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From the Laboratory to the Market and Back? **Historical and Critical Explorations of the Interchange between** **Academia and Industry**

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Edgar de Picciotto Family National Institute for Biotechnology in the Negev Building (Bldg. 41)
BGU Marcus Family Campus

Abstracts

(By Author)

How relevant to their future is the relevance of research universities to the world needs?

Rivka Carmi (Ben-Gurion University of the Negev)

Vannevar Bush's report titled, "Science - The Endless Frontier" in the 1940s, coupled with the so-called "industrial research" experience during WW1 (where "pure" and "applied" researchers worked shoulder to shoulder on war machine innovations), marked the beginning of a gradual departure from the basic/applied research dichotomy that characterized the 19th century discourse about science and the hierarchy and status of various fields of learning.

Two major developments have propelled the discussion about the role of research universities in addressing the needs of industry and the economic market in general: the continuous decrease in state/federal financial resources for research universities and the open innovation concept adapted by industry. These have led to the emergence of a rather more appropriate concept of a **discovery- invention** cycle that is bidirectional and interdependent and enables a welcome synergy between academic lab research and industrial market needs.

This presentation will describe three projects at BGU: The National Institute for Biotechnology in the Negev (NIBN), Deutsche Telecom (DT) and the Advanced Technologies Park (ATP) all present various models of such synergy.

The discussion of these projects will maintain that: 1. In fact, all of them do result in research that can be judged as "basic" according to the current criteria still used in academia, and at the same time promote the development of tangible products that meet industry needs and interests AND

bring the opportunity for income to the university. 2. They enable the university to provide students with additional, non-curricular tools that better prepare them for a meaningful career in industry. (Most of them will not remain in academia).

Both observations address the question of the relevance of research universities to a dramatically changing academic environment as well as technological world.

The required adaptation is not necessarily a threat to "basic" research but rather as a partnership in the discovery-invention cycle. This necessitates considerable bridging work between two different realms but helps to better serve both universities' interests and world needs.

How Industry Can Impact Basic Research in Chemistry and Vice Versa: A Personal Experience

N. Gabriel Lemcoff (Ben-Gurion University of the Negev)

One of the first daunting tasks that inexperienced young faculty members must perform at a university is choosing an area of research in which to perform their independent research. I let my heart choose this, and most of the research in our group was initially geared towards the synthesis and study of new catalysts for what would become a 'Nobel Prize' chemical reaction: olefin metathesis. Naturally, serendipity plays a big role on how scientific research develops, but in this talk I would like to highlight the influence my collaboration with industrial partners had on the development of the basic science in our group, especially for the discovery of new photochemical reactions and new polymers.

Academic Ethics and the Challenge of Commercialization

Isaac (Yanni) Nevo (Ben-Gurion University of the Negev)

Academic (Scientific) ethics, or more broadly the ethics of knowledge-seeking, concerns itself with the questions "What type of good (e.g., intrinsic or instrumental) knowledge is" and "How best to achieve it, compatibly with other goods and moral obligations" When properly functioning, universities have a claim on being indispensable tools in the advancement of that good, namely, knowledge (scientific or otherwise). They earn this status by creating an environment where cognitive and intellectual pursuits are valued for their own sake, where scientists are free and autonomous in the pursuit of truth, and where the gates are always open for new ideas and criticism.

How well universities achieve this ideal is a question of their internal structures and external constraints. Various conditions could advance or undermine the academic environment so understood. Specifically, our question focuses on the place of commercialization within

knowledge-seeking academic processes. Are these processes enhanced by the advantages of commerce (funding), or debilitated by the assumptions of its internal logic (the profit motive)?

In this presentation, “Commercialization” will refer to the introduction of the profit motive into the world of scientific research, specifically but not exclusively, bio-medical research, and the consequent appearance of financial conflicts of interest on the part of institutions and individual researchers. The “challenge” of the title refers to the ethical challenge that such an environment offers to the academic freedom and autonomy of universities and scientists, the integrity of their research, and the objectivity of their products.

Ag-Biotech: Unmet needs versus the research we would really like to do

Amir Sagi (Ben-Gurion University of the Negev, Department of Life Sciences, National Institute for Biotechnology in the Negev, Enzoitic Ltd. and others)

With respect to sex heritability, cultured decapod crustaceans (shrimp, prawns and crayfish) normally exhibit homogametic (ZZ) males (males that have only one kind of gamete) and heterogametic (WZ) females (females that have two kinds of gametes). Our discovery of an insulin-like androgenic hormone (IAG) have enabled gender manipulations beyond any boundaries. With temporal manipulations of the expression of IAGs we were able to cause sex reversal, obtaining functional ZZ females and WZ males. Based on this ability, all-male and all-female populations were created and used for efficient, sustainable aquaculture and increased yields. They were also suggested as biocontrol agents.

The R&D process of adjusting such technologies to preferred genders in each cultured crustacean species is time consuming and tedious; thus an industry-academia interface is needed to pursue such tasks. On the other hand, the research opportunities opened, with respect to the identity, content and function of the W and Z chromosomes in the context of sexual determination and differentiation, are immense and exciting. The balance between tasks that are driven by the industry’s unmet needs and the exciting research challenges will be discussed. I will also attempt to elucidate the evasive interface between academia and industry.

Knowing the Market as Driver of Innovation: The Case of the Chemical Industry

Anthony B. Travis (Edelstein Center, Hebrew University)

In the field of chemistry, the first modern science, the needs of society have invariably stimulated academic studies as much as, and in the past more than, the study of knowledge for its own sake. Examples are the synthetic dyestuffs industry, which determined university teaching and research programs in organic chemistry from around 1870 to 1914, and well beyond; and the fixation of atmospheric nitrogen, where, just prior to World War I, the promise of profit and fame stimulated

research as much as thermodynamics and kinetics. These two examples, mainly from the German chemical industry, will be used to explore the powerful influence of industry on the scientific endeavor.