

# Engaging Researchers in Research Information Management Systems

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[rims.cci.fsu.edu](http://rims.cci.fsu.edu)



# Overview

- Introduction
  - Research Design (Besiki)
- Findings
  - Activities and public RIMS profile (Shuheng)
  - Motivations (Besiki)
  - User-editable and -supplied metadata; implications to the practice (Dong Joon)
- Q&A

# RIMS – What is?

- Group of information systems that manage and provide access to researchers' authored content and identity information and related services
- There are many RIMSs of different scale and scope: global, statewide, institutional, and disciplinary
- Different names: Research Information Management Systems (RIMS), Current Research Information Management Systems (CRIS), Expert Finder Systems (EFS), Researcher Social Networking Systems ...



# Many different uses and users of RIMS

- RIMSs are essential for
  - sharing, grouping, linking, aggregating, and retrieving scholarship
  - evaluating the research productivity and impact of individuals, groups, and institutions
  - identifying potential collaborators, expertise, and new technologies; and assessing the innovation potential of those technologies
- RIMSs have many different users which may include, but are not limited to
  - **scholars** themselves, promotion and tenure committees, journal editors and conference program chairs, administrators, external evaluators, funding agencies, innovation and technology transfer officers, industry technology scouts, librarians, journalists, and members of the public

# Problem Statement

- Scalable and Effective Quality Assurance
  - How to ensure the accuracy and completeness of information and knowledge in RIMs?
- A critical issue for any information system. The quality and the value of the outcomes of the activities supported by RIMs are determined by the quality of research information they store and curate

## Quality Assurance



User professionals  
(RIMS managers, librarians)

Can only curate what researchers are  
willing to share



Use algorithms  
(aggregation, mining)

Can only curate what researchers are  
willing to share



Use a combination of professionals,  
algorithms, and **researchers**

**Engage researchers in sharing and curating  
their research information and knowledge**

# Research Design

- Problem *Engage researchers in sharing and curating their research information and knowledge. How?*
- Research Objective *Gain a better understanding of researchers' needs for and uses of RIMs*
- Outcome *Theoretical Framework for researcher participation in RIMs: Can be used to design communication strategies and templates for enhancing researcher's participation in RIMs.*

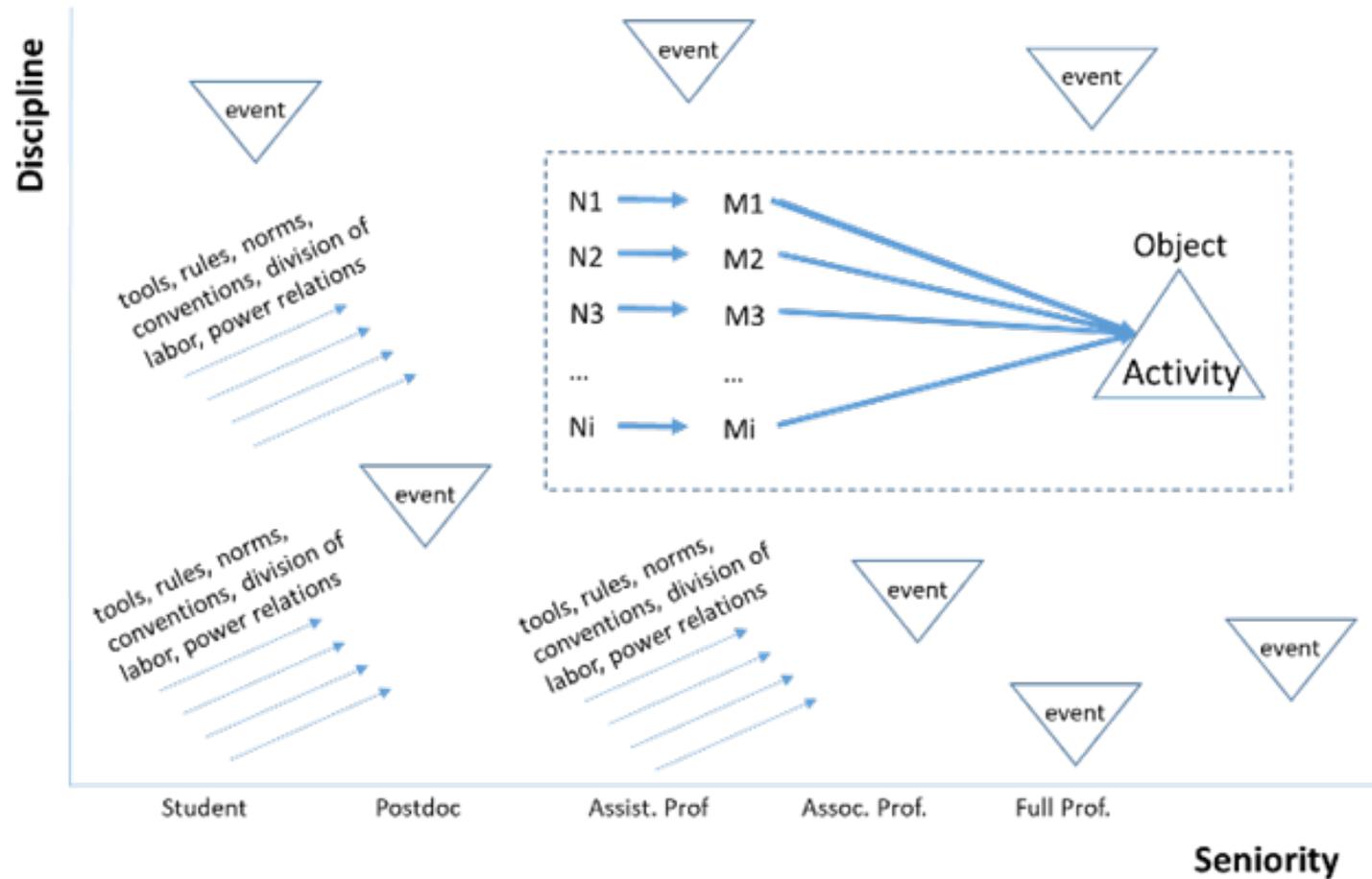
# Research Design

- Activity Theory and a literature analysis
- Qualitative semi-structured interviews
  - 15 researchers
- Survey
  - Sample of 412 researchers from 80 DUHRA universities stratified by seniority and discipline
- Designed an interview protocol and a survey questionnaire
- Expanded and refined the survey instrument
- Metadata analysis of sampled-profiles
  - 126 profiles

# Research Design – A guiding framework

- How can RIMS engage researchers in sharing and curating their research information and knowledge’?
  - Activity theory provides general models for the relationships among an activity’s needs, motivations and objective. It also defines a general structure of an activity’s context.
  - The online communities literature provides a general model of participation in peer-production communities, and motivation theories that can be used to explain and interpret researchers’ participation in RIMS and devise mechanisms for enhancing researchers’ participation in RIMSs.

# General Model of Researcher's Activity in RIMS



# Research Questions

- How can RIMS engage researchers in sharing and curating research information and knowledge?
  - What are researchers' needs and uses of RIMSs?
  - What are the motivations as well as amotivations/disincentives for each of those uses?
  - What are researchers' priorities for the RIMS uses?
  - What are researchers' priorities for the motivations?
  - What are the context factors that effect the uses and priorities?

