Managing & Financing Health Innovations using Offsets

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Technology - Dual Use

- In today's industry, technology used for a given product serves as at least a guideline for numerous other products thus paving the way for increased scope of products and services. Also many technologies have a dual-use application and thus many defense technologies also contribute to the civil sector.

Technology - Dual Use

- Dual-use technology is often used as an adjunct to the process of defense conversion.
- In its simplest definition, dual-use technology can be defined as "technology that has both military and commercial applications" (Alic, Branscomb, Brooks, Carter, & Epstein, 1992).
- Both spin-off and spin-on are aspects of dual-use technology.
- The DOD’s have spent, and will continue to spend, vast amounts of money to research, develop, and produce defense weapon systems.

Technology - Dual Use

- A large part of that process involves the development of leading edge technology.
- Computers, semiconductors, numerically controlled machine tools, jet engines, and aircraft all owe their successful commercial applications to the investment of federal research and development dollars through the DOD's.
- These are examples of spin-off, or the use of defense technology for nondefense, commercially viable products or processes.

Source: Policy Studies Journal | June 22, 1994 | Brandt, Linda

Armies and Technology in History

- A line or argument commonly heard among foes of the military, or of a strong military defense, is that money spent on defense projects could be better used toward improving society by providing jobs, raising the standard of living, and solving daily problems.
- In fact, four millennia of human experience support the claim that spending on the development of new military technology ultimately serves to benefit society.

Armies and Technology in History

- Probably the first example of this principle in action is the Egyptian adoption of the chariot, which greatly advanced the technology of transportation in the second millennium B.C.
- Had it not been for the invasion by the Hyksos in c. 1670 B.C., who dealt the Egyptians a brutal blow with their chariot-equipped cavalry, Egyptian civilization might never have adopted the chariot.

Armies and Technology in History

- In c. 800 B.C., the Assyrians introduced foundational concepts of logistics—a significant component of modern business, involving the allocation and provision of supplies to meet needs—as part of an effort to supply imperial troops.
- Two centuries later, the concept of a postal service was introduced as Persian emperors sought to maintain communication with field commanders.

Armies and Technology in History

- The Romans developed their roads, which ultimately provided the blueprint for the modern superhighway system—itself a concept introduced in the 1950s by President Dwight D. Eisenhower with military needs in mind.
- In about 100 B.C., Chinese armies began using the wheelbarrow, a piece of technology so vital to the transport of military material that the emperor kept its design a secret for many years.

Armies and Technology in History

- The list of military technological developments with civilian applications continues right up to the U.S. space program in the late twentieth century, without which modern satellite communication—to name just one example—would not be possible.
- Satellite technology, in turn, facilitated the military's global positioning system (GPS), today used by civilians for navigation in onboard vehicle systems.
- Additionally, the U.S. intelligence community and military played a pivotal role in developing the Internet.

Dual Use:
“Challange vs Opportunity”

I define a technology as dual use when it has current or potential military and civilian applications. Over the years "dual use technologies" have been seen from two different perspectives:

- *In arms control literature "dual use technologies" present a **challenge** when attempting to curb the international diffusion of weapons systems.*

