MechaForce: Shaping US Mechatronics Talent with and for Global Advanced Manufacturers

Gale Tenen Spak, PhD
Associate Vice President for Continuing and Distance Education, NJIT
spak@njit.edu

Rationale
Manufacturing’s resurgence in US is not yet assured, but with 11,000 manufacturers, probability is maximized by MechaForce Program (MFP). MFP brings German approach to NJ manufacturing & to educators to create ecosystem for scalable growth. Today manufacturing is a “spotless, safe & sustainable” industry which requires advanced “mechatronics” skills that merge hardware & software & reimagines how products are designed, made & serviced.

Situation
Germany is recognized as manufacturing powerhouse whereas US in not because of off-shoring & prevailing myth that industry is “dirty, dangerous & dead-end”. But reality is:

- 67 Percent of all manufacturing jobs in NJ are advanced manufacturing
- $77,000 average salary of manufacturers, 85% receive full medical benefits
- $31.8 Billion in contribution to NJ’s Gross National Product, making up 63% of all output
- 53 Percent of large US manufacturers consider moving back from China in 2016, compared to 37% in 2012
- 17 Percent of NJ manufacturers cannot find skilled workers today
- 70 Percent new US manufacturing jobs are expected by 2020

Challenge
 Appropriately adapt successful German Dual Skills/Apprenticeship Model to NJ in environment where there is unfamiliarity with model & where meaning of apprenticeship differs in US vs Germany.

Opportunity
Use aspects of German approach to rebirth NJ manufacturing industry sector by infusing industry-driven skills into new Mechatronics Career & Educational Pathway

- Take advantage of availability of Dream It. Do it (DIDI) program (existing industry-led marketing campaign) to change perception of manufacturing careers
- Leverage desperation of industry for talent & their access to funding (lacking among educators) as a launchpad for NJ MechaForce Program

MechaForce Program (MFP) Description

- NJ-wide scalable & scaling program, organized by NJIT, but led & funded by NJ manufacturers in partnership with NJ higher education sector, to address mechatronics workforce gap
- 2-year old MFP Advisory Board with majority seats held by corporate partners
- Uncovers & implements adaptable aspects of German model to NJ situation through contact with Consultant General of Germany, German American Chamber of Commerce, Deutscher Akademischer Austausch Dienst (DADD) & German Corporations (eg Siemens & Festo)
- Facilitates emergence of & students for industry-shaped mechatronics curriculum which includes study in laboratories for hands-on learning of robotics & automation equipment
- Arranges opportunities for learners both with & without academic degrees to acquire needed knowledge through career & educational pathway with on & off-ramps
  - Ensures learners without academic degrees can acquire industry-valued credentials, Associates Degrees, Internships/Apprenticeships/on-the-job training, & ways to continue education on a part-time basis to Bachelor’s Degrees
  - Ensures learners with non-mechatronics academic degrees can acquire industry-valued credentials, Continuing Education Units (CEUs) from mechatronics training classes, Internships/Apprenticeships/on-the-job training, & jobs

New Jersey Institute of Technology (NJIT) Assets Underlying MFP

- NJIT’s College of Engineering is only NJ engineering school offering specific Bachelor's degree, most akin to German model of hands-on & formal learning
- Houses 61-year-old Continuing Professional Education division as NJIT’s talent development arm & has trained 76,000 high-tech employees at 700+ companies
- Building new 9,500 Markerspace to compel opportunity for engineering education, industry partnerships and MFP

ManufactureNJ: NJ Advanced Manufacturing Talent Network

Proposed by NJIT in 2011 & operated with NJ State funds to connect NJ manufacturers to educators & public workforce system to form & fuse stakeholder’s (industry-government) workforce development alliances

- Uses Dream It. Do it (DIDI) Program already operating in 36 states to change perception of manufacturing to spotless, safe & sustainable from dirty, dangerous & dead-end
- To motivate program enrollments
- Identified & affiliated with new funding sources to cover learner’s tuition and fees in MFP academic programs
- Conducted “speed interviewing” events for MFP Board Members with alumni from schools
- Leveraged desperation of industry for talent & their access to funding (lacking among educators) as a launchpad for NJ MechaForce Program

Accomplishments 2014-2016

- Created industry-led Mechatronics curriculum with on & off-ramps leading to 130 credit Bachelor’s degree
- Identified NIMS, Siemens & ISA industry-valued credentials as most suitable to NJ manufacturers’ needs
- Developed systematic option to permit learners to acquire Associates Degree & identified specific 2-year & 4-year colleges which have programs compatible with MFP’s curriculum
- Estimates 465 learners now in MFP pipeline in 8 of 21 NJ Counties & growing
- Encouraged formation of new traditional & vocational high school/community college dual learning programs using MFP curriculum & helps other community colleges plan new Associate programs
- Conducted “speed interviewing” events for MFP Board Members with alumni from schools with existing compatible programs
- Identified & affiliated with new funding sources to cover learner’s tuition & fees in MFP academic training programs