The Case for Increased Collaboration Between Academia and Industry in the Food Sector in Jordan

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Executive Summary

Collaboration between universities and Micro, Small and Medium Enterprises (MSMEs) can facilitate knowledge transfer and stimulate the production of new knowledge and technology. This paper addresses the limited collaboration venues between universities and MSMEs in the food processing sector in Jordan. The paper puts forth policy recommendations to increase collaboration and enhance communication to facilitate innovative outputs in the food processing industry. Interviews were conducted to explore solutions to bridge this gap. One primary recommendation is the need for additional governmental efforts to design official guidelines for cooperation and collaboration between universities and MSMEs. Other recommendations include establishing specific agreements between MSMEs and universities and directing scientific research toward the industry's top priorities, forming research groups of students, professors, and enterprises to target the needs of the local industry. Additional policy recommendations include reducing taxes imposed on MSMEs and providing financial incentives and sources for research.

1 Introduction

Micro, Small and Medium Enterprises comprise 98.5 per cent of the total registered business enterprises and 60 per cent of formal jobs in Jordan.[1] MSMEs are the major source of entrepreneurship and innovation. These enterprises afford employment to many people and contribute to economic activity and national income.[2]

There has been increased attention on the role of innovation in the sustainability of enterprises in the food sector. One primary avenue to raise the innovative capacity of these enterprises is through collaborative university-enterprise interactions.[3] These interactions refer to situations where individuals and groups from academia and industry work together on specific projects, produce common outputs, and are characterised by high relational involvement. Examples include research partnerships (e.g., collaborative or sponsored research) and research services (e.g., academic consulting, contract research and the use of research facilities).

The success of collaborative research projects requires that both parties have a solid mutual understanding of the envisaged output and subsidised sources of finance. For example, several industrial MSMEs could benefit from collaboration with universities that provide technical assistance in production, waste management, risk assessment and quality assurance. This collaboration would add a competitive advantage to the final product. For the food processing sector specifically, universities can help set food safety standards and train the staff on food safety measures and laboratory testing to meet the ongoing demands from international markets for high-level certifications. Meeting the highest production requirements would increase MSMEs' marketability and competitive advantage.

[1] Dalia Hammad, "An Economic Outlook on Jordanian MSMEs," *Leaders International,* Oct. 6, 2022, https://leadersinternational.org/results-insights/an-economic-outlook-on-jordanian-msmes/.
[2] Nomita Sharma, "Management of Innovation in Micro, Small and Medium Enterprises in the Middle East and North Africa (MENA)," in Entrepreneurship Ecosystem in the Middle East and North Africa (MENA) (Springer, 2018), 611–26.
[3] Jane Jones and Graciela Corral de Zubielqui, "Doing Well by Doing Good: A Study of University-Industry Interactions, Innovationess and Firm Performance in Sustainability-Oriented Australian SMEs," Technological Forecasting and Social Change 123, 2017, pp. 262–70.

One of the main joint projects between industry and academia in Jordan is Faculty for Factory (FFF), a project at the University of Jordan which started in 2003 and is ongoing. The project developed a long-term relationship between the two entities and spread innovation, entrepreneurship, technology, and the commercialisation of research product culture in the Jordanian community. Faculty For Factory offers regular formal and informal communication between the universities and their industrial partners, which plays an integral role in developing and understanding the two partners' limitations, requirements, and expectations.[4]

Despite the success of FFF, there are still numerous hindrances and challenges to be met. These challenges include a lack of awareness and trust in the existing resources and the absence of financial funding. Additional obstacles are time restrictions and different operating schedules for academia and the industry. More specifically, industries are often oriented to short-term results, whereas universities function on a longer timescale and, therefore, might have a different expectation of the final result. Another aspect is that universities' work depends on semester structure and access to human resources, and infrastructures like laboratories and libraries are often restricted and reserved for internal use. The bureaucracy, complex structure and inflexibility of universities can hinder the success of cooperation.[5]

However, there are many ways to overcome such challenges. One possible way to get mutual access is through shared-use equipment arrangements.

In the following sections, the paper will delve into four suggestions to increase academia-industry collaboration and recommend policy recommendations to foster future collaboration according to these suggestions.

2 Methodology

Eight key informant semi-structured interviews were conducted with stakeholders and representatives from the following:

- The Jordanian government,
- Members of academia,
- The Jordan Chamber of Industry,
- The Farm Dairy (AlMazraah),
- INJAZ (business development manager),
- Jordan Academia Industry Platform (JAIP), and
- Faculty for Factory project.