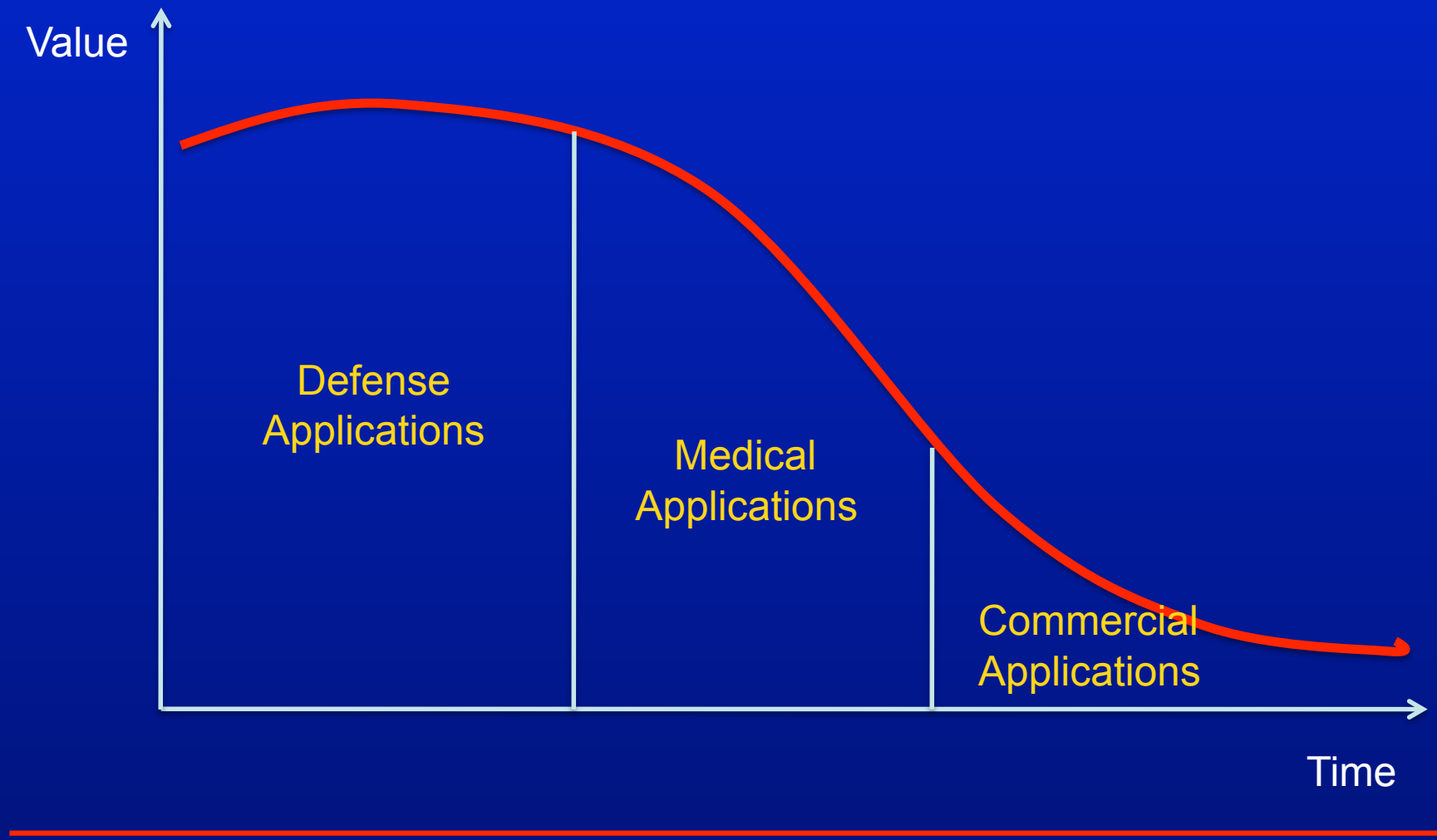
- *For analysts of the relationship between military and civilian production, "dual use" has at times been seen as presenting an **opportunity** for the wider exploitation of research and manufacturing efforts beyond their initial (military or civilian) goals.*

Source: Complex Products Systems Innovation Center Publications No: 55
Dual use technologies and the different transfer mechanisms
Jordi Molas-Gallart (SPRU)

Dual Use:
“Challange vs Opportunity”

- *The first perspective was prevalent in the late 70s and early 80s. The 1977 UN Report on the Economic and Social Consequences of the Arms Race and Military Expenditures already noted that when technologies where applicable to both military purposes and important civilian applications, the attempts to control the arms race by restricting access to such technologies would inevitably conflict with the attempts to support economic development by making these technologies available to all countries. This tension continues to be a source of disagreement and debate among those concerned with international peace and development issues.*
- *Recently, the term "dual use technology" has often been employed in the second sense: the common technological base supporting both civilian and military technological development can, for instance, provide an opportunity for defence manufacturers to diversify into civilian operations, and/or exploit commercial technologies for military applications.*

