Planning the Foundation for Development of Skilled Workforce for Advanced Manufacturing

OSU CARES GRANT
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REPORT

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Study conducted by:

Michael L. McVey
President, ClearView Management Resources

Cell:614.282.7105
E: Michael.McVey@talegence.com

Abstract

The catalyst behind this project is the shortage of semi-skilled to high-skilled workers for industrial robotics and advanced manufacturing operations, initially in Crawford, Hardin, Marion and Wyandot Counties.

According to a 2010 study by Georgetown University's Center on Education and the Workforce, new jobs in Ohio requiring postsecondary education and training will grow by 153,000 between 2008 and 2018 while jobs for high school graduates and dropouts will only increase by 29,000. The report predicts that Ohio will create 1.7 million job vacancies both from new jobs and from job openings due to retirement, and 57% of all jobs in Ohio (3.3 million jobs) will require some postsecondary training beyond high school in 2018. The Dayton Daily News reported in March 2012 that "job growth in the robotics industry is up sharply after a record year that saw $1.17 billion in North American robot sales, but the number of people with robotics skills is falling short of demand."

To solve the skills-gap issue in this four-county region, communities and educational institutions must understand the competencies that businesses are seeking. This grant funded research to identify specific skills required in advanced manufacturing to input into a shared database. The grant also provided the foundation for an alliance of employers, educational institutions, economic development organizations, and other vested stakeholders.

Impact

Connect businesses with qualified workers by:

- Identifying skills and training in Advanced Manufacturing
- Partnering with economic development to enhance business retention/expansion efforts
- Linking students with employers for experiential learning.

Align education with employer needs/strategies by:

- Developing alliance in priority industries in each of four counties
- Sharing results of skills analyses with educational partners
- Initiating development of career pathways.

Table of Contents

Note: Below is a complete list of Attachments, which are part of the original report. However, only **ten** are included in this report (found behind the *alphabetic* tabs).

Tab	Attachment Title
A.	Grant Document: The "Planning the Foundation for…
B.	Questionnaire Results
C.	Project Partners
D.	More High Schools Teach Manufacturing Skills
E.	How Prepared Are Students for the Workforce Report
F.	Four Goals Emerge from Board Retreat
G.	**Advanced Manufacturing-Industrial Competency Model**
H.	**Talent Architecture**
I.	Job Skills Comparison Report
J.	**The US Manufacturing & Industrial Sector: Economic…**
K.	Fulfilling the Skilled & Highly Skilled Talent Needs of MFG
L.	**Talent Pipeline to Talent Pools**
M.	Let's Make a Workforce Plan
N.	An Email Regarding the Interest of Young Women…
O.	**Talent Pipeline to Internal Talent Development**
P.	STEM Learning in Afterschool: An Analysis of Impact…
Q.	**Further Analysis of the Alignment or Misalignment…**
R.	Learning/Talent Development Systems (At a Glance)
S.	From Military Front Lines to Manufacturing Front Lines
T.	Developing Skilled Workers (Manufacturing Institute)
U.	**Engaging the Five Communities of Interest**
V.	**The Alliance Talent Information Hub (a web based…)**
W.	**Draft Plan for Alliance Website**
X.	**The Alliance - *Organization***
Y.	Next Steps
Z.	Articles & White Papers Used in Research

Introduction

The Manufacturing-Industrial (M-I) sector of the US has a "talent situation;" one that is impacted by many others in the *community* and one that impacts the entire community. The "talent situation" is that ***M-I's need for Skilled & Highly Skilled (S&HS) Talent exceeds the availability of S&HS Talent*** (and this talent is not easy to develop). This gap is not shrinking; it is anticipated to grow for the next 5 to 6 years. In the four-county region the grant team researched, less than 2% of the M-I firms reported that they would have 600 S&HS jobs to fill in the next six years; ***100 S&HS jobs/year for less than 2% of the organizations.***

Why?

There are a multitude of factors impacting the "relative" shortage of S&HS Talents for M-I sector such as:

- Large number of Baby Boomers retiring in S&HS jobs
- Use of high-tech tools increases every year
- Competition is up for S&HS Talent; more high-tech tools everywhere (e.g. Health Care & Bio Tech)
- Interest in M-I jobs/careers is relatively low: past layoffs, low pay, unsafe, unclean and uncomfortable working conditions are still in the minds of many
- Education has not caught up with the demands to develop S&HS Talents; many great initiatives, but...
- Collaboration is lacking among the M-I, Education and Government communities for an integrated Talent Development Architecture to make maximum use of all resources
- Many M-I firms lack resources and the talents for effective (outcomes v. costs) workforce development

What is the impact on the M-I sector?

What would happen if the M-I revenues and spending would drop?

