workforce investments	\$6 - \$19 million
- Investment in plant/equipment	\$0.8 - \$14.2 million
- Investment in information systems or software	\$190,000 - \$750,000
- Investment in workforce practices or employee skills	\$175,000 - \$700,000
- Other investments	\$2.9 - \$7.0 million
Avoided unnecessary investments	\$.15 - \$1.9 million

The preliminary data suggest that average wages for Montana manufacturing jobs were about \$47,300 in 2015. Total wages associated with the new and retained jobs were approximately \$18,352,400 ($388 \times \$47,300 = \$18,352,400$). Using an average tax rate of 4.0 percent, the new and retained workers paid approximately \$734,100 ($\$18,352,400 \times .04 = \$734,096$) in Montana Individual Income Taxes.

The Montana Department of Labor and Industry estimates that the employment multiplier of manufacturing is 3.58. This is interpreted as 2.58 new jobs created in other sectors as a result of one new manufacturing job. This agency also reports that the wage multiplier is 2.72, which suggests that an additional \$1.72 in wages is created elsewhere in the Montana economy for every \$1.00 in new manufacturing wages.

Calculations based on the employment and wage multipliers are reported in Table 9 (page 18). The 388 new and retained jobs associated with MMEC visits in 2015 led to a total of 1,389 ($388 \times 3.58 = 1,389.0$) new jobs in Montana and approximately \$49,918,500 ($\$18,352,400 \times 2.72 = \$49,918,528$) in statewide wages. These additional wages generated roughly \$1,996,700 ($\$49,918,500 \times .04 = \$1,996,740$) in Montana Individual Income Tax revenue.

RETURN ON INVESTMENT

The State of Montana provided approximately \$250,000 per year to support MMEC during this survey period.

As shown in Table 9 (below), MMEC projects during 2015 generated approximately \$1,996,700 in Montana Individual Income taxes from both direct and indirect jobs. Based on the \$250,000 calendar year funding for MMEC, Montana's return on investment during 2015 was approximately 8.0 to 1 ($\$1,996,700 / \$250,000 = 7.99$). Therefore, the public dollars invested in MMEC provide Montanans an excellent rate of return.

Table 9. Economic impacts of MMEC services in 2015.

Sector	Jobs	Wages	Montana Individual Income Taxes
Manufacturing	388	\$18,352,000	\$734,000
Other Industries	1,001	\$31,566,500	\$1,262,700
TOTAL	1,389	\$49,918,500	\$1,996,700



