Faculty for Factory: A University-Industry Link Program in Jordan

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Overview

Faculty for Factory (FFF) program is a national Jordanian program that was started in 2003 with the purpose of strengthening applied scientific research cooperation between the universities and the industry.
Outline

• Higher Education in Jordan
• Mechatronics Education in Jordan
• Jordan Industry and Challenges
• FFF Program Background
• FFF Mechanism
• FFF Goals and Objectives
• FFF Mechatronics-related Projects
• SWOT Analysis
• Conclusion
Higher Education in Jordan

• University of Jordan was established in 1962
  ▫ First university in Jordan

• There are 30 universities in Jordan
  ▫ 10 public universities
  ▫ 20 private universities
Mechatronics Education in Jordan

• Mechatronic programs started in the late 1990’s

• There are currently seven universities in Jordan that offer B.S. degrees in mechatronics
Number of PU mechatronics students
There are currently 225,000 students in all Jordanian universities
- 35,000 are engineering students (15% of total)
- 2,200 are mechatronics students (6% of engineering)

The estimated number of mechatronics engineers in Jordan is 4,000
- Registered as Electrical or Mechanical Engineers under the Jordan Engineers Association (JSA)
- JSA has 80,000 engineer members
- Therefore mechatronic engineers are about 5%
Mechatronic Graduates

• Many of the graduates were able to use their multi-disciplinary knowledge to benefit the needs of the regional market.

• A good number of these graduating engineers work in the Gulf area, specifically, Saudi Arabia and UAE.
Jordanian Industry

• Jordan economy is among smallest in the ME
  ▫ $36 Billion GDP

• Industries
  ▫ Pharmaceuticals, clothing, fertilizers, potash, phosphate, mining, cement, and inorganic chemicals

• Industrial production growth rate is about 1%
Challenges for mechatronics in Jordan

- The size of the “production, automation, and manufacturing” industry is small
- The majority of used technology is imported
- The lack of understanding for the mechatronics discipline and profession in Jordan and the Gulf countries
FFF Program Background

• The FFF program was first implemented in 2003

• Initially, only 20 factories were involved while this number grew to 112 factories in 2011.

• The total number of projects implemented under the FFF program by the end of 2011 was 712 projects
FFF Program Background

- The program developed a network composed of industrialists and university professors.

- This network was first established as the governing body of the FFF program, which included:

- It later evolved to include more than 20 universities and 100 companies.
FFF Key Industries

1. Food supply, agricultural and livestock
2. Packaging, paper, cardboard and office supplies
3. Mining
4. Leather and garments
5. Information technology
6. Therapeutic and medical supplies
7. Chemical industries and cosmetics
8. Plastic and rubber
9. Construction
10. Wood industry and furniture
FFF Projects over the years
Program Mechanism

• Factories interested in the FFF program submit a request to join the FFF network.

• The faculty member visits a company in the FFF network and learns of their problems.
  ▫ They work together to identify a particular problem to work on for the project.

• The faculty member submits a diagnostic study to the FFF executive committee
  ▫ If the proposal is approved, then the faculty member meets with key personnel at the company to plan for the project work
Program Mechanism

• The faculty member works at the company for a three-month summer period.

• The faculty member submits a final report to the FFF committee.
  ▫ The report should document how the problem was resolved and how it benefited the company

• The final report is evaluated and if approved the FFF program pays for the participants work.
Program Goals

- Benefit from the knowledge and expertise of distinguished academics in Jordanian universities.
- Transfer practical knowledge to researchers and students in order to improve the quality of educational outcomes.
- Break the barrier and build confidence between the universities and the industry.
- Develop long-term projects that can benefit the national economy.
Benefits to the Faculty Member

- Expand practical knowledge and skills
- Continue learning and transfer technology
- Develop communication & public relations’ skills
- Improve teaching methods
- Increase income
Benefits to the Factory

• Expand theoretical knowledge and applications
• Develop problem-solving skills
• Identify and solve factory problems
• Obtain additional human resources
• Increase profit
FFF Mechatronics-related Projects
<table>
<thead>
<tr>
<th>#</th>
<th>Project Theme</th>
<th>Univ.</th>
<th>Company</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Development of a plant-wide compressed air management policy to cut costs &amp; reduce waste</td>
<td>BAU</td>
<td>Crown Middle East Can Co.</td>
<td>80%</td>
</tr>
<tr>
<td>2</td>
<td>Remote monitoring and control system for solar energy utility</td>
<td>PSUT</td>
<td>Millennium Energy Industries</td>
<td>90%</td>
</tr>
<tr>
<td>3</td>
<td>Automating the packing process for cookies</td>
<td>BAU</td>
<td>Alfouri Company</td>
<td>56%</td>
</tr>
<tr>
<td>4</td>
<td>Design of semi-automatic construction blocks machine and strength’s improvement</td>
<td>JUST</td>
<td>Tahboob Factory</td>
<td>82%</td>
</tr>
<tr>
<td>5</td>
<td>Development of an automated sorting system on production lines</td>
<td>HU</td>
<td>International Company for Industrial Ceramics</td>
<td>32%</td>
</tr>
<tr>
<td>6</td>
<td>Real-time inspection system for medication labels based on image acquisition and processing</td>
<td>PU</td>
<td>The Pharmaceutical Arab Manufacturing Co. Ltd</td>
<td>90%</td>
</tr>
<tr>
<td>7</td>
<td>Design and implementation of an automatic system for inspection of metal sheet surface flatness</td>
<td>BAU</td>
<td>Canning Industries Company</td>
<td>76%</td>
</tr>
</tbody>
</table>
Project Results

- All the projects were considered successful, except for projects 3 and 5.
- This provides a 71% success rate.
- All the successful projects resulted in establishing solid relationship between the university professor and the company.
  - This in turn initiated a practical social-work network among the participating parties.
SWOT Analysis

• Strengths
  ▫ Link universities with the industry
  ▫ Build confidence between partners
  ▫ Find common interest
  ▫ Improve communication skills
  ▫ Develop long term projects
SWOT Analysis

- Weaknesses
  - Overlook its network potential
  - Work on non-sustainable projects

- Opportunities
  - Can help in building professional networks
  - Can help spin-off professional associations

- Threats
  - Collaborate (unethically) where the only goal is the financial benefits
Conclusion

• The FFF program had a major role in developing concrete connections between the Jordanian universities and local industry.

• This link is essential in advancing practical research that is needed in developing countries such as Jordan.

• One result of the FFF program was the creation of a dynamic relationship among the participating parties.