- The resurgence or re-shoring of M-I in the US will stop and possibly reverse; orders will drop, plants layoff, plants close; and M-I work will move overseas...so what?
- In spite of the reputation of the M-I sector in the US, it contributes 12 % of the US GDP and for every $1 spent in M-I another $1.37 is added to the economy; the M-I sector impacts 28.5 % of the US economy. The M-I sector employs 9 % of the workers in the US and M-I operations and employment results in the employment of another 13+ %; the M-I sector impacts 22 % of the jobs in the US, almost 1 out of every 4 jobs.
- In Crawford County, M-I sector accounts for ***64% of all job earnings***. In Wyandot County, M-I sector ***impacts over 53% of the economy***.

What are the solutions to the "talent situation"?

Once the Why analysis (above) has been completed, a Who analysis needs to be conducted. The grant team identified a "Five Communities of Interest" (5CoI) model, which include 26 sub-communities to play roles in the solutions.

Based on the M-I makeup of the region -- 84% of the M-I operations are small (<50 employees), 12% are medium (50 - 250), and 5% are large (>250) -- the strategy to integrate the engagement of the 5 CoIs is to create an alliance organization to coordinate solution activities or to conduct concerted solution activities. The alliance would leverage the resources of many and create the perception of a larger organization to job candidates and resources outside of the community, thus get more attention and assistance.

Some other solutions proposed include:

- "Blended" Talent Development Architecture that integrates the expertise from the Education, M-I training, and JFS Workforce Development Communities and uses resources that have been identified (in main report)
- Plans and methodologies to increase interest in M-I jobs/careers in students and parents, educators, military technicians
- Region Talent Certification System
- NAM Approval/Validation of The Alliance Certifications
- Attract "The Talent" into S&HS M-I Jobs and Careers
- Create Methodologies with multiple channels to gather more data
- Educate the Five Communities of Interest
- The Alliance Website
- The Alliance Talent Information Hub (a web-based Talent Tool)

Executive Briefing

The Virtual Alliance for Advanced Manufacturing
The Manufacturing-Industrial Virtual Alliance for Talent Growth
The Skilled Talent Pipeline for Advanced Manufacturing

This report on and recommendations for an Alliance is the outcome of questionnaires, interviews and other discoveries conducted under the Alber Enterprise Center of The Ohio State University via the project titled "**Planning the Foundation for Development of Skilled Workforce for Advanced Manufacturing**," which is an OSU CARES Seed Grant Project (see **Attachment A - Grant Document** and **Attachment B - Questionnaire Results**).

The questionnaires and interviews were conducted with ten manufacturing firms, with two education organizations, and with four Business/Economic Development Coordinators in the four-county region of Crawford, Hardin, Marion and Wyandot (See **Attachment C - Project Partners**). In addition, the discoveries included interviews with others in these industries and consultants to these industries outside of these counties and the gathering of data from a myriad of reports from organizations such as the National Manufacturing Association, the Ohio Manufacturing Association, ACT, SHRM, Bersin-Deloitte, Deloitte, Towers Watson, BlessingWhite, Georgetown University, McGraw Hill, Boston Consulting Group, Ohio Department of Education, Ohio Department of Job & Family Services, Bureau of Labor Statistics, Proactive Technologies, and the Manufacturing Institute.

The Situation

A. Demand is Up for Skilled & Highly Skilled Talents

The Manufacturing-Industrial (M-I) business sector's demand for Skilled & Highly Skilled (S&HS) Talents is on the rise, particularly between now and 2021. *In the four-county region in which we conducted the questionnaire, 8 out of 500 M-I organizations forecasted 600 S&HS job vacancies in the next 6 years; that's 100 S&HS Talents Jobs needed per year in less than 2 % of the organizations.* See **Attachment B - Questionnaire Results**.

Primary factors which influence this are:

- More *Baby Boomers*, who make up a large percentage of the S&HS workforce, are retiring; ***more vacancies of Skilled & Highly Skilled (S&HS) jobs***

- Production processes and equipment are increasing in technology levels to meet production numbers, achieve the high level of quality demanded today, and to control production costs; ***more Skilled & Highly Skilled (S&HS) jobs...more vacancies***
- Due to a variety of reasons, there appears to be a resurgence (or the "reshoring" of MFG) of the Manufacturing-Industrial (M-I) sector in the US, and Ohio is the #5 state in the US in the M-I industry; thus, ***more Skilled & Highly Skilled (S&HS) jobs...more vacancies***

B. Relative Supply is Down

S&HS talent supply for the M-I sector is down. Primary factors which play a role in this are:

- **The Competition for S&HS Talents**: The competition is high and increasing. The primary competitors with M-I industry include the Health Care & Biotech, Education & Talent Development, Government & Military, and the Information Technology sectors. Coincidentally, the Baby Boomers retiring from the M-I industry, which is one of the primary factors driving demand, is also one of the reasons that the Health Care & Biotech industry competition is increasing.
- **Learning/Talent Development System Issues**: In spite of a number of movements (e.g. STEM and STEAM) in making the science and mathematics curriculum more aligned with the S&HS needs of many industries (see "The Competition for S&HS Talents" above) and the increased focus on tying curriculum to manufacturing situations, case studies or skills usage in some geographic regions (e.g. West Virginia - see **Attachment D - More High Schools Teach Manufacturing Skills,** Texas and North Carolina), the Education & Talent Development industry is not fully aligned (e.g. **curriculum, timing and resources**) with the S&HS talent needs. Therefore, the talents coming out of the Education system are not meeting the talent requirements (both in numbers and in subject matter/talents) in the workplace or for further talent development. See **Attachment E - How Prepared Are Students for the Workforce Report** and **Attachment F - Four Goals Emerge from Board Retreat**.

  This alignment can begin in the 4-6 grade years; see Levels A and B of **Attachment G - Advanced Manufacturing-Industrial Competency Model**, which was created after reviewing thousands of pages of job talent data we gathered. (NOTE: This model is critical in developing a Community Multi-Phased/Multi-Partner Talent Education & Development System. It is the organization foundation.) Elements of A. Core Work Styles/Traits and B. KSC's-Level 1 begin to be developed in these years. These are further developed in grades 7-8, 9-10 and 11-12/Career/Tech schools. Finally, elements of ***C.*** KSC's-Level 2 can be developed in 11-12/Career/Tech schools. However, Educators and subsequently their curriculum delivery need alignment.

  Finally, M-I organizations are not committing the resources necessary for the functions of Talent Architecture/Competency Management, Internal Talent Development, or Succession Management. **Attachment H - Talent Architecture** illustrates three levels of Talent Architecture that can be used to

articulate the talents needed to perform a job and to achieve a certification. They are also used to identify the talents that the workforce possesses, which is used to identify *who* is qualified to perform *which* jobs.

Talent Architecture/Competency Management is critical to Talent Development. In **Attachment I - Job Skills Comparison Report** (Proactive Technologies), Dean Prigelmeier, President, addresses the importance of this to Talent Development when he states,

"When defining the components of an effective core development program, a detailed job/task analysis provides a wealth of data to zero in on those entry-level core skills that are important to job training success. The Job Description Report alone provides the overall tasks a successful employee will need to master as well as the pre-requisite core skills, abilities and other requirements.
If solid, content-valid job data is available for designing effective core skill development programs that meet specifically an employer's job requirements, having that level of job data for many local or regional employers can facilitate strong workforce development strategies for those employers."

- **Insufficient Interest in Jobs/Careers in the M-I Industry**: There is a gap in the S&HS Talent's (people) interest in jobs/careers in the M-I industry; attracting the S&HS talents is a major challenge and it begins with PreK-12 youth. Perceptions and reputations of the M-I industry still include that it is dirtier, less safe, lower wages, less challenging, and less stable (layoffs and shutdowns) than the other industries that are competing for the S&HS talent. Based on multiple studies and data (e.g. Bureau of Labor Statistics), these perceptions are no longer true. M-I today is significantly different than the M-I world of your parents and grandparents; see **Attachment J - The US Manufacturing & Industrial Sector: Economic, Education & Employment Impact *at a Glance***.

  One note of interest about the M-I industry compared to other industry jobs is, "The average tenure (job security) in this sector is 5.9 years (2014), which is higher than the following sectors: Agriculture (4.1), Construction (3.9), Wholesale and Retail (3.6), Transportation & Utilities (5.1), Information (4.8), Financial (5.0), and Education and Health Care (4.5)"

  Interest being down can have at least two primary impact on supply of S&HS Talents: 1) if one is not interested in the industry, they are less likely to take the courses or to work as hard at the courses to obtain the skills; and 2) if one is not interested in the industry and has the S&HS Talents, they are going into a competing industry...***supply for M-I is down***.

- **Unrecognized, Unknown and Unrealized S&HS Talent**: Most organizations have workforce with S&HS talents and/or with high learning capabilities within their "four walls" that they are not paying attention to
  - They don't track all the talents new employees bring to the table; frequently they only pay attention to the talents they have for the job for which they are being hired now
  - They don't track talent growth, formal or informal, which means they don't know that that they have developed some S&HS talents; and they don't see growth rate which is one *learning capability* indicator
  - They don't maintain any of this info in a data base that would facilitate talent searches
  - They don't align workers with talent requirements of future jobs or the self-directed learning tools to pursue those talents on their own (with an SME, Mentor or Coach)

Organizations have already hired from the supply (the talent pools) but are not maximizing use of the supply; the internal talent pool is stagnating...***supply for M-I is down***.