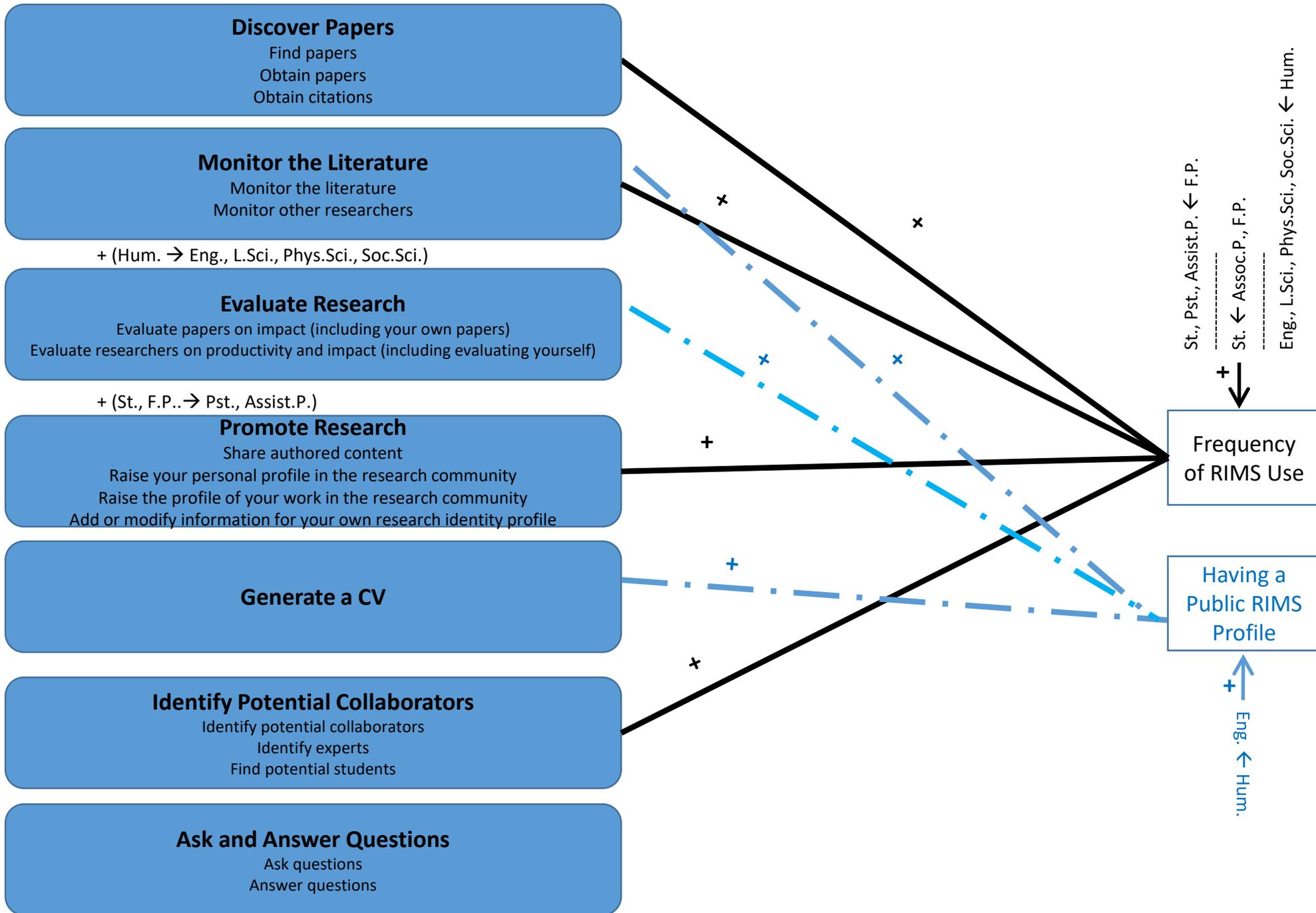


# Findings: Researchers' Needs and Priorities for RIMS services

- How to identify RIMS services and measure their relative value?
  - How do researchers use RIMSs? For what activities do researchers use online RIMSs?
  - How to measure researchers' priorities for those activities and related RIMS services?

# Task Groups

# Extent of Use



# Why to have a RIMS Profile?

- I started using Google Scholar ... after Google misidentified [my] article. I actually did not have the intention to use Google Scholar—just created an account to correct the error. (S2)
- There are students or applicants who pursue me through LinkedIn or ResearchGate ... For student recruiting, I don't see a very efficient mechanism to find good applications because for now, we have probably only two ways. One way is the random applications in the system, because every university has an application system ... The second way is just to go out and ask my friends or colleagues ... That's very inefficient. I don't have enough applications. I don't have a big pool to select [from]. (S15)
- “Never ceases to amaze me how many postdoc scientists & other early career researchers have basically zero internet presence. Many have no website (beyond an impoverished uni site & even that's often missing), no readily available contact details, no pub list.  
**Don't be invisible.**
- So, if you're an active junior researcher & don't have a readily accessible public profile, these are 3 things you're missing out on:
  - collaborations
  - peer reviewing opportunities (important for training, good way to impress editors & build connections)
  - speaking invitations”
- “Another thing they're missing: requests from journalists. I often want to talk to the post doc, the lead author who was hip deep in the work. But the big wig is the one listed, and if I can't find the post doc? I can't ask them.”
- “What I find even more amazing are relatively established researchers (with faculty position) who haven't set up a Google Scholar profile...”
- **“Invisibility deprives [researchers] of opportunities and also deprives colleagues of their expertise.”**

# Why **NOT** to have a RIMS Profile?

- If you don't maintain it [your research identity profile], then it gives people an inaccurate view of your productivity, so you run the risk of potentially sending a signal about your productivity that's not accurate. (S9)
- I think there's too many of them out there and it's too much to keep up with, and that it's a little overwhelming ... I sometimes wonder if ResearchGate and Academia.edu are just fads and that they will be replaced or disappear at some point with something that is more effective and more [widely used] across the board. (S7)
- “2 takes: 1) "not into self-marketing" is a "ivory-tower" kind of idea. I'm from a soc dept w profs hired in the 70s, who do not use SPSS, dislike dynamic powerpoints & Ted talks from academics, and tell their students online presence is a waste of time.”
- “I agree - but it's hard when you're starting out! It can feel vain and if you don't have publications it's hard to know what to have on there. **Good templates help...**”
- “At which stage of a research career we should start being present online from your point of view? Would it be appropriate for a PhD student to be involved in scientific communication and/or having a personal website to promote her/his research?”
- “They are not invisible. You and other people know them. They don't wanna too much exposure. Internet presence demands time, can be very tricky and dangerous sometimes...”
- “Well said. I never really bothered (and still don't) with much of an online presence. It takes a lot of time to do properly and that's time I could be spent writing papers or preparing lectures.”

# Amotivations

Having a Public RIMS Profile

↑ + Eng. ← Hum.

**Not Required**  
My institution does not require me to have a profile in a RIMS  
I am not expected by my supervisor to have a profile in a RIMS

1

**No Effect on Status**  
Not having a profile does not really hurt my reputation as a researcher  
I feel that not having a profile in a RIMS does not affect my status as a researcher

2-3-4

**Not Useful**  
I have no real need to have a profile in a RIMS  
It does not really make a difference to my work whether I have a profile in a RIMS or not

2-3-4-5

**Cost**  
I avoid the cost of maintaining my profile  
I do not have time to spend on maintaining my profile

2-3-4-5

+ (Hum. ← Soc. Sci.)

**Not Norm**  
It is not common to have a profile in a RIMS in my department or laboratory  
Not many researchers I know have a profile in a RIMS

3-4-5

+ (Hum. ← Soc. Sci.)

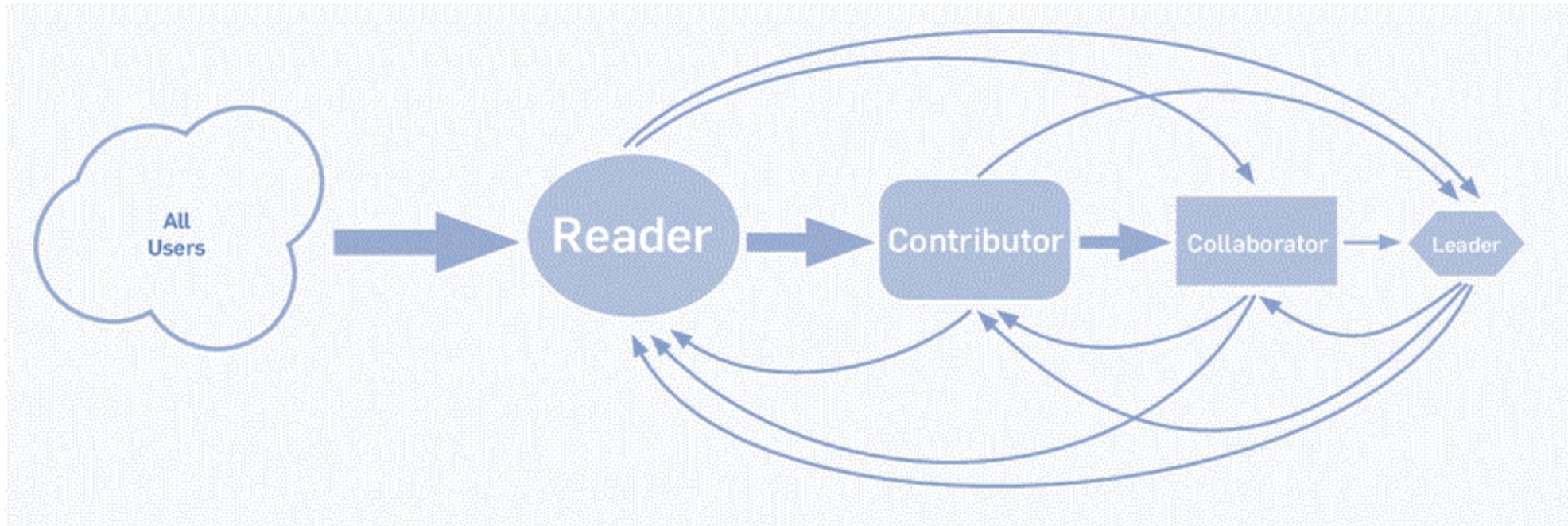
**Fad**  
I'm not certain whether RIMSs are a fad or here to stay