Technology "Value Curve"



Examples of Dual Use Technology "Defense & Medical"

Technology	Military / Defense Use	Civilian / Medical Use
Acoustic	Sonar	Ultrasound Diagnostic Imaging
RFID	Military Goods Tracking	Patient Data Monitoring
Shape Memory Alloys	Defense Avionics & Engine Parts Joining Technologies	Cardiac Valves……..
Laser	Guidance & Weaponry	Surgical Tool
Intelligent Textiles	Wound Healing	Cardiac Patch

Surgery benefits from defense technology:
Dual use applications of Wright Laboratory Avionics technologies to Computer Assisted Minimally Invasive Surgery (CAMIS)

- Wright Laboratory Avionics Directorate is helping to assemble a team of defense and civilian researchers to transition defense avionics and related technologies to the medical community with the goal of improving the Computer Assisted Minimally invasive Surgery (CAMIS) concept.
- Key partners include Ohio Aerospace Institute (OAI), a not-for-profit state-chartered agency, Cleveland Clinic Foundation hospital, and Picker International, medical equipment manufacturer.
- The CAMIS concept is in response to the fact that despite technical advances, most excision surgeries are exploratory rather than remedial.
- As a result, large incisions are required so the surgeon can first search for the "target" tissue and then, more cutting is needed to remove or destroy the "target".
- CAMIS is an opportunity to transition defense avionics technologies to help tackle a critical non-defense issue on the national agenda, health care.

Dual UseApplication – GE Medical Systems

- Array Processor Block
  - Fast processing block in CT 9800 Systems
  - Guidance block in specific Missile Systems

Financing Health Innovations

Some ways of financing innovations :

- R&D Funds (Defense & Non-Defense)
- Venture Capital
- Offsets

What is Offset ?

- Offsets are industrial compensation practices mandated by many foreign governments when purchasing defense articles.

- There is a definition developed in 1986 by a U.S. government interagency group: '...offsets are industrial compensation practices required as a condition of purchase in either government-to-government or commercial sales of defense articles and/or defense services as specified in the International Traffic in Arms Regulations.

What is Offset ?

- In defense trade, offsets include mandatory co-production, licensed production, subcontractor production, countertrade, foreign investment, technological cooperation and joint R&D.
- Offsets may be direct, indirect, or a combination of both. Direct offsets refer to compensation such as co-production or subcontracting, 'directly' related to the system being exported.
- Indirect offsets apply to compensation unrelated to the export item, such as foreign investment or countertrade' ("Offsets In Defense Trade", *DISAM Journal, 20:2, p. 67).*

Turkish Offset Guidelines

• Category-C:
In defense, aeronautics and aerospace industry and/or other fields requiring high technology;

DEFINITIONS
a. Technological cooperation,
b. New and/or expanded investment,
c. R&D activities.

Existing offset guidelines are open to support dual use technology (defense & medical) co-operation and joint R&D activities but needs improvement…

Evolution of Offset Guidelines for Technological Cooperation

2003	2007	2011 + Beyond (Expected)
Very Restrictive	Improved but still limited	Supporting Critical Technologies
30% - 50% cash payment to TSKGV by the recipient of tech transfer	Requires exports of products manufactured using the transferred technology	In line with the technological priorities of the country - critical dual use technologies (defense + medical)

Next Steps...

- Valuation of technology is highly complex and extremely difficult and at times may appear to be subjective.
- Creation of a technology valuation body is a must
- Critical dual use technologies (in defense + medical) can be selected supporting the defense technological priorities of the country
- Incentives should be provided to attract joint R&D projects for dual use technologies.
  - Higher multipliers
  - Investment Incentives (tax holiday, subsidies, etc.)

Thank You...

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