So, demand for S&HS talents is up for the M-I industry and the supply or availability is down; not a good match. According to a report done by Deloitte and The Manufacturing Institute, "There's no way around it: respondents report, on median, that 5% of their jobs remain unfilled simply because they can't find people with the right skills.

> ***"Translated to raw numbers, this means that as many as 600,000 jobs (skilled production and production support) are going unfilled..."***

C. Collateral Issues

- **M-I Industry focus on and/or prioritization of Talent Management** (e.g. Job Descriptions, Talent Development, and Succession Planning):
  There are approximately 500 M-I firms in the four-county region; they all have different levels of Talent Management (TM) Resources (see "D. Overview" below; often performed by the HR positions) and have different levels of Commitment to the functions of Talent Management. This level of managing the workforce, TM, while it has been around in various forms under other labels or titles for ten plus years, is a relatively new arena for many organizations in the M-I industry; it's definitely a "systems thinking" approach to talent.

  We found through our questionnaires and interviews with M-I firms that even some of the large firms are not proficient with TM processes and with the tracking of TM data. In addition, at times we found

situations where "the right-hand didn't know what the left-hand was doing" and at times "the efforts of the right-hand conflicted with the efforts of the left-hand."

- **Data**
  - **Additional Data to be Gathered and Maintenance of Data**:
    - M-I Industry: Data was gathered from ten manufacturing firms out of a possible 500. Additional firms need to be tapped to see a clearer picture of the situation. In addition, a methodology should be established to maintain this data in a continually updated fashion.
    - Education Community: Data was captured from two Career Centers relative to a single curriculum subject, Robotics. Additional studies in Career centers need to be tapped for information as well. Finally, the PreK-12 segment of the Education Community needs to be explored to find what is being done relative to increasing the interest in S&HS Talent development and what is being done to align this development with M-I S&HS Talent needs.
    - Government: There are primarily two organizations that need to be explored further; ODE and Job and Family Services (both State and Counties).
  - **Availability/Ease of Access to Job Data**: The data we solicited from the M-I industry through our questionnaire/questionnaire and interviews was not easily accessible for most of the organizations; many answers were educated guesses. This is not unusual. In the last five years I have met with dozens of organizations about Talent Management data bases and the accuracy of Most M-I firms don't have a data base software (e.g. a Talent Management software) in place that sets the Talent Architecture (articulates and organizes all talents; knowledge, skills, tasks, education, certifications...), maintains a talents' listing, maintains Job Profiles/Descriptions, maintains People Profiles/Resumes (current employees plus potential employees), and maintains all of this data in a fashion that is easily searchable and easily organized for analytics and reporting
  - **Level of Details of Data**: Job Profile/Description Talent data is maintained at significantly different detail levels going from one M-I firm to another. This makes alignment of the Education system, Students, Parents, various government agencies, etc. difficult.
  - **Job Performance Aids or Job Tools Data**: Not only are the details of the talent requirements important to talent development, but identifying and tracking the Job Performance Aids or Job Tools (in addition to equipment, other tools such as check lists, policies, procedures, technical manuals, instructions, and forms used in M-I production processes) are important and should be included as part of the Job Profile/Description and integrated into training. This also facilitates creating Job Tools SME's (Subject Matter Experts) to conduct problem solving in the event something goes wrong, keep them up to date, and educate others on them. Some of these tools may also be provided to the Talent Development: Education & Training community to integrate into curriculum or to illustrate how different subject matters are used in M-I work such as mathematics, writing and reading, and sciences.

- **Jargon/Language Used**
  - There isn't a common language among M-I firms which identifies Jobs and Talents, which is needed when aligning the Talent Development: Education & Training community with the talents that need to be developed
  - When people apply for jobs, they frequently don't use the same language for talents as do the M-I firms
- **Demands on the Education Community**: The Education Community is continuously bombarded with changing expectations (e.g. Common Core; recent change with which schools are making efforts to comply) and by different expectations expressed by numerous entities such as Parents, Government (e.g. ODE), the Business Community, School Boards, General Community (e.g. relative to spending, which impacts taxes) and Non-Profit Cause oriented organizations. Thus, they are "careful" about making changes to curriculum. Therefore, creating a concerted, positive relationship; providing substantial data; substantial communications with Administration, Educators and Counselors; and then some...will be required to most effectively influence change.

