Research and Knowledge management

Fatchiyah, PhD
Professor of Molecular Genetics
Dept. Biology, Faculty of Science, Brawijaya university
Website: http://fatchiyah.ub.ac.id
Email: fatchiya@ub.ac.id
Competency Areas

• Training’s Aims
  – Change of knowledge, skills and attitudes of the trainees
  – Learning very particular things offered
  – Not eating the fish, but learning to fish
  – Learn to work in groups

• Business skills (Learning to learn)
• Self Development
• Material Production
Three types of action

<table>
<thead>
<tr>
<th></th>
<th>Type of action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thinking</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Head</td>
</tr>
<tr>
<td>Individual</td>
<td>1</td>
</tr>
<tr>
<td>Small group</td>
<td>4</td>
</tr>
<tr>
<td>Whole class</td>
<td>7</td>
</tr>
</tbody>
</table>
Research & Knowledge Management

- **Research Management (RM)** focuses mainly on abilities to prepare, execute, disseminate, evaluate and sustain research activities within a certain frame with different settings and strategies in higher education systems or in private sector.

- **Knowledge management (KM)** focuses on how an organization (either higher education system or private sector) identifies, creates, captures, acquires, shares and leverages knowledge.

- Both consist of
  - To Get
  - To Use
  - To Learn
  - To Contribute
  - To build
  - To Assess
  - To Sustain
  - To divest

- With more focus of **RM** (left) and **KM** (right)
Research and Knowledge Management

Framework for a learning organization
Research and Knowledge Management

Trust & Scientific Work

**Socialization** involves transferring tacit knowledge from one person to another (example: on-the-job-training)

**Externalization** makes tacit knowledge explicit (learning to contribute and make tacit knowledge understandable: example: a good researcher makes his tacit knowledge public)

**Combination** transfers explicit knowledge to explicit knowledge (Example: making knowledge usable via IT: customers and engineers)

**Internalization** is the transfer of explicit knowledge to tacit knowledge (example cooking from a new recipe, gaining latent abilities with a new quality)
In this model there are two kinds of exchanges taking place between the acteurs:
Tangible exchanges which include all transactions, invoices, requests for proposals, confirmations and receipts
Intangible exchanges which include all interactions, learn effects, changes taking place in people, knowledge shared and intangible benefits:
Intangible benefits are advantages or favors that one person can offer to another: Supporting career planning, making critical introduction for someone, vouching for them socially as well as in business.

Don‘t forget that the IT is only one fourth of the whole system. Peoples‘ relation makes the three-quarter
Research and Knowledge Management

Process

Theory

Organizational Learning
(Senge; Crossan)

Practice

Content

The learning Organization
(Senge; Dixon)

Organizational Knowledge
(Hayek & Penrose, Polanyi; Nelson & Winter)

Knowledge Management
(Davenport & Prusak; Grint 6 Case)
Research and Knowledge Management

Scientific Work

- Qualification to do Research
- Research planning
- Being
- Thinking
- Project
- Encounter
- Communication
- Efficiency
- Authenticity
- Alienation
- Political
- Patriarchy
- Dialectical
- Theory of Knowledge ethics
- Research policy

Prof. Fatchiyah, PhD – Brawijaya University
Research and Knowledge Management

Scientific Work Requirements

- Establishing & Maintaining Relationship
- Process Control & Supervision
- Research Management Requirements
- Provision With Information
- Provision with Equipment & Means

Prof. Fatchiyah, PhD– Brawijaya University
Research and Knowledge Management

Trust & Scientific Work

Research Management Requirements

1 Preparation
2 Execution
3 Publication
4 Dissemination
5 Integration

Research Process

Management Tasks & Activities

Prof. Fatchiyah, PhD – Brawijaya University
Quality however stands for
**Assessment:** evaluating processes, outcomes and performance
**Reviews:** evaluating proposals and articles in Journals
**Evaluation:** Periodical and systematic analysis of processes (institutionally organized)
**Accreditation:** certification and legalization of programmes
**Audit, etc.** and more termini for judgement
An evaluation culture which is institutionally set has three facets:

**Regularity**: periodically evaluating the scientific processes, like publications, research budget, equipments etc.

**Generalization**: Performance analysis of the scientific progress as a whole and not only certain positive or negative experiences

**Systematization**: relative to criteria, standards, etc.
Quality is embedded in the social context:

**Internal and external importance:** Impact on science and society at large

**Specific and general aims and criteria:** Not only fitness for purpose, but holistic general aims and objectives

**Reflection and control:** Improvement and change for resources‘ distribution
<table>
<thead>
<tr>
<th>Authors</th>
<th>Journal</th>
<th>ICC-Coefficient</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marsh &amp; Ball 89</td>
<td>Psychological Journals</td>
<td>0.27</td>
<td>-1.0 to + 1.0</td>
</tr>
<tr>
<td>McPhail &amp; Simon 87</td>
<td>American Sociological Review</td>
<td>0.16</td>
<td>-1.0 to + 1.0</td>
</tr>
<tr>
<td>Hargens &amp; Herting 90</td>
<td>American Sociological Journal</td>
<td>0.28</td>
<td>-1.0 to + 1.0</td>
</tr>
<tr>
<td>Lampert/ Hargens &amp; Herting 90</td>
<td>Law &amp; Society Review</td>
<td>0.17</td>
<td>-1.0 to + 1.0</td>
</tr>
<tr>
<td>Ciccetti 91</td>
<td>England Journal of Medicine</td>
<td>0.26</td>
<td>-1.0 to + 1.0</td>
</tr>
</tbody>
</table>
# Measuring R & D Performance

<table>
<thead>
<tr>
<th></th>
<th>Evaluative</th>
<th>Explanatory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td>Measure Performance</td>
<td>Predict performance</td>
</tr>
<tr>
<td><strong>Inquiry</strong></td>
<td>Retroactive</td>
<td>Proactive</td>
</tr>
<tr>
<td><strong>Time line</strong></td>
<td>Past/Present</td>
<td>Future</td>
</tr>
<tr>
<td><strong>Observation focus</strong></td>
<td>Output</td>
<td>Input</td>
</tr>
<tr>
<td><strong>Indicators</strong></td>
<td>Consequential</td>
<td>Causal</td>
</tr>
<tr>
<td><strong>Rationale</strong></td>
<td>Accountability/Ranking</td>
<td>Productivity improvement</td>
</tr>
<tr>
<td><strong>Ontology</strong></td>
<td>Rational choice</td>
<td>Human relations</td>
</tr>
</tbody>
</table>
### Performance evaluative factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Indictor</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reputation</td>
<td>Rank in reputational poll</td>
<td>Carter, 1966, Roose and Anderson 1970</td>
</tr>
<tr>
<td></td>
<td>Honors/awards</td>
<td>Jauch &amp; Glueck, 1975</td>
</tr>
<tr>
<td></td>
<td>Positions held journal/Ass.</td>
<td>Jauch &amp; Glueck, 1975</td>
</tr>
<tr>
<td></td>
<td>Invitation to present papers</td>
<td>Jauch &amp; Glueck, 1975</td>
</tr>
<tr>
<td></td>
<td>No. Postgraduate Students</td>
<td>Jauch &amp; Glueck, 1975</td>
</tr>
</tbody>
</table>
### Performance evaluative factors