6

# Implications for RIMS Design and Management

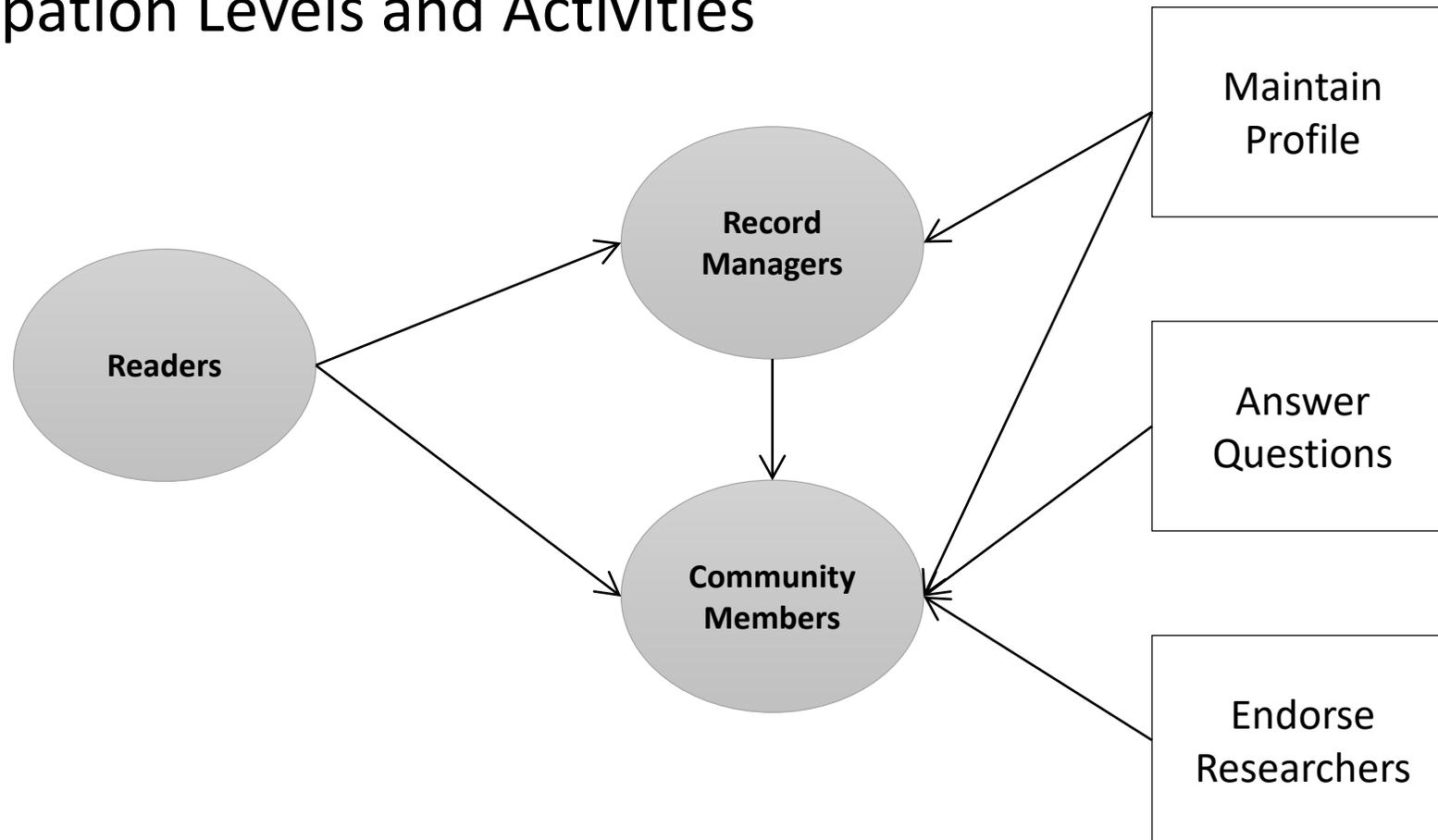
- The taxonomy of tasks can help generate a set of requirements for and groupings of services that RIMSs need to provide.
- Identifying the groups of tasks linked to frequent use of RIMSs can help prioritize services with regard to implementation, support, and marketing to users.
- The relationships among tasks and RIMS services could also be enumerated and used to tailor communication with users to promote higher RIMS use and adoption.
- Specifically, the identified relationships could be used to assemble communication messages that educate users on how a specific RIMS component or service could be used, including uses that were not intended when the system was designed.