> *Furthermore (and this is a colossal "furthermore"), the Education Community and the M-I sector should realize that the development of S&HS talents is not just a M-I industry opportunity. Georgetown University's Center on Education and the Workforce identified that 35% of the total US workforce requires S&HS talents; that equates to approximately 47,000,000 jobs (three (3) for every M-I sector job!) In addition, they found that another 10% of the workforce requires advanced degrees (masters and PhD's), which frequently requires the same foundation skills (e.g. math, science, reading and writing, critical/analytical thinking, computer, and problem solving...see levels A, B and some of C on* ***Attachment G - Advanced Manufacturing-Industrial Competency Model****) as the S&HS Jobs, which means that* ***developing S&HS Talents impacts 60 million jobs!*** *Technology*

- **Five Communities of Interest**: A thorough examination of the findings listed in A, B, C and D of the Situation leads to the fact that this situation involves numerous factors which are influenced by a number of different types of entities in the region. We have identified and labeled these as the Five Communities of Interest; see **Attachment K - Fulfilling the Skilled & Highly Skilled Talent Needs of the Manufacturing/Industrial Community; An Integrated Opportunity** and explore the Who (they are), Roles (they play), and Benefits (each one will realize) of the Five Communities of Interest. The most effective, sustaining solutions will be ones that will engage and integrate all Five Communities of Interest in a concerted effort.

D. Overview

This situation is primarily a **Talent Management** (TM) issue; Talent Management (TM) includes the following eight integrated functions:

- Competency Management (Talent Architecture/Articulating Talents, Job Profiles/Descriptions, and People Profiles/Resumes)
- Talent Acquisition (Sourcing, Attracting, and Selecting)
- On-Boarding
- Talent Development
- Workforce Planning
- Employee Engagement
- Performance Management
- Succession Management

The primary issues as described in the Situation above are elements of the four functions of Competency Management, Talent Acquisition, Talent Development and Succession Management. Two of these begin way before the Talent Pools are filled; way before M-I firms begin the Talent Acquisition processes. They begin in the home, in the community and in the education process.

See **Attachment L - Talent Pipeline to Talent Pools**. The first of two pages illustrates the talent development process outside of employment; it does include the Military. The second page includes an illustration that also reflects "Influencing Interest in Manufacturing & Industrial Jobs."

Note: The other four functions of TM -- On-boarding, Workforce Planning, Employee Engagement, and Performance Management, -- can dramatically impact the rate or hourly level of production of the workforce and increase tenure, which can impact the Talent Acquisition needs (number of people to hire).

Increasing Employee Engagement alone can have a dramatic input; questionnaires conducted by BlessingWhite consulting firm and Towers Watson indicate that Fully Engaged employees (19% of Workforce) are 24% more productive than Partially Engage employees (52% of Workforce); *in 4 days they achieve what it takes the Partially Engaged employees 5 days*. Workforce Planning can facilitate could facilitate reorganizing S&HS workers time and duties in a manner that results in more hours of S&HS work outcomes. See **Attachment M - Let's Make a Workforce Plan (Talent Management Magazine)**.

Impact/"So What" Statements

If the S&HS talent requirements are not met, this may mean that future production requests of the region's M-I industry will be shifted to other M-I locations (in Ohio, the US and other countries), which would reduce employment in the region; could actually result in firms moving entire M-I plant operations to other locations. And, the economic impact would not stop there.

Reduced M-I employment has a domino effect; housing/Real Estate, groceries and other retail establishments, the education systems, construction, etc. would all be impacted; lost revenue, lost jobs, shutdowns, etc. Additionally, tax income generated from businesses, individual income, property, and sales would all decrease as the demand for some government services will go up due to results such as increased unemployment; less dollars for more product (e.g. JFS's).

Finally, these types of situations have occurred before and have resulted in regions getting negative reputations. Some have even been given labels which have been hard to overcome such as the *Rust Belt* and have resulted in years of poorer economy in these areas. Pittsburgh recovered more quickly than Cleveland, but 100's of millions of dollars were invested by private organizations in addition to government support.

See **Attachment J - The US Manufacturing & Industrial Sector: Economic, Education & Employment Impact *at a Glance*** to have a greater comprehension of magnitude of impact that the M-I Industry has on the livelihoods of US citizens; on the US economy.

Purposes of The Alliance...Why an Alliance?

A. Primary Purposes

1. **Leverage the Resources of *The Many*** organizations (very small to large) and individuals in the Five Communities of Interest (5CoI's) for the common purposes associated with increasing the S&HS Talent Pool in the Region for the M-I industry. Coordinate the efforts of many. At times, become the voice of many; *carry more weight*. This helps all M-I firms, particularly the smaller ones who have extremely limited resources to commit to this Situation.

   Furthermore, this partnering of many facilitates the **painting of a bigger "job opportunities picture."** For example: it can present 300 job opportunities in one location as opposed to having to go to 300 locations for the same opportunity level. This makes it an easier journey for qualified talent, which means more will visit; more will apply.

