Scaling Technical Education for Incentivized Industries

Sandra Gehlen Krebsbach, Ph.D.
MOT 2018 Capstone
Delta of MOT for my practice

I developed a business perspective

I learned to analyze technical businesses choices and the options for future success: innovate, expand, merge, acquire, or divest.

I learned how to use specific instruments to conduct technical forecasting and assessment of institutional capacity to deliver on the technology

I learned that my experience, networks and knowledge of two-year technical education and municipal leadership were relevant to course assignment and class presentation.

I learned in order to move forward with technical changes and innovation, it requires talented individuals and talented groups with healthy group dynamics as is the case in education and government.
Incentivized Industries

Nevada
Gigafactory

Wisconsin

Tesla
Panasonic
FOXconn
Nevada and Story County

State of Nevada

$1.5B tax incentive passes Legislature on Sept. 10, 2014

- Contract signed October 17, 2014

Story County, Nevada:
- Upgrades substation
- Roads

Gigafactory (Tesla 80% and Panasonic Energies of North America (PENA) 20% ownership)

- 6500 workforce hires by 2020
- $5B in facility commitment-2014 upped to $10B in 2018
- 5M sq. ft. when completed

Tsla-ex101-265.htm and Interview Nevada Governor’s Office of Economic Development-Director of Research
Gigafactory

A Tesla “startup” lithium-ion battery production facility

- Batteries are Panasonic’s expertise
  - 300-400 technicians from Panasonic Osaka temporarily in Reno
  - Material Handlers and Operations Controllers hired by Panasonic
  - Located in a region that does not have a skilled workforce as noted in the contract with ratings of “3” tsla-ex101-265.htm.
Wisconsin and Racine County

State of Wisconsin
• $2.85B cash to Foxconn November 10, 2017
  • Staged payments based on job creation benchmarks. Penalty of repayment by Foxconn if not met.
• Infrastructure improvements
  • $784M by Racine County, TIF
    • New Substation Transmission lines
    • 24” water pipe from Lake Michigan
    • Roads and Cable
  • State of Wisconsin with application for Federal support
    • *$250M for Interstate 94 and frontage roads
    • Rail improvements
    • Permits to draw water from Lake Michigan

• 22 M sq. ft. facility
• 13,000 workforce by 2024
• $10B in facility commitment

*Source: BizTimes Milwaukee Business.
Arthur Thomas April 16, 2018
• Experienced global corporation, Hon Hai Precision Industry Company Ltd. of Taiwan produces crystal display glass used in smartphones, television screens, and computer monitors.

• Foxconn is creating memos of agreement per institution
Government, NGO, and Institutional Responses

Nevada 2014-2018
• Support from
  • Governor Sandoval and the Legislature
  • Western Nevada Economic Development Council
  • Nevada Higher Education System Council
  • Early institutional support from Truckee Meadows CC
  • University of Nevada Reno did not see role in workforce until 2018

Wisconsin 2017-2018
Support from
• Governor Walker and most legislators
• Racine and Kenosha Economic Development organizations
• Racine County and City of Racine in Tax increment Financing of $784 M for infrastructure
• Regional collaboration among universities, technical colleges and K-12 on engineering pathways
Partnership Results

• Increased number of hires at Material Handler 2 Operator level

• Over 800 New hires as a result of TMCC hiring events

• TMCC is assisting with new hire training and developing internal training

• Looking at a plan for incumbent worker training and higher level of training
Capacity

Traditional Delivery
– 2 full time instructors
– 30 students per year (1 year Certificate of Achievement)
– 2 classrooms – shared lab

Modularized Delivery
– 2 full time instructors
– 300+ students per semester
– Learning Resource Center and 2 labs
Issues

– Posting grades throughout semester
– Scheduling faculty
– Federal programs and short-term classes
– Managing class caps
– Tracking completions
– Build modularized course sections
Tools from MOT used to analyze findings

The Four Zones

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<td>PERFORMANCE ZONE</td>
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<td>(Horizon 3)</td>
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Porter’s Five Forces

Figure A  Forces Driving Industry Competition

Zone to Win, Geoffrey Moore, 2015, Diversity Publishing,

Zone to Win

**Applied to education**

**The Four Zones**

- **Mission-Critical**
  - Disruptive Innovation
    - Transformation Zone (Horizon 2)
  - Sustaining Innovation
    - Performance Zone (Horizon 1)

- **Enabling**
  - Incubation Zone (Horizon 3)
  - Productivity Zone (Horizon 1)