The interviews were conducted face-to-face and virtually. The outcomes of the interviews were analysed to identify possibilities for fostering partnerships between academia and industry and exploring how to overcome any challenges.

For the purpose of this paper, MSMEs are categorised according to the number of employees as micro

[4] Yousef Al Abdallat, "Using Innovation and Ecosystem to Transform Covide-19 from Crisis to an Opportunity: The Case of Jordanian Program 'Faculty for Factory'(FFF)," in *The Effect of Coronavirus Disease (COVID-19) on Business Intelligence* (Springer, 2021), 245–55.
[5] Olga Bychkova, "Innovation by Coercion: Emerging Institutionalization of University–Industry Collaborations in Russia," *Social Studies of Science* 46, no. 4 (2016): 511–35.

(1–4), small (5–19) or medium (20–99). This is in line with the definitions used by the Department of Statistics (DoS) of Jordan, the World Bank's small and medium enterprises (SMEs) database, the Central Bank of Jordan (CBJ) and the Jordan Enterprise Development Cooperation (JEDCO).

3 Investment in Research and Development

Food firms cooperate and collaborate with research institutions through joint R&D projects, access to laboratories and scientific equipment, and research contracts. Networking with universities and research institutes is vital for MSMEs, which lack internal expertise and have limited finance for investment in R&D activities.
Interviewees agreed that MSMEs often concentrate on their enterprises' daily workflow and continuity. Therefore, newly established companies spend their funding on growth and continuity rather than installing and funding an R&D department.

For knowledge and technology transfer to be successful in the food industry, the industry should have the internal capacity to absorb research and entirely turn it into marketable products. Industrial employees can facilitate this by having a research-level corresponding to the university, enabling effective communication with external information sources.[6]

Investment in research also requires extended financing. Therefore, dependency on donors or loans with higher risks and increased interest rates prohibits such investment. MSMEs must find other methods, such as grants, subsidies, and services.[7]

These other methods could include seeking funding from governmental funds and programmes like the Industrial Scientific Research and Development Fund (IRDF), the National Fund for Enterprise Support (NAFES) and the National Centre for Research and Development (NCRD) which have been developed to support MSMEs.

4 Matching industries' needs in research

The success of collaborative research projects requires that academia and industries have a solid mutual understanding of the everyday work, envisaged output, and subsidised sources of finance. However, university projects are purely academic. They do not address the challenges MSMEs face daily, according to the CEO of the Farm Dairy, who added that cooperation and collaboration between academia and industry should achieve the mutual interest of both entities.

Therefore, it is essential to establish research and development linkages between academia and the industry (through university alums or active partnerships with the food industry) to develop new technologies, products, and processes that influence these enterprises' competitive advantage. Examples include cooperation on resource management and efficiency, clean production, solar thermal energy, waste recycling and sustainable packaging, upgrading, and ensuring the safety and quality of food products. Furthermore, the CEO of the Farm Dairy expressed the need for collaboration by stating that "proper

[6] Alessandro Muscio and Gianluca Nardone, "The Determinants of University–Industry Collaboration in Food Science in Italy," *Food Policy* 37, no. 6, 2012, pp. 710–18.
[7] Ibrahim Soliman and Ahmed Mashhour, "National Agro-Food Policies in Jordan," 2012.

communication is needed." MSMEs should determine specific market needs and communicate with universities to address these needs. To make this process easier, MSMEs and academic institutions need to establish mutual respect and interest in one another.

5 Acquiring standards certifications

Academic-Industry collaboration facilitates applying best practices in food production sustainability and management of energy resources. However, there are additional parameters that interfere with academic-industry collaborations. The parameters include the institutions' size, location, and whether they registered in the industry chamber. Therefore, bureaucratic organisations and unclear responsibilities are the main obstacles to a successful partnership.

Therefore, there is an urgent need for MSMEs to obtain international certificates that meet national standards such as ISO 22001 or ISO 9001. These certificates are essential for research centres and universities collaborating with industry. Training and technical support for food laboratories to obtain accreditation for specific tests focused mainly on food contaminants (biological and chemical, e.g., food-borne diseases and pesticide residues in agricultural products).[8]

6 Modernising Agriculture Departments

Curricula at universities are still lacking in terms of linking the content to the needs of modern-day industries and empowering innovative thinking. One academic stated that it is crucial to modernise Jordanian universities' agriculture faculties and departments to include topics and specialities in tech and biotech agriculture. These topics include the fundamentals of biological sciences, smart agriculture systems, biotechnology, and genetics. It is also essential to build the skills and competencies of the learners to address and research the food industry issues and opportunities related to food security, nutrition, agriculture and water resources, and environment management.