2. Create a ***S&HS Talent Development Triumvirate System*** (communities of M-I, Education & Development, and Government (e.g. ODE and JFS's)) to develop more S&HS Talent that's aligned with M-I needs; *increase the S&HS Talent Pool.*

   This requires efforts in the following areas:

   - Increase the interest of students, youth and adults, and the youth's parents in jobs/careers in the M-I industry. And, this effort may have the greatest ROI on the future development of S&HS Talents for the M-I industry.

     Note: Increasing the interest of students and their parents (and the educators as addressed above) in the M-I industry (the products that are created, the jobs and careers that are available, the talent growth potential that exists, etc.) may be a rather complex and long process, especially since it may require overcoming some perceptions/resistances. This will require well laid out strategies, different for each audience, conducted through a variety of channels, over a period of time. It will require a thorough understanding of the audiences and what drives them at different ages.

     For Example: During some conversations with different people, multiple times the concept that young women need to have an interest created in Math and Sciences before the end of middle school or the likelihood of developing that interest and not losing it would diminish greatly. I explored this more including connecting with Laura Grindle, Executive Director of See Kids Dream (which includes a curriculum for elementary school students) and a Curriculum Development Specialist. She provided me with the results of her brief discoveries (because of my inquiry) in an email, **Attachment N - An Email Regarding the Interest of Young Women in Math & Science**. Basically, her findings recommend that more discoveries be done to determine more facts about young women's interest in Math and Science. Similar discoveries need to be done regarding the interests of young men.

   - Increase Educators interest: 1) in the M-I industry: in what M-I organizations produce, in production processes, in M-I's role in the community, etc.; 2) in aligning some curriculum to M-I needs; and 3) to helping to increase students interest in M-I industry.
   - Enhance the M-I Communities performance of Job Task Analysis to provide a more thorough and accurate picture of the S&HS needs; may influence some changes in **Attachment G - Advanced Manufacturing-Industrial Competency Model.** Dean, President of Proactive Technologies, discusses Job Task Analysis in Section 2. Methodology in his report **Attachment I - Job Skills Comparison Report**.

- Enhance the Talent Pipeline to Internal Talent Development Model for increased understanding and buy-in by both the M-I Community and the Education Community ("Internal" and "External" Talent Development functions). **Attachment O - Talent Pipeline to Internal Talent Development**
- Align the PreK-12 curriculum (e.g. math, science, reading, writing, and problem solving) with levels A, B and C of **Attachment G - Advanced Manufacturing-Industrial Competency Model**
- Align Career Centers, Community Colleges, four-year degree programs (colleges and universities) even more with various Competencies of levels A-F of **Attachment G - Advanced Manufacturing-Industrial Competency Model**
- Evaluate the numerous Math and Science aligned programs that exist such as STEM, PLTW, and STEAM including exploring existing programs in schools for success and if they should be expanded, how to do so. The engagement can be in the classroom of Math and Science curriculum and in after school programs/projects. See **Attachment P - STEM Learning in Afterschool: An Analysis of Impact and Outcomes**.

  Note: There are numerous *Beacons of Light relative to S&HS talent development in the Education System in Ohio, some industry specific and some not. One funding source which has supported these efforts is the "Straight A Fund," which has provided millions of dollars for education initiatives including S&HS talent development. One of these is RAMTEC at Tri-Rivers Career Center (grades 11-12 and Adult Education) in Marion, Ohio, which serves nine (9) school districts. RAMTEC, Robotics & Advanced Manufacturing Technology Education Collaborative, works with manufacturers of Robotics equipment (e.g. FANUC, Motoman, and Lincoln Robotic Welding) and support systems, such as Parker Hydraulics, that are used in M-I production processes. It has performed so well that the State of Ohio granted ("Straight A Fund") $15 M to implement RAMTEC in 8 other Career Centers across the State of Ohio.*

  There are numerous other S&HS Talent Development initiatives at all levels of the Education Community, some specifically for the M-I sector, some for other industries such as Health Care, and some generic to all technology industries. To make adjustments to curriculum and the tools used by Educators and Instructors and to keep up with technology changes is a monumental undertaking that even if the Education agrees to it will take years of adjustment. See **Attachment Q - Further Analysis of the Alignment or Misalignment Between the Manufacturing-Industrial Sector Needs and the Talents Developed by the Education Community**.