# Roles, Participation Levels: Moving between the Periphery to the Core



# Findings

- Participation Levels and Activities



# Motivations

1

Share Scholarship

2-3-4

Improve Status

2-3

Enjoyment

3-4

Support Evaluation

5

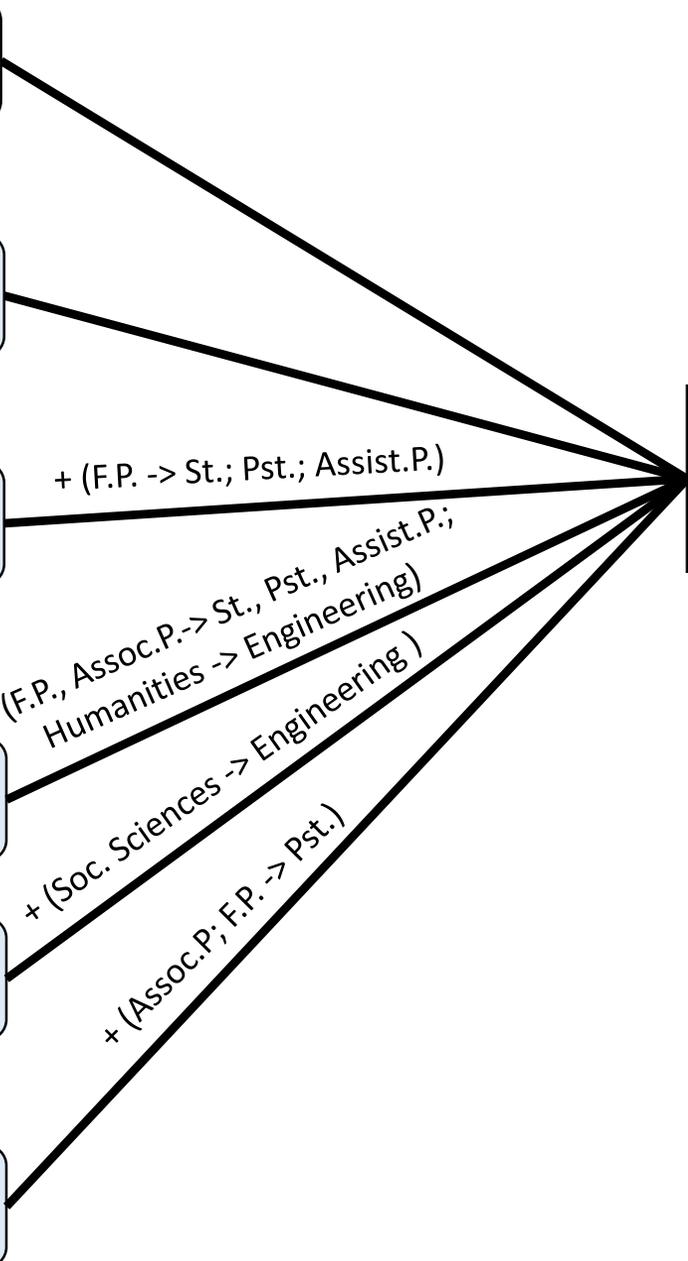
Quality of Recommendations

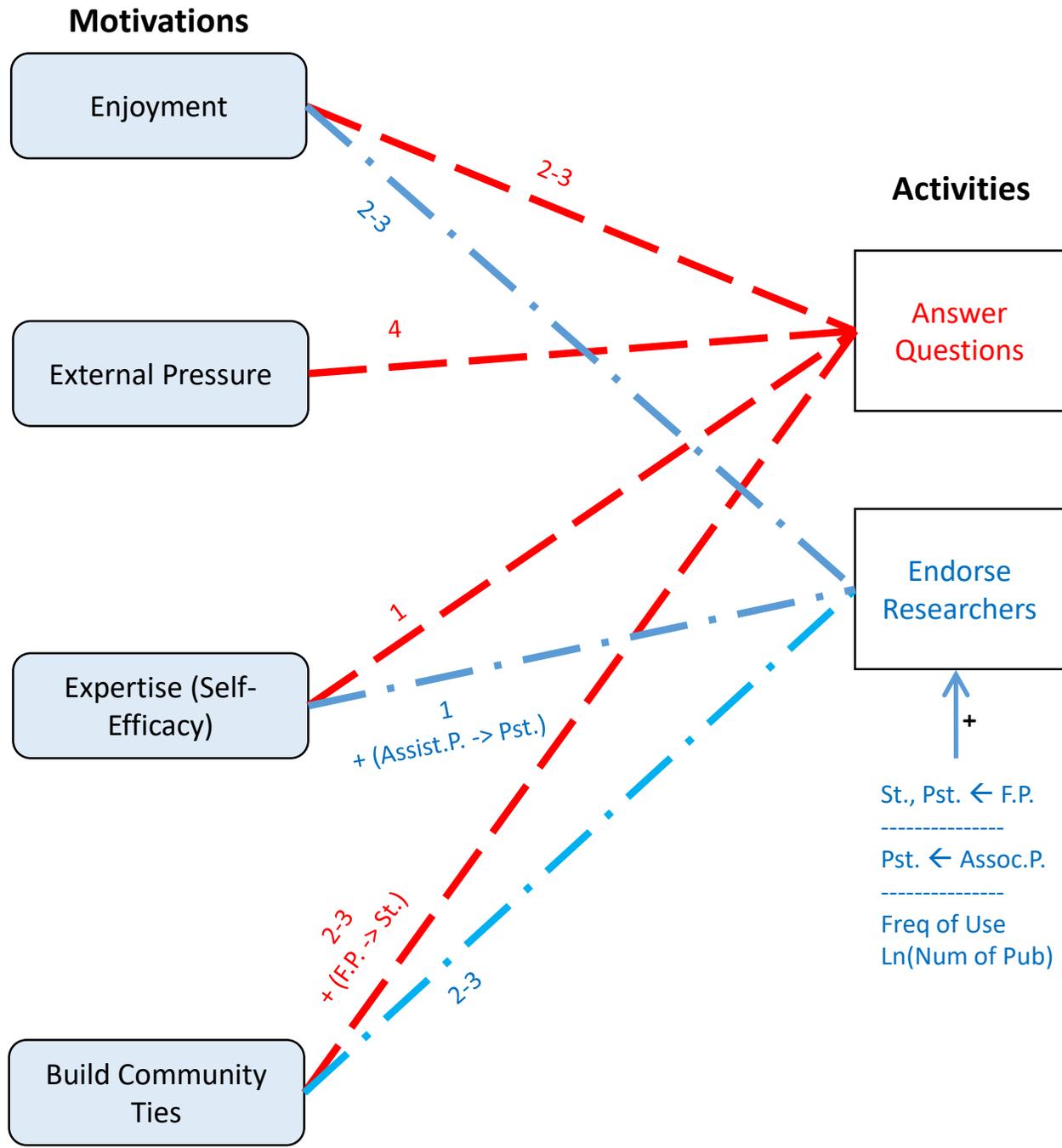
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External Pressure

