INNOVATION, SOCIAL CAPITAL AND DEVELOPMENT

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INDUSTRIAL PERFORMANCE CENTER
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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RESEARCH QUESTION

HOW UNIVERSITY CAN STIMULATE ECONOMIC GROWTH

SOME QUESTIONS:
1. HOW CAN UNIVERSITIES INTERACT WITH INDUSTRY?
2. WHAT DO THE FIRMS EXPECT FROM UNIVERSITIES?
3. WHAT BROADER ROLE UNIVERSITIES CAN PLAY IN ECONOMIC DEVELOPMENT?
4. WHAT ARE THE KEY TO SUCCESS OF UNIVERSITY INDUSTRY INTERACTION?
STUDY FOCUS

1. UNIVERSITY-INDUSTRY RESEARCH CENTERS IN THE US (22) IN THE US

2. REGIONAL STUDIES IN BOSTON AREA
   Southern New York State
   OULU, HELSINKI AND TAMPERE IN FINLAND
MEASURES OF SUSTAINABLE SUCCESS

UNIVERSITY: KNOWLEDGE GENERATION
   EDUCATIONAL SERVICES (ENROLLMENT & GRADUATION)

ECONOMIC DEVELOPMENT: JOBS
   NEW FIRMS
   EXPANSION OF FIRMS
   TAX BASE INCREASE
DIMENSIONS OF MEASURES

INDUSTRY/UNIVERSITY CENTER EFFECTIVENESS

I-U RELATIONSHIP

GENERAL SUPPORT

TARGETED SUPPORT

JT VENTURE
INFORMAL INTERACTIONS
CONSULTING
INSTITUTIONAL ARRANGEMENT

EXPLICIT KNOWLEDGE

TACIT KNOWLEDGE

PEER INTERACTION
WHAT INDUSTRY IS CONCERNED ABOUT

TECHNOLOGY DEVELOPMENT
RESEARCH, DEVELOPMENT & COMMERCIALIZATION

MANAGING RISKS FOR DEVELOPMENT
RISKS OF PRE-COMPETITIVE RESEARCH, FLEXIBILITY
AND IMPROVING LIKELIHOOD OF SUCCESS

HUMAN CAPITAL DEVELOPMENT
TRAINING OF NEW EMPLOYEES, CONTINUING EDUCATION,
CURRICULUM DEVELOPMENT

ACCESS TO EXPERTISE AND FACILITIES
BUILD AND ENHANCE SKILLS AND KNOWLEDGE, USE OF
FACILITIES

FORUM FOR NETWORKING
STRUCTURE, MISSION AND CRITICAL MASS
<table>
<thead>
<tr>
<th>TWO TYPES OF UNIVERSITY CENTERS</th>
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<tr>
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<tr>
<td>UNIVERSITY REPUTATION</td>
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<tr>
<td>INTERACTION LEVEL</td>
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<tr>
<td>NATURE OF OUTCOME</td>
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<td>NATURE OF CLIENT FIRMS</td>
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NETWORKING

DEVELOPMENT OF CORE TECH

DEVELOPMENT OF NON-CORE TECH

PROBLEM SOLVING

TRUST

UNIVERSITY/INDUSTRY RELATION AND ITS EFFECT
UNDERLYING FACTORS FOR THE UNIVERSITY/INDUSTRY RELATIONS
<table>
<thead>
<tr>
<th>UNIVERSITY-INDUSTRY COLLABORATION</th>
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<tbody>
<tr>
<td><strong>ORGANIZATIONAL IMPACT</strong></td>
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<tr>
<td><strong>TECHNOLOGY CENTRALITY</strong></td>
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<td><strong>NATURE OF TRANSFER</strong></td>
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<td><strong>FORM OF COLLABORATION</strong></td>
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KNOWLEDGE CREATION

(Ref. Carayannis et.al. 2000)
DYNAMIC CAPABILITY

ABILITY TO INTEGRATE, BUILD AND RECONFIGURE INTERNAL AND EXTERNAL COMPETENCES TO ADDRESS RAPIDLY CHANGING ENVIRONMENT
LEARNING PROCESS
TO DEVELOP DYNAMIC CAPABILITY

ACCUMULATION OF EXPERIENCE

KNOWLEDGE ARTICULATION

KNOWLEDGE CODIFICATION
SOCIAL CAPITAL

DEFINITION

durable and institutionalized network of social relations (Bourdieu)

connections among individuals—social networks and the norms of reciprocity and trustworthiness (Putnam)

the sum of the actual and potential resources embedded within available through, and derived from the network of relationships (Nahapiet & Ghoshal)

networks and norms that enable people to work collectively (Woolcock)
CORE CONCEPTS

TRUST
SYMPATHY
FORGIVENESS

INFORMATION FLOW
INFLUENCE
POWER
SOCIAL CAPITAL

NORMS & RECIPROCITY

VALUE INTRODUCTION

BOUND SOLIDARITY

ENFORCED TRUST

FOUR PILLARS OF SOCIAL CAPITAL

ECONOMIC & SOCIAL EXCHANGES
RELATIONSHIPS

MARKET
HIERARCHICAL
SOCIAL
EXCHANGE PROCESS
AUTHORITY
FAVOR/GIFT

ANCHORS IN SOCIAL CAPITAL

NETWORK ASSETS
EXTERNAL
INTERNAL
UNIVERSITY/INDUSTRY RELATIONS

NETWORKING
- STRUCTURAL
- NORMS OF RECIPROCITY

PROBLEM SOLVING
- COGNITIVE
- INFO SHARING

TRUST
- RELATIONSHIP

MAPPING DIMENSIONS OF SOCIAL CAPITAL WITH UNIVERSITY/INDUSTRY RELATIONSHIP
SOUTHERN NEW YORK

RURAL
DOMINANT FIRM: Corning Glass
University: Alfred University specialty Glass Science
Isolated Community
BOSTON Mass