> *Manufacturers need to ask now, "What else can we do to close the gap between the increasing level of S&HS talents needed for production and the level of S&HS talents being developed? Can we, should we wait for Education to fully align themselves with what we need and do what they should do to develop the talents; especially for the "pre-requisite core skills, abilities and other requirements" (See **Attachment I - Job Skills Comparison Report**). Or with all that the Education Community is doing, should we do a better job of aligning what we do in Workforce Development with what they are teaching and be more effective with our curriculum and work together to improve both roles?"*

- Enhance the Talent Development functions in M-I organizations; increase their effectiveness. Read Sections 1, 2, and 5 of **Attachment I - Job Skills Comparison Report** and see **Attachment R - Learning/Talent Development Systems (At a Glance).** Create apprenticeship programs.
- Make the Job Descriptions and Certifications and associated Learning Systems available to the Workforce (facilitating self-taught or self-directed) so that they can align themselves with the organization's talent needs and pursue talent development on their own accord, working with SME's, Mentors & Coaches.

3. Move to a **Region Talent Certification System** that includes full certifications and sub-certifications; on talents from Team Leader, Discoveries Specialist and Mentor certifications to Project Management Professional, ASQ Quality Certification, Robotics, Manufacturing Skills, and Certified Robotic Arc Welder.

   Centralized Certification systems have achieved results such as the following:

   a. Align education pathways with M-I industry
   b. Validate talent capabilities of students/potential workers and current workers
   c. Help to achieve the goal of a centralized talent language; talent terminology recognized by all, which again facilitates alignment amongst all Five Communities of Interest
   d. Drive students and workers to achievement. Frequently certifications take less time to achieve than degrees and diplomas and they can even be designed as "stepping stones" for major certifications. Navy Nuc's had a variety of certifications and the sailors drove to achieve them on their own; they became "badges of honor." They would use certification manuals and pursue them working with SME's (Subject Matter Experts), Coaches and Mentors; sort of a structured informal learning system. Less classroom time and less cost.

Certification processes also frequently give the participants a better feel for what the job/work will be like. Thus, once they get there, they stay. According to The Manufacturing Institute, "turnover is 50 % lower for certified workers."

4. Pursue **NAM Approval/Validation of The Alliance Created Certifications**: Increases credibility and facilitates workforce being global.
5. **Attract "The Talent" into S&HS M-I Jobs and Careers**; increase the interest of Military Technicians and other "qualified" S&HS youth and adults in M-I Jobs and Careers in the Region; Attract Military Technicians: Military Technicians have been tested for compatibility with S&HS subject matter, successfully completed S&HS training, and successfully performed in a S&HS arena; they are "proven." In addition, they are proven to be 4% more productive and have a 3% lower turnover rate. They have a greater sense of safety awareness and are more disciplined, accountable, reliable and often better team players.

   a. Need to work with Military Associations such as NGAUS, NCOA and NDIA; use social media sites such as Military Groups on LinkedIn, and Military search firms such as RecruitMilitary in Cincinnati, OH. (See **Attachment S - From Military Frontlines to Manufacturing Front Lines: Veterans and Your Workforce**). Finally, work with proven Military hiring programs such as those under ODJFS and Ohio Means Jobs, which frequently offer "rewards" for hiring Vets.
   b. Through regional M-I marketing systems such as an Alliance Website and the creation of Regional M-I messages/branding, attract "qualified" S&HS Talent to the M-I sector; people with more S&HS Talents and with greater capacities for learning additional S&HS Talents.

6. **Develop methodologies with multiple channels to gather more data** on jobs, on jobs talent, and on talent development systems and to establish a periodic updating of data.

   Data is compelling; more data is even more compelling to more people. Data drives decision making; data gives a cause impetus; and data is used to more accurately identify sources, causes and sizes of issues and successes. Without data, you're just making noise. Without accurate and objective data, sometimes the issue is not as big as you thought and sometimes it's bigger than you think. We're proposing an Alliance that integrates Five Communities of Interest; more data is needed on a continually updated basis.
7. **Educate the Five Communities of Interest (5CoI's)** about: *Global Solutions* to achieve Alliance goals; Solutions that have been implemented in other regions; new findings/studies that relate to this Situation (See **Attachment T - Developing Skilled Workers (Manufacturing Institute)**); and best practices for functions such as: Attracting Talent, Hiring Systems; Developing Talent (See **Attachment I - Job Skills Comparison Report** and **Attachment R - Learning/Talent**

Development Systems (At a Glance)), and Employee Engagement. Furthermore, maintain an Inventory of Global Solutions (initiatives, proven processes and tools, studies, actions, "best" practices, innovations...) "with supporting data" and "without supporting data" on The Alliance website.