**Comfort zones**

- Education stays primarily in the sustaining innovation looking at performance and productivity
  - Student performance
  - Completers
  - Students per faculty
  - Cost per student
Zone to Win

Applied to education

The Four Zones

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Disruptive Innovation
- Incubation zone
  - Experimentation, trials
  - Protection from performance standards and productivity standards

Transformation zone
- Taking the ideas and transforming them to technical education
- Or transforming technical education
Porter’s Five Forces

Figure A  Forces Driving Industry Competition

- Potential Entrants
- Threat of New Entrants
- Suppliers
- Bargaining Power of Suppliers
- The Industry
- Rivalry among Existing Firms
- Substitutes
- Threat of Substitute Products or Service
- Buyers
- Bargaining Power of Customers
Bargaining power of suppliers

are the faculty as skilled experts on the equipment and software that are the key to being able to offer the course or program. Existing tenured faculty may not have the skill set because of tenure, but if the program continues, this will have to be accommodated first through upskilling or reassignment within the program. The course or program cannot be offered without the appropriately credentialed instructor who can be an adjunct if there are tenured faculty not qualified for the program to be offered. As technological innovation accelerates, faculty and instructors will limit the institutions’ ability to offer the program or update the program. The instructors can come from the employer or supplier of the technology used or from alumni of the program. Highly skilled and qualified faculty can opt to work in industry or other institution. Technical education at the two year level does not have the flexibility to recruit through incentives as four year universities.
Industry Rivals

**Industry Rivals** are other for credit community and technical colleges within in the state or in bordering states. Online learning and for profit technical education are rivals as they function within the model for course and credit delivery and accreditation regulation for financial aid.
New Entrants

- **New entrants** are technology enhancements of the human worker through exoskeleton devices that prompt or prohibit movements so the workers will learn to adjust and comply. Augmented reality through headsets and glasses connect the worker to an engineer or instructor who directs or advises him on what to do, for example, on the surface of the engine or equipment to be adjusted or serviced. Augmented reality screens are being used in production lines to see what needs to be done (Rockwell Automation) and to communicate instructions on how to do it [19]. Virtual reality can transport the worker to another work group or station to learn and to practice.

- Private industry such as Google, Facebook, and Apple are in the research and development space and could easily move to technical training.
Substitutes

Substitutes are certification programs that are being recognized by employers as more credible in verifying employability skills than a high school diploma and for credit programs including degrees. High school career and technical education have been moving to postsecondary and are part of Perkins Congressional funding packages. High school career and technical education are opening innovation opportunities through Makers, and have suggested there be newly designated funds (2017) for innovation project.
Bargaining Power of Customers

the students, the incentivized industry employer and other employers who need the same skills set for their employees. The incentivized employer may have the capacity to import skilled technicians as does Panasonic with 300-400 technicians from Osaka who work for the period of time needed for their technical skill level or until such time that there are trained workers in the location or automation reduces the need for them. The employer can either incentivize or threaten technical education to modularize the curriculum, change procedures, offer flex times for workers, and multiple completion or re-entry points. The incentives are scholarships, equipment, instructors, and students. The threats are taking over instruction themselves or purchasing it from vendors of online and simulated learning. Other threats are hiring consultants who can take the colleges’ intellectual property from PowerPoint presentations and lectures without compensation. For credit curriculum syllabus is public information. Existing employers can coordinate to demand that the same programs are available to the incentivized employer. Educational providers are at risk of offering programs that are not completed due to student work commitments so the employer’s input, buy-in, and cooperation are important to mitigate their bargaining power.

Students are customers who can demand scholarships, flexible hours, stackable credentials, and job guarantees for taking or completing the program. Students can also select a non-traditional vendor or rival.
Findings

• Credentials recognized in the workplace are replacing credit completion certificates and degrees

• Technical education institutions are becoming distribution centers for industry sponsored training of trainers dependent on student purchase of their equipment

• Workplace skills and basics in math and communication are the responsilibility of institutions to teach not the employer

• Incentives can bring disruptive innovation that propels a region into global activity with higher skilled workers
Recommendations for scaling

• To higher education
  • Create an innovation stage for technical education to meet the needs of industry to include modularization, financial aid adjustments for competency, flexible faculty workloads, outside experts, credential recognition other than a transcript

• New sources of faculty expertise
  • Military assignments to teach or newly retired military
  • Augmented reality connecting experts to students in a learning situation
  • Virtual reality

• Collaboration on pipelines from K-12 to universities to build the technical expertise
  • Robotics programs, early realization by universities they are in the pipeline.
Thank you

Questions?