Urban
Dominant University: Harvard and MIT
    other Universities: Boston University, Northeastern
        Tufts, University of Massachusetts
Home for High Tech Industry
Aerospace Industry
Dept of Defense Research Laboratories
Financial Institutions
FINLAND

- OULU  TAMPERE  HELSINKI

SOME POINTS ABOUT FINLAND

HOMOGENEOUS CULTURE
VERY HIGH EDUCATIONAL LEVEL
SMALL COUNTRY
GEOGRAPHICALLY ISOLATED
PROACTIVE POLICIES
Figure 2. Explosive Growth in Electronics Since the Early 1990s:
Finnish Manufacturing Production Volume by Industry (€ billions in 2000 prices)

Sources: ETIA database, Hiernae et al. (1976), National industrial statistics by Statistics Finland.
THREE FINNISH REGIONS

OULU TAMPERE HELSINKI

OULU: MOST ISOLATED
CLIMATE IS SEVERE ARCTIC WEATHER
SMALL TIGHTLY KNIT COMMUNITY
UNIVERSITY OF OULU
TWO DOMINANT FIRMS: NOKIA AND SONERA

TAMPERE RICH INDUSTRIAL HISTORY
MAJOR SHOCK IN EARLY 1990
UNIVERSITY OF TAMPERE AND TAMPERE UNIVERSITY OF TECHNOLOGY
DOMINANT FIRMS: NOKIA AND SONERA

HELSINKI CAPITAL OF THE COUNTRY
UNIVERSITY OF HELSINKI AND HELSINKI UNIVERSITY OF TECHNOLOGY
HOME OF ALL MAJOR CORPORATIONS INCLUDING NOKIA AND SONERA
### COMPARISON OF THREE REGIONS

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<thead>
<tr>
<th>ITEMS</th>
<th>SOUTHERN NY</th>
<th>FINLAND</th>
<th>BOSTON</th>
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<tbody>
<tr>
<td><strong>POLICY ORIENTATION</strong></td>
<td>DRIVEN BY A STATE FUNDED AGENCY</td>
<td>DRIVEN BY MULTIPLE AGENCIES</td>
<td>NO DIRECT GOVERNMENT INTERVENTION</td>
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<tr>
<td><strong>ORIENTATION</strong></td>
<td>LOCAL</td>
<td>GLOBAL</td>
<td>NATIONAL</td>
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<tr>
<td><strong>FINANCIAL NETWORK</strong></td>
<td>POOR</td>
<td>GOOD THROUGH PRIVATE AND PUBLIC AGENCIES</td>
<td>GOOD THROUGH PRIVATE INITIATIVES</td>
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<td><strong>PEER SUPPORT NETWORK</strong></td>
<td>ABSENT</td>
<td>GOOD</td>
<td>GOOD</td>
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<td><strong>ROLE OF DOMINANT FIRMS</strong></td>
<td>VERY LITTLE</td>
<td>IMPORTANT</td>
<td>ESTABLISHED FIRMS WERE MENTORS</td>
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<td>ROLE OF THE UNIVERSITY</td>
<td>MINIMUM</td>
<td>SOURCE OF TECHNOLOGY</td>
<td>SOURCE OF TALENTS</td>
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<td>SOURCE OF TALENTS</td>
<td>NODE IN THE NETWORK</td>
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<td>INTERPRETIVE</td>
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<td>LOW</td>
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RICHARD LESTER & MICHAEL PIORE: INNOVATION: THE MISSING DIMENSION, HBS 2004
Public Support for Innovation Development in Finland

- **SITRA**
- **TE-CENTRE FINNVERA**
- **TEKES**
- **OULUTECH SITRA / SEED**
- **FFI**

**Venture Capital**
**Business Finance, guarantee**
**R&D in technology**
**Pre-seed, seed finance**
**Evaluation, protection, r&d (prototype 1) and commercialisation**

**Research**
**Market demand**
**Idea**
**Evaluation**
**Patenting**
**R&D**
**Business Plan**
**Marketing**
**Start up**

Ref: Oulu University
Innovation Process in Oulu University

**RESEARCH BASE**
- Environmental research NorNet
- ITC Infotech Oulu
- Biotechnology Biocenter Oulu

**PRE-INCUBATOR ACTIVITIES**
1. Pre-evaluation of Research Results and Ideas
2. IPR – evaluation and Protection
3. Implementation Plan / Business Plan

**COMMERCIALIZATION**
- New High-tech Start ups / Technopolis Oulu
- Incubator / OuluTech Ltd.
- License Agreements with a 3rd Party / Licentia Ltd.

Ref: Oulu University
INNOVATION NETWORK IN BOSTON

ALUMNI

VENTURE CAPITAL

SPECIAL FORUMS

CORPORATE NETWORKS