<table>
<thead>
<tr>
<th>Yield</th>
<th>Total publication (books, conf.)</th>
<th>Carter, 1966, Roose and Anderson 1970</th>
</tr>
</thead>
<tbody>
<tr>
<td>Character yield No. Pages</td>
<td>Niemi, 1988; Malhorta &amp; Kher, 1996</td>
<td></td>
</tr>
<tr>
<td>Publication yield/capita</td>
<td>Howard/Cole &amp; Maxwell, 1987</td>
<td></td>
</tr>
<tr>
<td>Publication adjusted to the co-authors</td>
<td>Coe &amp; Weinstock, 1984; Vocino &amp; Elliott 1984</td>
<td></td>
</tr>
<tr>
<td>Influence</td>
<td>Citation counts (SSCI/SCI)</td>
<td>Sharplin/Mabry, 1985; Garfield, 1978</td>
</tr>
<tr>
<td></td>
<td>Text book citation count</td>
<td>Perlmann, 1984</td>
</tr>
<tr>
<td></td>
<td>Cited manuscripts</td>
<td>Cole &amp; Cole, 1967</td>
</tr>
<tr>
<td>Factor</td>
<td>Indictor</td>
<td>References</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Demographic</td>
<td>Age</td>
<td>Levin &amp; Stephan, 1991</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>Astin, 1978; Cole 1979</td>
</tr>
<tr>
<td></td>
<td>Marital status</td>
<td>Astin &amp; bayer, 1979; Cole &amp; Zuckermann, 1983</td>
</tr>
<tr>
<td>Experience</td>
<td>Career age</td>
<td>Rebne, 1990; Goodwin &amp; Sauer, 1995</td>
</tr>
<tr>
<td></td>
<td>Past performance record</td>
<td>Allison &amp; Long, 1990</td>
</tr>
<tr>
<td></td>
<td>Methodology knowledge</td>
<td>Jones &amp; Preusz, 1993</td>
</tr>
<tr>
<td></td>
<td>Education/training quality</td>
<td>Rebne, 1990</td>
</tr>
<tr>
<td></td>
<td>Doctoral school prestige rating</td>
<td>Long, 1978</td>
</tr>
<tr>
<td></td>
<td>Initial placement prestige rating</td>
<td>Long, 1978</td>
</tr>
</tbody>
</table>
## Performance explanatory factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Indicator</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personality</td>
<td>Self-efficacy</td>
<td>Taylor, et al., 1984</td>
</tr>
<tr>
<td></td>
<td>Goal driven</td>
<td>Locke, et al., 1994</td>
</tr>
<tr>
<td></td>
<td>Multiple project Managem. skills</td>
<td>Taylor, et al., 1984</td>
</tr>
<tr>
<td></td>
<td>Time Managem. skills</td>
<td>Hancock, et al., 1994; Harries and Kaine, 1994</td>
</tr>
<tr>
<td></td>
<td>Decent</td>
<td>Scott, 1981; Rebne, 1990</td>
</tr>
<tr>
<td>Institutional</td>
<td>Visibility research consequences</td>
<td>Gordon &amp; Marquis, 1966</td>
</tr>
<tr>
<td></td>
<td>Time spent on research</td>
<td>Hoyt &amp; Spangler, 1976; Fox, 1992</td>
</tr>
<tr>
<td></td>
<td>Time allocation</td>
<td>Hoyt &amp; Spangler, 1976; Fox, 1992</td>
</tr>
<tr>
<td></td>
<td>Size of institution</td>
<td>Rebne, 1990</td>
</tr>
</tbody>
</table>
## Performance explanatory factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Indicator</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial</td>
<td>Research grant awards</td>
<td>Boyer, 1990; Gillett, 1991</td>
</tr>
<tr>
<td></td>
<td>Direct expenditure</td>
<td>Jones, Lindzey, &amp; Coggeshall, 1982</td>
</tr>
<tr>
<td>Collaborative</td>
<td>Contact with peers</td>
<td>Jones &amp; Preusz, 1993; Zambaripa, 1995</td>
</tr>
<tr>
<td></td>
<td>Consulting projects</td>
<td>Nancock, et. Al., 1992; Rebne, 1990</td>
</tr>
<tr>
<td></td>
<td>Supervision G. students</td>
<td>Hancock, et.al., 1992</td>
</tr>
<tr>
<td></td>
<td>Doctoral Programmes</td>
<td>Pettigrew &amp; Nicholls, 1984</td>
</tr>
</tbody>
</table>
Indicators Components of Research Performance

