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Thank you and welcome to Toledo. I wish to share with you some random thoughts about the interaction of knowledge with the business of making things.

Universities, have knowledge as their stock in trade. Universities create knowledge; they transmit knowledge and occasionally apply it. The phrase “Knowledge Economy” is being heard with increasing frequency. I wish to assert, at the outset, that the phrase “Knowledge Economy” is a misnomer. “Knowledge Economy” is being used most often from University presidents to legislators; or others wishing to justify the role of higher education in today’s difficult economy. Knowledge in and of itself may be used for good or for evil, and may or may not have an impact on prosperity, depending on the uses to which it is put. Only when knowledge is applied, when it guides and inspires handiwork can it be said to improve the human condition by creating prosperity, good health and long life.

Manufacturing improves the human condition, and has and will change the world. To make things, from molecules to spaceships, from nanoparticles to hydroelectric dams is ultimately the only way to change the course of human existence.

To speak of a “Knowledge Economy” implies a solipsistic view which leads us in exactly the wrong direction for the 21st century.

We have come to recognize that knowledge is no longer owned by individuals or institutions. Knowledge is now fluid, moveable, and exists in cyberspace. This externalization of knowledge has caused some to speculate that the mind itself is being externalized. Whether this makes sense or not, we can probably agree that the externalization of mankind’s knowledge stores and computational power probably constitutes the world’s greatest revolution. The “Life of the mind” is now a communal life; the reclusive scholar is not merely an anachronism, it is impossibility.

In advanced economies with high labor costs, manufacturing no longer can succeed if based on rote machine processes and relatively low-skilled labor operating those machines. Now, it is about fully automated factory floors and about companies that require people with very high skills, even master’s and doctoral degrees, to run production, using team structures, flexible and rotational assignments, and other new ways of defining the worker role. Manufacturing increasingly is about customization of products, or about just-in-time production. Logistics, transportation and supply chains are very important factors.

As the industrial economy of the last 200 years or so transforms rapidly into what is incorrectly called the “Knowledge Economy,” the authors believe that we cannot take this to mean that we will, or should, cease to make things and build things – or that a prosperous economy can run on service industries alone. What it should mean is that new knowledge and the highly sophisticated technologies of our time and the future will be applied to the making and building of things.

Ultimately, all human thought and knowledge should lead to implementation by human hands. Although religion, philosophy, and art offer their pleasures or consolations and enhance our civilization, and although medical science may heal the sick, the world’s fortunes (including our ability to savor the arts) are improved only by handiwork, artisanship, manufacturing, and building. Knowledge infuses and sustains artisanship, craftsmanship, and manufacturing. New knowledge ultimately will be effective in creating the new manufacturing. Making things and building things are the end results of knowledge of the material world.

There are at least three prerequisites for successful manufacturing. The first is human capital, the second is an innovative system, and the third is a supply chain. Each of the three separately constitute a sine qua non for the global manufacturer. First is human capital, the first ingredient is asked often by site selectors and CEO’s. This is the university’s oldest and most venerable commitment, and often the place where modern universities are falling down. The state of Ohio has approximately 75,000 open jobs and 10% unemployment. To the degree that this mismatch reflects our university’s performance in the human capital arena, we are falling short.

But more important to my analysis here, there is a rapidly developing knowledge base about how to produce human capital. Pedagogy is changing. Universities are changing in their application of knowledge in this arena. Innovation systems are also the subject of a developing knowledge base. Formerly, the process seemed inscrutable. Today understanding customer needs, the value of interdisciplinarity, and formal periodic iteration constitute new avenues of knowledge about innovation. The University of Toledo has cultivated special understanding of these systems.

Finally, manufacturing supplies are a sine qua non. Supply chains and their management have developed as a field of understanding necessary for successful manufacturing. The reliability and design of these systems constitute a new field of study. The timing and sequencing of delivery call for new and detailed knowledge. New Knowledge interacts with the manufacturing world in exciting new ways.

Toledo is home to the Chrysler Jeep plant and the Jeep plant is home to exciting new supplier concepts, embodied in its supplier park. New knowledge is at work there.

The University of Toledo’s College of Business and Innovation has created the North American Vehicular Supply Chain Institute. Its purpose is to create and assemble existing and new knowledge regarding this third pillar of the manufacturing world.

Knowledge and manufacturing will interact in interesting and important new ways in the 21st century. You being here is a part of that. Thank you for inviting me to be a part of it.