7 Conclusion

Trust, common interest, and public awareness were often stated in interviews to express the pillars of a successful relationship between industry and academia. The interviewees noted the need for direct investment in the industry's research priorities for the food processing sector. The first step toward academia-industry collaboration would be identifying and validating the sector's challenges. Afterwards, a structured research programme could be designed and financed accordingly to address the specific challenges of the food processing sector.

To enhance the competitiveness of MSMEs in the food processing sector, universities can be involved in the internal upgrade of technical know-how, food safety, compliance with international regulations and marketing of new products. Additional partnership avenues include assistance in general management, technical optimisation, human resources management, financial management, sales and marketing, energy

[8] Lina Hundaileh and Fadi Fayad, "Jordan's Food Processing Sector—Analysis and Strategy for Sectoral Improvement," *Deutsche Gesellschaft Für Internationale Zusammenarbeit (GIZ) GmbH, Bonn and Eschborn*, 2019.

saving, waste management, clean production, resources efficiency and other topics identified according to the needs of the industry.

8 Recommendations

Public policies can stimulate innovation in low- and medium-technology industries by connecting firms and universities through collaborative scientific research. This will lead to the development of firm capabilities for innovation by facilitating knowledge transfer or learning.

Below are policy recommendations categorised according to the target audience that aims to establish, maintain, and increase the collaboration between academia and the industry:

8.1 Government

- Provide an opportunity to maximise the utilisation of research and development facilities in universities and the coordination of efforts to effectively participate in solving problems facing the food industry. These facilities will integrate research, extend local knowledge to significantly increase productivity improves product quality, and maintains environmental sustainability.
- Provide specialised, long-term, and renewable industrial financing to overcome the challenges and obstacles facing the food sector in obtaining loans.

8.2 Education and Training Institutions

- Create research consortiums within Jordanian universities to determine top-priority research topics for the food sector, align efforts to reduce duplicate projects, and address industry topics in students' research projects.
- Develop a customised curriculum for agriculture departments at universities based on a needs assessment done by the universities by consulting local food producers.
- Universities and research centres should award prizes based on energy or water saving; eco-packaging and clean production for companies collaborating with universities to achieve these novel outcomes.
- Promote a dual vocational training system to enable university students to receive accurate, on-the-job training in food technology and production.
- Raise public awareness by conducting a joint campaign between the agriculture and business faculties and the food sector to provide opportunities for students' practical training in food MSMEs. The companies could also collaborate with students and faculties to use university facilities.
- Agriculture and business administration faculty councils to hire a representative from the food industry to align strategic goals between academia and the food industry

8.3 Chamber of Industry

- Establish a specialised business association for the food processing sector to collectively advocate for MSMEs in governmental entities and other stakeholders in the food processing sector. The food processing sector's needs are addressed within the Chamber of Industry, where they are likely to compete with other more dominant sectors.
- The Chamber of Industry should set additional criteria for companies' boards to hire scholars, researchers, and academic representatives.
- Form an association of food processing entrepreneurs to promote MSMEs in government

agencies and other stakeholders in the food processing sector.

- The Chamber of Industry should collaborate with agricultural faculties in universities to provide training on product development, food safety systems, cost optimisation, and clean manufacturing.
- The Chamber of Industry and universities could create a research group for the food processing sector, including university professors, students and MSMEs / factories operating in the food processing sectors to work together where mutual benefit can be achieved in production and publication in an innovative environment.

8.4 Food Industry Sector

- Food processing firms and factories must establish a platform to advocate industrial or other policy changes that will benefit the industry i.e. tax reductions or financial incentives for research.
- Introduce a third party to link research projects' outcomes in the food industry with researchers' competencies in the universities, similar to the Jordan Academia Industry Platform (JAIP).[9]
- Sign memorandum of understanding with academic institutions to align efforts, guarantee win-win situation and bridge the gap between long- and short-term vision.
- Create a Centre of Excellence to increase food industry competitiveness locally, regionally, and internationally.

[9] JAIP is the region's first commercial Academia-Industry online platform that enables enterprises to benefit from researchers through dynamic matching models and allows academic researchers to connect with industry partners efficiently.

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