- Organizational knowledge
- Innovation
- Organizational learning
- R & D personnel
- Technology transfer
- Contract services
- Research project time
- R & D facilitations
- Technology implicit transfer
- Customers‘ satisfaction
- Job satisfaction
- Information
Trust & Scientific Work

Criterion required for an egalitarian cooperation:
Understanding research as part of the job-description or business

Quality of Research: Articles published in international refereed journals; scientific books by internationally well-known publishers; citations

Research Activity: Minimum quality standard; reports in national journals; working papers; conference proceedings; conference presentation

Impact of Research: citation by other researchers; invited and plenary presentations; number of foreign co-authors

Activity in Educating young scientists: doctoral degree produced; number of doctoral students supervised

Activity in scientific community: membership in editorial boards; edited books and special issues of journals; services as an expert; scientific conferences organized, memberships in program committees
Decision-making Process and Structure
Locus of decision-making by Level

- Institutional Governance
- Institutional executive
- Faculty/Department/ research Centre
- Level of separate research activities
- Committees
Establishing research management structures

- Establishing an environment conducive to research (research culture)
- Fostering flexibility (external environment)
- Setting and maintaining quality standards
- Attracting to the university

The task

- Capacity of the central research office, staffing and authority
- Size of discretionary funding
- Incentives and disincentives for encouraging participation
- Interface between research management and the academic structure
- Students’ educational career interests and research
Research and Knowledge Management

Requirements for exercising managerial position

• Entrepreneurship
• Ability and willingness
• Administrative and organizational skills
• Strategic thinking
• Networking skills
• Resourcefullness
• Understanding research process
• Research leadership capacity
• Communication skills
Critical Components for Governance

• *Owing the right assets*: knowledge; rights (IPR); human resources; financial resources; facilities; organizational capital; evaluation

• *Providing the right skills*: adapting to change; anticipating change; generating change

• *Enhancing the right capabilities*: relationship, networks

Contzen, 2003
Key Questions for Institutions for Establishing and Developing Institutional Research Plan

- Articulation of strategic decision-making at the institutional level vs individual or team activities
- Formulate research priorities which built upon strength and engage environment (metropolitan, provincial or rural)
- Balance competing pressures: basic vs more oriented; maintaining breadth vs concentrating on limited areas; supporting existing activities vs responding to emerging possibilities; tried and tested vs high risk undertakings etc.
- Ensuring the exclusiveness and representativity of priorities: balance between university governance and management
- The increasingly onerous impact of reporting demands in the model of central steering
Nurturing the research career
Motivational Aspect

- Intellectual Challenge
- Recognition by the peer group
- Recognition by academic institutions
- Recognition by institutions outside academia

Managerial tasks

- Attracting high calibre research staff
- Retaining research staff
- Research education
- Supporting early career researchers
Research and Knowledge Management

Theses concerning scientific cooperation (A. Mehler, U. Engel)
1. German government policy is becoming more aware of its international responsibilities.
2. Social sciences dealing with developing countries are increasingly being marginalised in German university education, in systematic disciplines as well as in the so-called regional studies.
3. Developing countries-oriented basic research lacks the funds for ongoing internationally competitive and politically relevant research.
4. Critical and systematic political consultancy and evaluation capacities are scarce.
Research and Knowledge Management

Scientific control

Low-trust-Environment

High-trust-Environment

Trust

Efficiency & Effectiveness

Leadership, top-down

Relationship, ascription

Responsibility, leader

Performance: measurable

Lose Structure, egalitarian

Risk and uncertainty, opportunism

Relationship, dispositional

Leadership, missing

Performance: intangible

Network:

Control and trust

Leadership:
Instead of focusing On re-structuring And re-engineering focus on:
-increasing trust
-relationship
-increasing performance
-change management
-Information flow
-optimum control and trust