B. Secondary Purposes of The Alliance; Supporting/Enhancing the Primary Purposes

1. **Engage all of the Five Communities of Interest (5CoI)** in generating and maintaining solutions to The Situation. See **Attachment U - Engaging the Five Communities of Interest**.
2. **Provide a Talent Management (TM) software** to create a Competency Management System to generate Job Descriptions, Special Skills Certifications and People Profiles including student resumes; create a common jargon.
   - Capture and maintain (keep up to date) M-I talent data for Talent Development/Training, Talent Acquisition, Succession Management, and Performance Management
   - Provide a source of talent data that M-I firms can build Job and People Profiles, for current workforce and for "potential hires"
   - Provide a source of talent data that students can see; enhance their interest, align their educational pursuit, and build their own profiles/resumes
   - Help to create "one language" for the S&HS talent system for all Five Communities of Interest. If all can access it, all can use it
   - Provide a source of talent data that Education Community can use for alignment...see **Attachment V - The Alliance Talent Information Hub (a web-based Talent Tool)**.

3. Provide a **Central Communication Tool for The Alliance** (The Website) to facilitate the targeted participation of all parties in the 5CoI's. Team Planning Sessions; Team Virtual Meetings; Chat Rooms; Questionnaires/Questionnaires; Reports; Document Storage and Access; Access TM Software...Job Descriptions and People Profiles/Resumes; Ask a SME, Mentor or Coach; Mentoring and Coaching session, etc. *Home of the Virtual Alliance!* See **Attachment W - Draft Plan for Alliance Website**.

4. **Establish the Alliance *Success Criteria:*** to be used in accountability and success marketing

Alliance Structure

Initial/Founding Membership: Business/Economic Development Leaders, Manufacturing firms which participated in questionnaire and one Manufacturing firm who participated in multiple interviews; and two from the Education Community who participated in interviews. These have all expressed interest in being part of the alliance. The firms are Bridgestone APM Company, Durez, GE Appliance & Light, Honda, IB Tech, International Paper, Triumph Thermal Systems, and Vaughn Industries and the Education Community two are: RAMTEC Tri-Rivers Career Center and Tolles Career & Technical Center.

For more on Structure see **Attachment X - The Alliance - *Organization***.

Alliance Website

- Many of the individuals in the organizations we engaged with in this data gather process are already strapped for time. Getting them to go to more meetings would be quite a stretch. One of the reasons for creating a website is to create a communication hub through which virtual meetings could be conducted; get expert participation without having to be present at one place at one time. Discussion rooms (private and open) could be utilized.

- Some of the S&HS talent that we want to attract (e.g. Military Technicians) to this region are in other parts of the world. We want them to visit our community, talk with current workforce, ask questions of our education community, complete job applications, and file their Profile/Resume with us.

These two and much more can be done using a website. To learn more, see **Attachment W - Draft Plan for Alliance Website.**

Next Steps

Where do we go from here? What are the "next steps" toward solution sets for The Situation? Among the Next Steps is to connect the M-I Community to The Ohio State University...*other community resources*. See **Attachment Y - Next Steps**.

Note: Below is a complete list of Attachments, which are part of the original report. However, only **ten** are included in this hard-copy report (indicated in **red** below and found after the tabs).

Tab	Attachments
A.	Grant Document: The "Planning the Foundation for Development of Skilled Workforce for Advanced Manufacturing" OSU CARES Seed Grant project "submittal" documents; Alber Enterprise Center of The Ohio State University
B.	Questionnaire Results
C.	Project Partners
D.	More High Schools Teach Manufacturing Skills
E.	How Prepared Are Students for the Workforce Report (McGraw Hill)
F.	Four Goals Emerge from Board Retreat (ThisWeek Worthington News)
G.	Advanced Manufacturing-Industrial Competency Model
H.	Talent Architecture
I.	Job Skills Comparison Report
J.	The US Manufacturing & Industrial Sector: Economic, Education & Employment Impact *at a Glance*
K.	Fulfilling the Skilled & Highly Skilled Talent Needs of the Manufacturing/Industrial Community; An Integrated Opportunity
L.	Talent Pipeline to Talent Pools
M.	Let's Make a Workforce Plan (Talent Management Magazine)
N.	An Email Regarding the Interest of Young Women in Math & Science
O.	Talent Pipeline to Internal Talent Development
P.	STEM Learning in Afterschool: An Analysis of Impact and Outcomes
Q.	Further Analysis of the Alignment or Misalignment Between the Manufacturing-Industrial Sector Needs and the Talents Developed by the Education Community
R.	Learning/Talent Development Systems (At a Glance)
S.	From Military Front Lines to Manufacturing Front Lines: Veterans and Your Workforce
T.	Developing Skilled Workers (Manufacturing Institute)
U.	Engaging the Five Communities of Interest
V.	The Alliance Talent Information Hub (a web-based Talent Tool)
W.	Draft Plan for Alliance Website
X.	The Alliance - *Organization*
Y.	Next Steps
Z.	Articles & White Papers Used in Research