# Activities

Maintain Profile

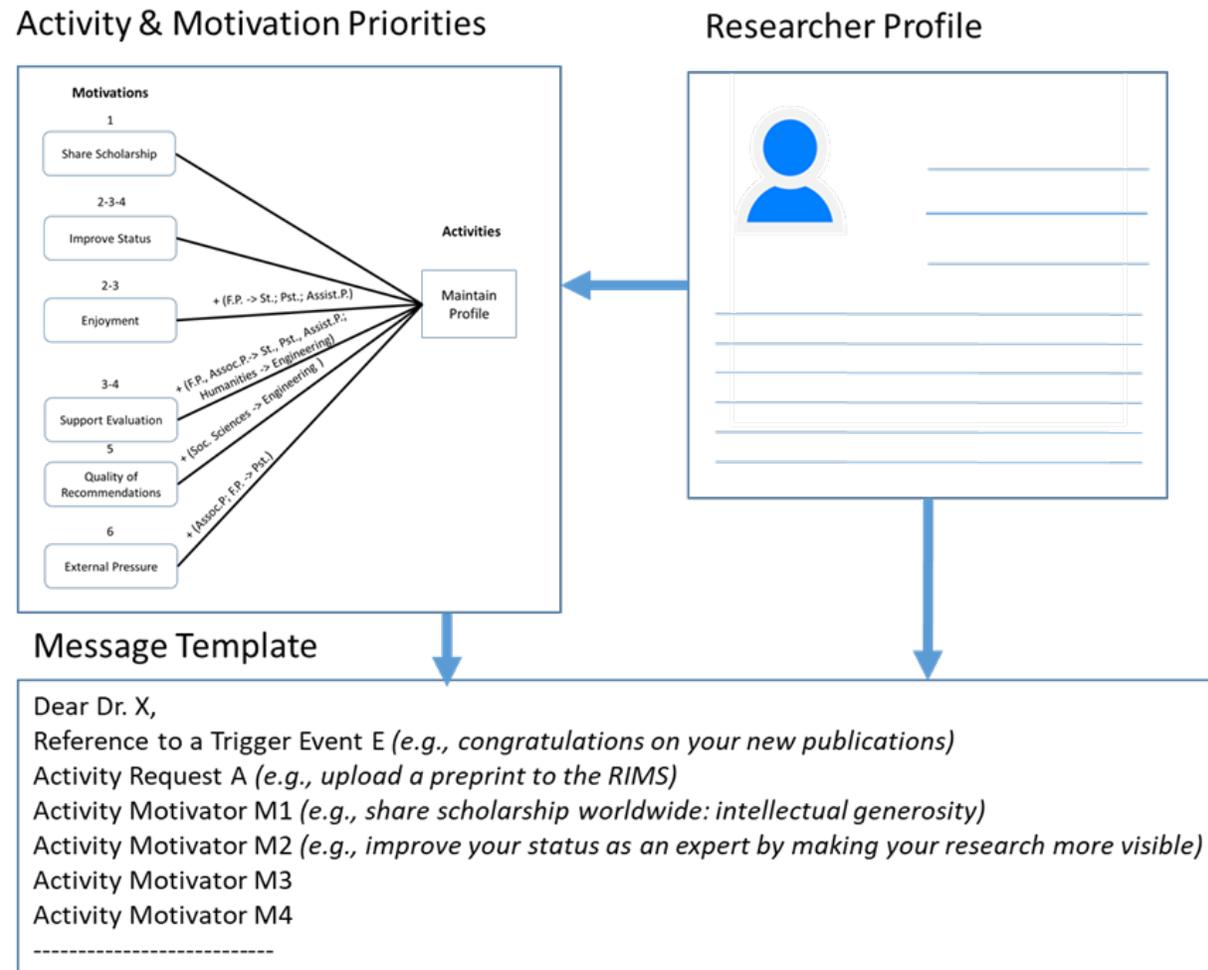




# Implications for RIMS Design and Management

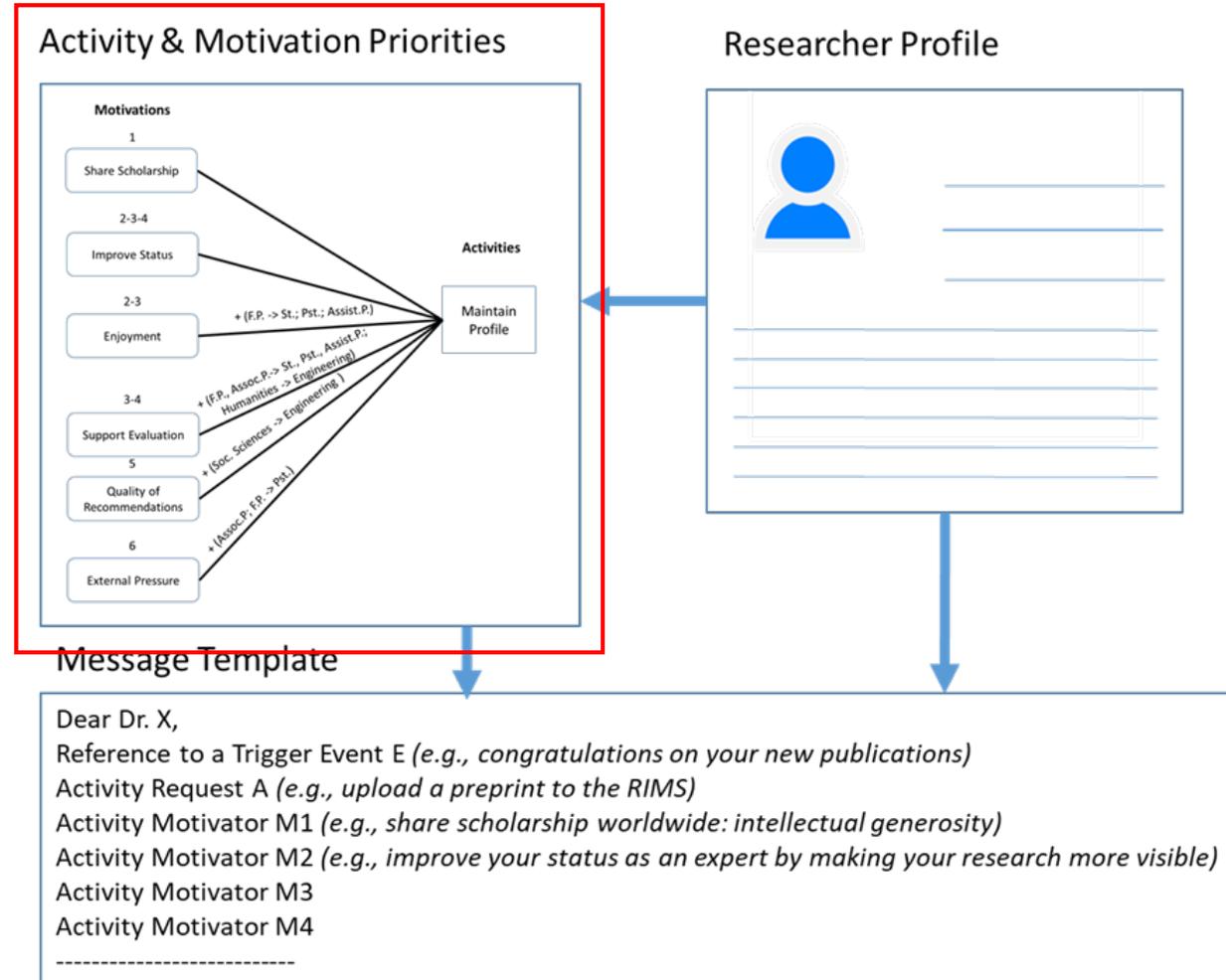
- Activity-specific sets of motivations can be used to guide the design of personalized communication strategies and message templates to increase researchers' participation in RIMSs and the quality of their contributions.
  - Communication strategies can be implemented as sets of association (i.e., If-Then) rules. The If part may specify the condition of the rule, such as the recommended activity or task for the researcher, and the researcher's context, such as the discipline, seniority, extent of RIMS use, trigger event, or number of publications. The Then part of the rule may specify a communication action(s) and the related message templates the RIMS curator can use to engage the researcher in the recommended activity.
  - Furthermore, the activity-specific priorities for motivations from the Framework can be used to define what motivations the content a message template should connect to and in what order.
- As with the other models in the Framework, the motivation typology and models can be further expanded and refined unobtrusively through association rule learning by collecting and mining RIMS logs of researchers' actions and changes in their contexts (e.g., events such as seniority status changes or having new publications). In addition, the rules can be refined by directly requesting feedback from researchers.

# Example of Framework Use: Message Template Relationships



# Findings – Profile Metadata

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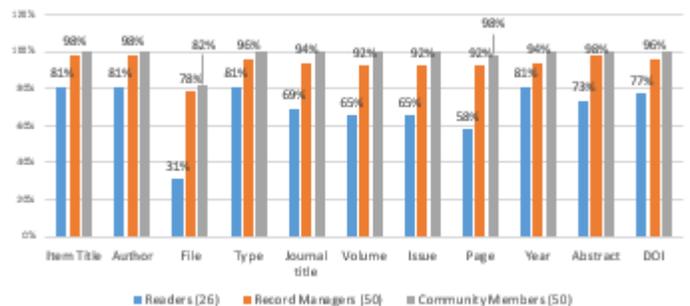
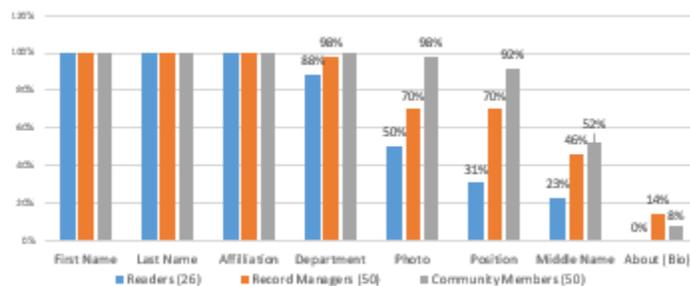
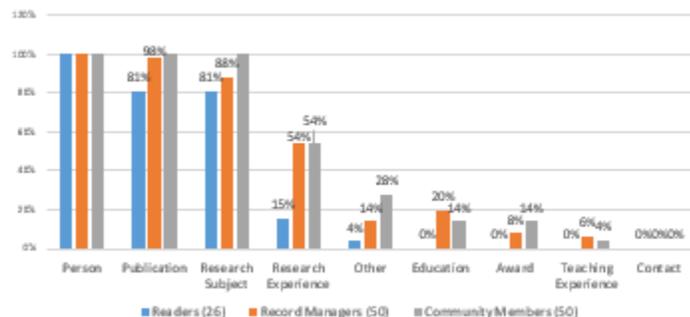
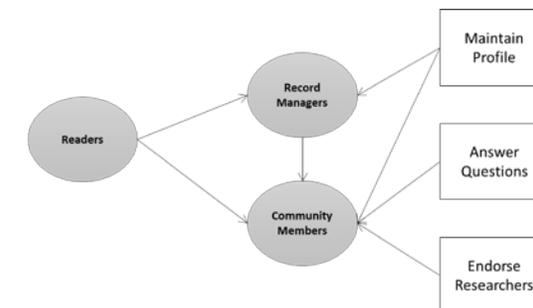


# Findings

- User-Editable Metadata

Categories	Metadata Elements
<b>Person</b>	First name, Middle name, Last name, Alternative first name, Alternative middle name, Alternative last name, Degree, Institution, Department, Position, Time period, Gender, Email address, Profile photo, Time zone, About
<b>Publication</b>	Publication title, Author, File, Type (i.e., book, chapter, code, conference paper, method, patent, poster, proposal, technical report, thesis, working paper), Journal referee, Volume, Issue, Page, Day, Month, Year, Topic, Abstract, DOI, Publisher, Editor, Edition, ISBN, Chapter, Book title, Description, Language(s), Repository link, License, Ref. Number, Ordinal, Grant number, Report number, Supervisor, Degree, Version number, State
<b>Research subject</b>	Topic, Skills & Expertise, Discipline
<b>Research experience</b>	Position, Institution, Department, Research group, Time period, Location, Description
<b>Teaching experience</b>	Position, Institution, Department, Time period, Location, Description
<b>Education</b>	Institution, Field of study, Degree, Time period, Location
<b>Award</b>	Type (i.e., award, grant, scholarship), Title, Start date, End date, Amount, Funding agency, Grant reference, Principal investigator, Research institution, Co-investigator, Secondary institution
<b>Contact</b>	Location, Website, Phone, Mobile, Fax, Twitter, Skype, Instant messenger, Birthday,
<b>Other</b>	Language(s), Scientific society, Journal referee, Other interest, ORCID

# Findings



- Community members are more willing to share their personal information than readers and record managers.
- Compared to readers, community members and record managers are more willing to provide full-texts of their works (downloadable files) on ResearchGate.
- Community members are more likely to share their skills and expertise, research topics, and disciplines on ResearchGate.