Quality improvement
Social Network and Trust

Trust in Social Order

Historical view

SECURITY

↓

AUTONOMY

RIGHT

-Negative Human Image
-Political Despotism
-Political hierarchy
-No or Simple Networks
-Lack of Trust/Control

-Positive Human Image
-political and individual Freedom
-Egalitarian Principle
-No or complex Networks
-Much Trust/Trust abused

Contract
Placing TRUST Definitions:

- Placing Trust
- Trustor
- Trustee
- Honor Trust
- Abuse Trust
- Obtaining Payoff
- Receiving Payoff
Trust, Autopoiesis and Communication in a Complex Social Order

Trustor:
- Information based upon
  - Selection
  - Sense
  - TRUST

Transfer based upon
- Selection
- Sense
- TRUST

UNDERSTANDING

Trustee:
- Honor/abuse information, Transfer, missing sense
- No action/Reaction

Prof. Fatchiyah, PhD – Brawijaya University
Trust in Social Networks

Social Networks are necessary settings in complex social systems. To improve socially **learning** and to improve economically **control**.

Empirical Evidence

- **Larson 92**: Relation between organizations starts with small transactions in order to increase trust after a "trial period".
- **Uzzi, 96/7**: Failure rates are lower the stronger the partners are integrated in Networks - "comparative advantage of trust in strong relationships".
- **Gulati, 95**: Interorganization ties between advertising agencies and their clients have smaller probability of being dissolved - "Network properties, experiences in alliances".
Empirical Evidence

- Lyon, 94: The probability for arranging relationship with a formal contract decreases with the number of years. "subcontractors have been trading with their most important consumers"
- Kollock, 94: Experiment with sellers and buyers show that dens networks were extrem opinion about trustworthiness. "Learning through networks about others experiences"

Conclusively:
(1) Dens information in networks do not necessarily lead to more trust, but the content of the information
(2) Dense network improves trust, but distrust is often disregarded
(3) Network increases the control of behaviour of trustees due to experiences and risks shared
Trusters who are better embedded in social networks will learn faster from other trustors and are in a better position to control the trustee because they receive more information and transmit information faster through the network.
Social Network and Trust

Categories of Trust and Confidence

<table>
<thead>
<tr>
<th>Trust</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>I. The Networker</td>
</tr>
<tr>
<td></td>
<td>Committing to common activities</td>
</tr>
<tr>
<td></td>
<td>Sharing risks among the members of the network</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trust</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>II. The Classical Entrepreneur</td>
<td></td>
</tr>
<tr>
<td>Individual's need for achievement</td>
<td></td>
</tr>
<tr>
<td>Opportunism in co-operation</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trust</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>III. The Small Scale Enterpriser</td>
<td></td>
</tr>
<tr>
<td>Avoiding risks</td>
<td></td>
</tr>
<tr>
<td>Small scale networking</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trust</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>IV. The Self-employed</td>
</tr>
<tr>
<td>Withdrawal from common activities</td>
<td></td>
</tr>
</tbody>
</table>
Trust and Confidence

1. Becoming self-employed entrepreneur is buying one’s own autonomy
2. Confidence about being one’s own master
3. Independent of timetable and controls imposed by supervision
4. Decide, who are the customers, what are the products, how is production technically executed
5. Understanding uncertainty and risk
6. Understanding irregular income
Stability  
Bureaucracy

Change
Networks

Complexity and Applicability Disorder and Managem.(2)

Pioneer Style
Conclusions:

1. Proposal Writing is not only a skill; it is a managerial activity at the same time
2. The context in which the proposal writing skills are realized is the most important aspect
3. Research activity is the most public activity and is controlled by the scientific community
4. Research is according to the evolutionary theory of epistemology a critical selection among variants
5. Quality and relevance are measured by peer reviewing
6. International research needs basic consideration of co-operation patterns