# Findings

- Relationships among Metadata & Participation

Metadata elements	Levels of Researcher Participation		
	Chi-Square	df	Asymp. Sig.
RG Score	2.212	2	0.331
Reads	5.081	2	0.079
Citations	1.983	2	0.371
Profile views	8.187	2	0.017
Followers	10.391	2	0.006
Research items	1.665	2	0.435
Skills and expertise	34.626	2	0.001
Following	26.560	2	0.001
Followed items	10.822	2	0.004
Topics	10.371	2	0.006
Awards and achievements	4.315	2	0.116
Photo	24.330	2	0.001
First name	0.001	2	1.000
Last name	0.001	2	1.000
Middle name	5.956	2	0.051
Position	30.689	2	0.001
Department	7.719	2	0.021
Affiliation	0.001	2	1.000
Project	6.659	2	0.036
About	4.229	2	0.121
Research experience	12.288	2	0.002
Teaching experience	0.279	2	0.870
Education	5.834	2	0.054
Language	1.900	2	0.387
Scientific societies	6.757	2	0.034
Advisor	6.221	2	0.045
Journal referee	2.101	2	0.350
Question	2.377	2	0.305

# Findings

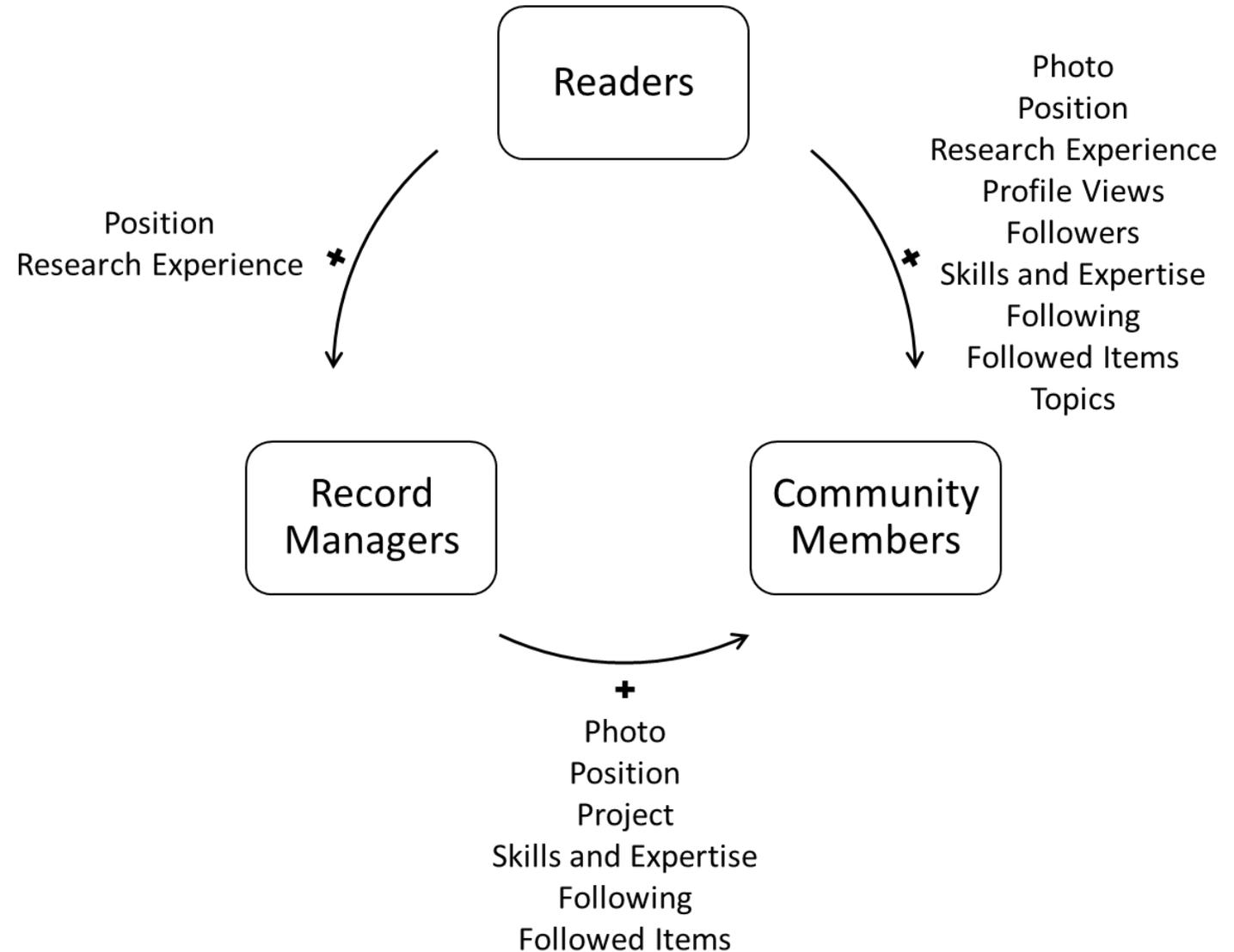
- Relationships among Metadata & Participation

Metadata elements	Model fit	Coefficient (p-value), when baseline 0	Coefficient (p-value), when baseline 1
	$\chi^2$ / p-value	Indicator: 1 / 2	Indicator: 2
Photo	29.01 / 0.0001	0.85 (0.090) / <b>3.89 (0.001)</b>	<b>3.04 (0.004)</b>
Position	31.50 / 0.0001	<b>1.66 (0.002) / 3.25 (0.001)</b>	<b>1.60 (0.008)</b>
Research experience	13.57 / 0.0011	<b>1.87 (0.002) / 1.87 (0.002)</b>	4.65 (1.000)
Project	6.69 / 0.0352	0.47 (0.692) / 1.83 (0.090)	<b>1.37 (0.049)</b>
Department	2.94 / 0.0864	1.85 (0.117) / 0	0
Scientific societies	1.99 / 0.1580	-0.81 (0.169) / 0	0.81 (0.169)
Advisor	2.64 / 0.1042	1.09 (0.123) / 0	-1.09 (0.123)

Metadata elements	Mean Ranks	Sample 1 - Sample 2	Std. Error	Adj. Sig.
	0/1/2			
Profile views	45.96/	0 – 1	9.025	0.812
	55.92/	0 – 2	8.970	<b>0.024</b>
	69.81	1 – 2	6.971	0.139
Followers	44.38/	0 – 1	8.828	0.076
	64.13/	0 – 2	8.828	<b>0.004</b>
	72.81	1 – 2	7.303	0.704
Skills and expertise	39.69/	0 – 1	8.803	0.378
	53.16/	0 – 2	8.803	<b>0.001</b>
	86.22	1 – 2	7.281	<b>0.001</b>
Topics	44.62/	0 – 1	8.782	0.083
	63.94/	0 – 2	8.782	<b>0.004</b>
	72.88	1 – 2	7.264	0.655
Following	40.94/	0 – 1	8.824	0.284
	55.69/	0 – 2	8.824	<b>0.001</b>
	83.04	1 – 2	7.299	<b>0.001</b>
Followed items	54.40/	0 – 1	8.578	1.000
	55.42/	0 – 2	8.578	<b>0.032</b>
	76.31	1 – 2	7.095	<b>0.010</b>

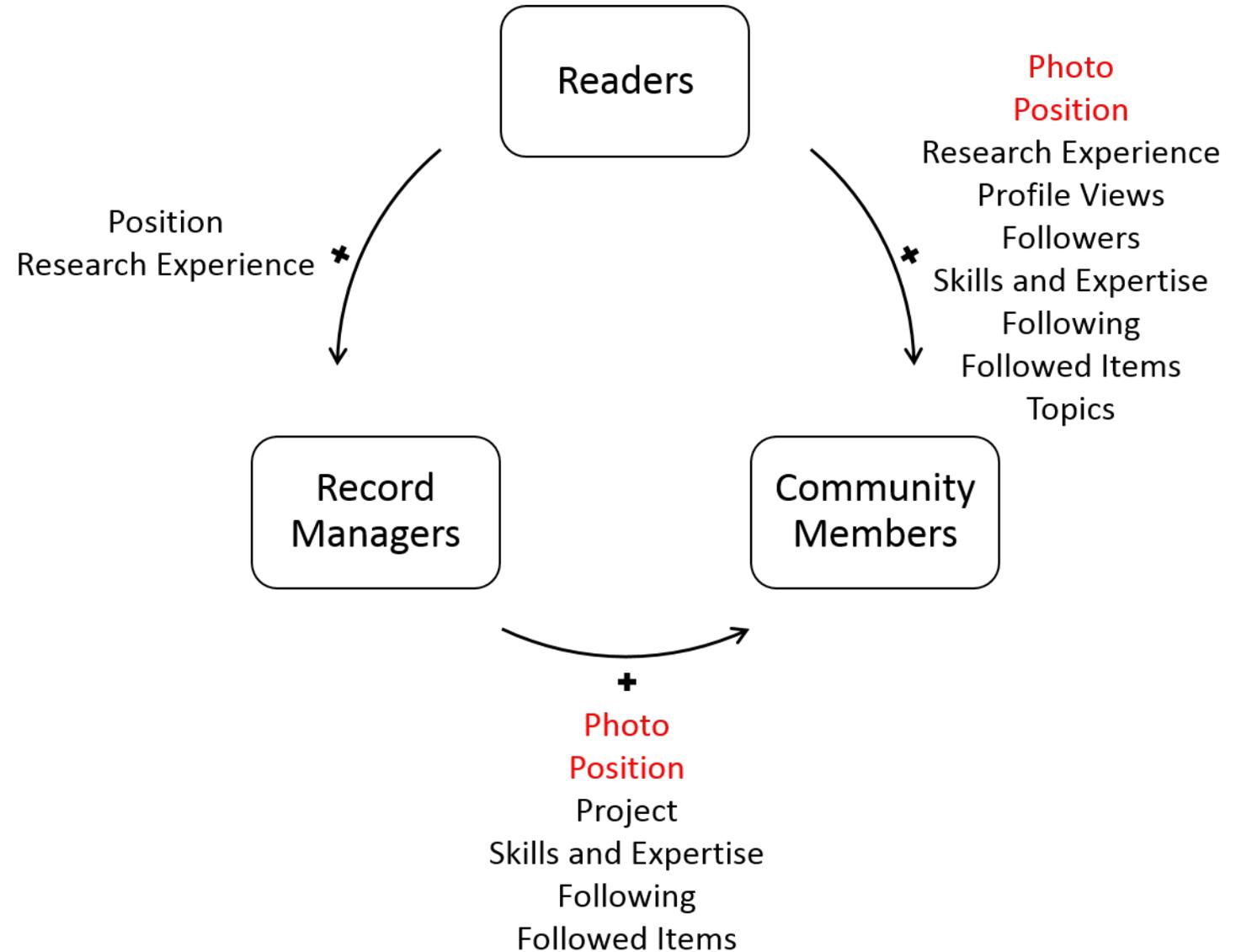
# Findings

- Relationships among Metadata & Participation



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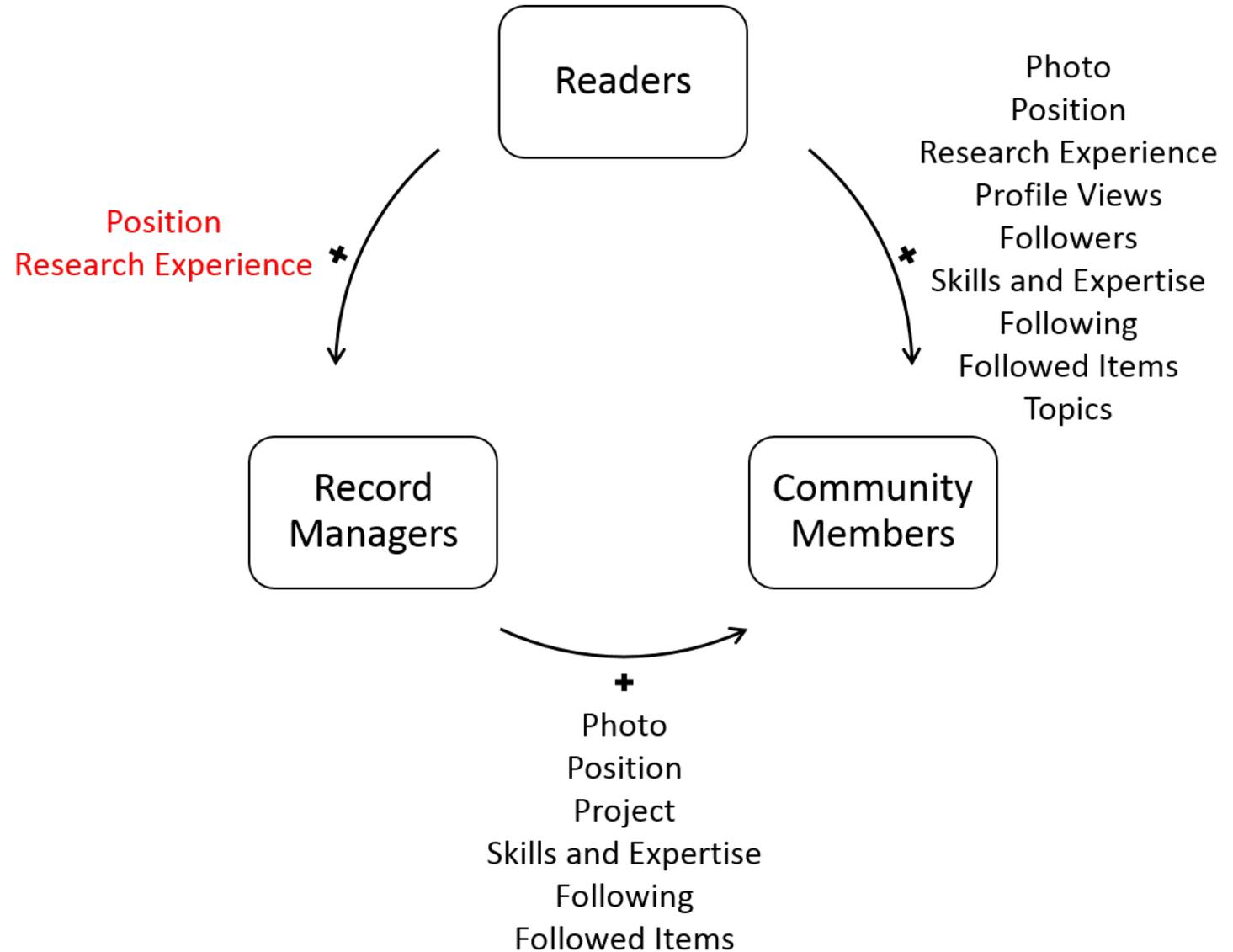
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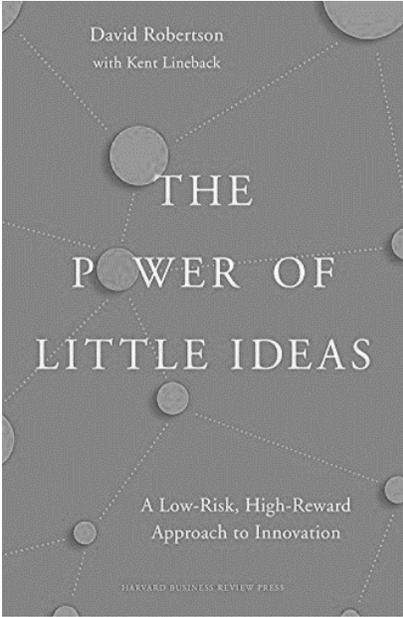
# Findings

- Relationships between researchers' participation levels and their use of metadata

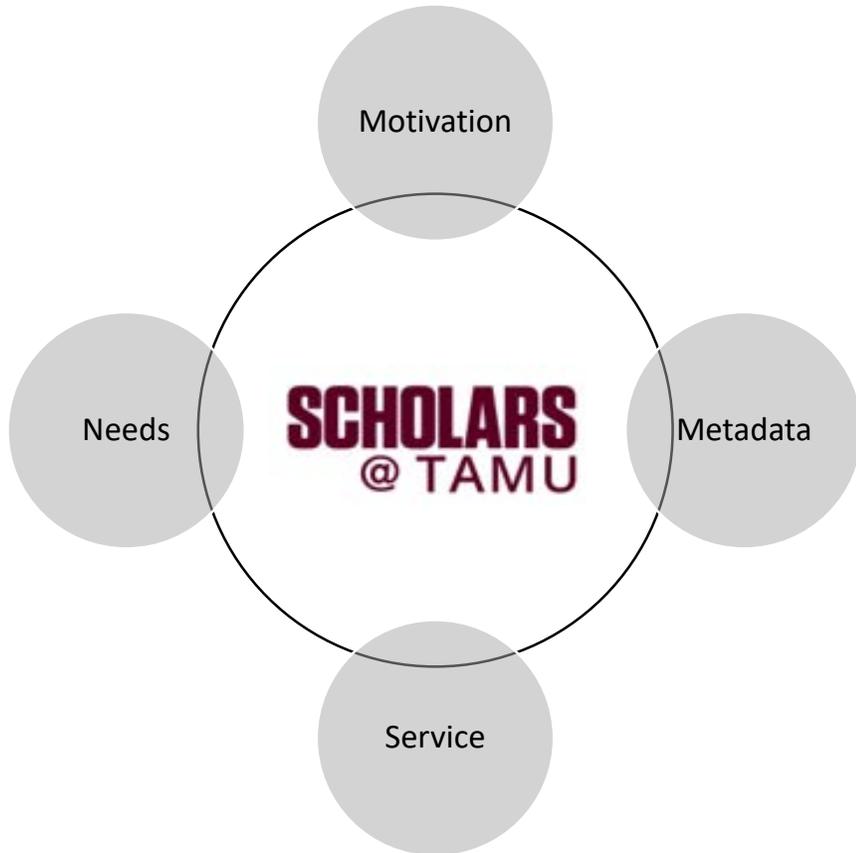
	Readers	Personal Record Managers	Community Members
Most common metadata elements supplied by users	First Name, Last Name Department	First Name, Last Name Department Position Research Experience	 First Name, Last Name Department Photo Position Research Experience Project Skills and Expertise

Application to RIMS within institutions

# Application to RIMS within institutions



# Application to RIMS within institutions



- Core System:
  - Scholars@TAMU
- Motivations & Needs
  - Share Scholarship
  - Improve Status
  - Support Evaluation
  - External Pressure (Tenure & Promotion)
  - Identify Expertise and Potential Collaborators
- Complementary Service & Metadata Analysis
  - Discovery of faculty expertise and Research
  - Institutional research support
  - Program reviews and accreditation

# Application to RIMS within institutions

- Example 1
  - Analysis of Research Activity and Impact


  
**Department of Mechanical Engineering**
  
 Analysis of Research Activity and Impact

July 23, 2018

Office of Scholarly Communications Report | MEEN Research Analysis

Office of Scholarly Communications Report | MEEN Research Analysis

**Departmental Research**

We used the classification of the journals that publish MEEN research to create a word cloud of the major research topics of the department (Fig. 1).

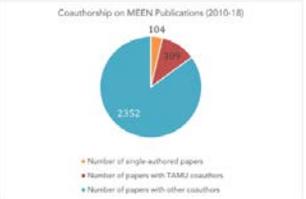
Fig. 1. Web of Science field categories of journals that published MEEN articles, 2010-2018.



**Research and Publication Practices of MEEN Faculty**

The faculty of MEEN is highly collaborative, where most of the papers published by faculty are coauthored with a range of researchers at TAMU and around the world.

Fig. 2. Coauthorship on MEEN publications, 2010-2018.

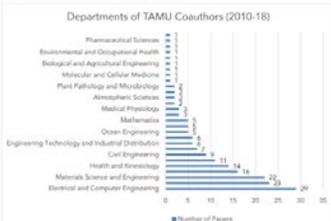


• Number of single authored papers  
 • Number of papers with TAMU coauthors  
 • Number of papers with other coauthors

Office of Scholarly Communications Report | MEEN Research Analysis

Fig. 3. TAMU coauthors on MEEN publications, 2010-2018.

Departments of TAMU Coauthors (2010-18)



Department	Number of Papers
Pharmaceutical Sciences	20
Environmental and Occupational Health	18
Biological and Agricultural Engineering	16
Molecular and Cellular Medicine	14
Plant Pathology and Microbiology	12
Jeanes College	11
Mathematics	10
Engineering Technology and Industrial Distribution	9
Health and Kinesiology	8
Material Science and Engineering	7
Electrical and Computer Engineering	6
Other Engineering	5
Energy & Fuels	4
Chemical Engineering	3
Chemistry	2
Physics	1
Science & Technology	1
Materials Science	1
Automation & Control Systems	1
Mechanics	1
Thermodynamics	1

Fig. 4. Top 20 US institutions of coauthors on MEEN publications, 2010-2018.



Office of Scholarly Communications Report | MEEN Research Analysis

Fig. 5. Location of US coauthors on MEEN publications, 2010-2018.



Fig. 6. Location of international coauthors on MEEN publications, 2010-2018.



Office of Scholarly Communications Report | MEEN Research Analysis

**Research Productivity and Impact**

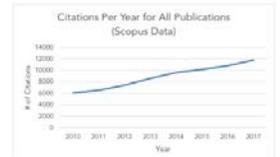
We can characterize the productivity and impact of the Department of Mechanical Engineering as a whole. We can then extend our analysis by characterizing the career trajectory of MEEN faculty by looking at their productivity and scholarly impact as a function of years since the PhD.

The analysis of departmental publication rate and citation rate over the last 10 years show that the departmental research has significantly increase in scholarly impact over that time.

Fig. 7. Number of publications of MEEN faculty, 2010-2017.



Fig. 8. Citations per year for all MEEN publications, 2010-2017.



# Application to RIMS within institutions

- Example 2
  - Notification for pending publications

From: Scholars@TAMU [mailto:[scholars@library.tamu.edu](mailto:scholars@library.tamu.edu)]  
Sent: Wednesday, March 07, 2018 5:28 AM  
To: [djlee@tamu.edu](mailto:djlee@tamu.edu)  
Subject: New Publications Found

 Texas A&M University Libraries  
**SCHOLARS@TAMU**

Howdy Dong-Joon Lee,  
1 New Publication Found.  
[Claim Your Pub](#)

This is an automated message from the Scholars@TAMU system to alert you that we have found your new publication(s). Only the publications you approve will appear in your Scholars@TAMU profile. If there are several publications that are not yours, please contact [scholars@library.tamu.edu](mailto:scholars@library.tamu.edu) and we will help refine your search settings. Scholars@TAMU only sends these automated messages when we find new publications that appear to be authored by you. If you do not want to receive messages like this, please click [unsubscribe](#) or contact [scholars@library.tamu.edu](mailto:scholars@library.tamu.edu) and we can disable the automatic searching function on your behalf.

[unsubscribe](#)

# Application to RIMS within institutions

- Example 2
  - Notification for pending publications

***Current participation rate ~ 60% of current profile owners (2.6K people)***

From: Scholars@TAMU [mailto:[scholars@library.tamu.edu](mailto:scholars@library.tamu.edu)]  
Sent: Wednesday, March 07, 2018 5:28 AM  
To: [djlee@tamu.edu](mailto:djlee@tamu.edu)  
Subject: New Publications Found

 Texas A&M University Libraries  
**SCHOLARS@TAMU**

Howdy Dong-Joon Lee,  
1 New Publication Found.  
[Claim Your Pub](#)

This is an automated message from the Scholars@TAMU system to alert you that we have found your new publication(s). Only the publications you approve will appear in your Scholars@TAMU profile. If there are several publications that are not yours, please contact [scholars@library.tamu.edu](mailto:scholars@library.tamu.edu) and we will help refine your search settings. Scholars@TAMU only sends these automated messages when we find new publications that appear to be authored by you. If you do not want to receive messages like this, please click [unsubscribe](#) or contact [scholars@library.tamu.edu](mailto:scholars@library.tamu.edu) and we can disable the automatic searching function on your behalf.

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# Next Steps

- Develop design recommendations for RIMS based on the study's findings
  - Design instruments to measure researcher attitudes and motivations for participation in RIMS
  - Design communication strategies and messages tailored to specific RIMS user types, their motivations and attitudes, so that a RIMS could recruit and retain researchers, and increase their participation
  - Design new, or more personalized RIMS services



# Questions?

Project Website:  
[rims.cci.fsu.edu](http://rims.cci.fsu.edu)

