Users and Uses of Research Information Management Systems: Readers, Record Managers, and Community Members

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Introduction

- Universities engage in curating digital scholarship produced by their employees, including managing their research identity profiles through institutional repositories (IRs; e.g., Expertnet.org, Stanford Profiles).
- IRs need researchers' involvement and help to harvest and curate their authored publications and data, including research identity data/metadata.
- IRs may not have sufficient resources to control the quality of large scale uncontrolled metadata often automatically harvested and ingested in their databases. They may need help from IR contributors and users to control the quality of research identity data
- There are general and community specific research information management (RIM) systems (e.g., Google Scholar, ResearchGate, Academia.edu, Mendeley, ORCID, NASA ADS, SSRN) from search engines, publishers, content aggregators, and research communities. They too strive to engage researchers in RIM

Introduction (continued)

- The literature on online communities shows that successful peer curation communities that are able to attract, retain, and engage enough participants can provide scalable knowledge curation solutions of a quality that is comparable to the quality of professionally curated content.
- This study addresses the need to have a greater knowledge of how to design scalable and reliable solutions for research information curation by examining researchers' participation in RIM systems (RIMS) - to have a better understanding of ***who*** uses RIMS, ***what*** RIMS are used, ***how, why,*** and ***when***
- Findings inform of the design of RIM services, and mechanisms for recruiting and retaining researchers for providing and maintaining their research identity data

Research Questions

1. How do researchers use online RIM systems?
2. What are the types of researcher participation in online RIM systems?
3. What are researchers' motivations and amotivations to participate in online RIM systems?

Research Design

- Activity Theory and a literature analysis were used to guide the design of an interview protocol and a survey questionnaire
- Qualitative phase: Semi-structured interviews
  - Data was collected using semi-structured interviews with 15 researchers representing 9 study fields, 10 institutions, and 5 seniority categories (3 full professors, 3 associate professors, 3 assistant professors, 3 postdoctoral researchers, & 3 doctoral students) between January and July 2016

Research Design (continued)

- Quantitative phase: Survey
  - Interview findings were used to expand and refine interview questions and develop a survey instrument
  - Survey instrument was pretested with 9 participants (1 associate professor, 4 assistant professors, 2 postdocs, and 2 graduate students)
  - A finalized survey was distributed to 1,678 researchers in the fall of 2016. 412 participants finished the survey (25% response rate). They represented 80 Doctoral Universities with Highest Research Activity institutions according to the Carnegie Classification of Institutions of Higher Education and all 12 categories of fields of study of NSF's Survey of Earned Doctorate (SED)

Survey Participants

#	Discipline Categories	Freq	%	#	Race	Freq	%	#	Seniority	Freq	%	#	Gender	Freq	%
1	Business Administration	17	4.1	1	African American	11	2.7	1	Graduate Student	73	17.7	1	Female	180	43.7
2	Communication	7	1.7	2	Asian	94	22.8	2	Postdoc	101	24.5	2	Male	223	54.1
3	Computer and Information Science	17	4.1	3	Hispanic or Latino	24	5.8	3	Assistant Professor	92	22.3	3	Prefer not to answer	9	2.2
4	Education	7	1.7	5	Caucasian	244	59.2	4	Associate Professor	72	17.5				
5	Engineering	58	14.1	6	Other	13	3.2	5	Full Professor	74	18				
6	Humanities	28	6.8	7	Prefer not to answer	26	6.3								
7	Life Sciences	79	19.2												
8	Mathematics	23	5.6												
9	Physical Sciences	57	13.8												
10	Psychology	37	9												
11	Social Sciences	72	17.5												
12	Fields Not Elsewhere Classified (NEC)	10	2.4												

RQ1: How do researchers use online RIMS?

ID	Task	% of Participants
0	Find papers	91%
2	Obtain papers	75%
1	Find researchers	68%
3	Obtain citations	67%
8	Monitor the literature	61%
4	Verify citations	55%
10	Evaluate papers on impa	51%
11	Evaluate researchers on	43%
9	Monitor other researche	39%
23	Add/modify information research interests, paper citations, et	34%
7	Identify experts	32%
13	Raise your personal profile in the research community	32%
14	Raise t	31%
12	Sha	26%
5	Ger	17%
17	Cor	17%
6	Ide	15%
16	Ans	11%
21	Find	9%
15	Ask	8%
18	Find	8%
24	Add the rse	8%
25	Revie	7%
19	Find potential empl	4%
20	Find potential graduate advisors	4%
22	Find potential students	1%

I think they have different functions. Like for ResearchGate I can follow some people. So I can have their most recent papers. But sometimes I also use Google Scholar when I have a specific paper that I want to look for. So if I know the title of the paper, or I know the author, and I want to see their publications, I will use Google Scholar. (S11)

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)

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Add/modify information for your own research identity profile

8. Generate a CV

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how much work should
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One of the advantages to using these [RIM] systems is the ability to discover researchers that you may not have known like this ... I'm going to follow this guy from Boston now because apparently he likes my work and I want to be helpful to him, and I want to see what he's doing with the stuff of mine that he's citing, because maybe we could be good collaborators. (S9)

I used ResearchGate besides Google Scholar because ResearchGate has slightly different methods of constructing the social network and the way they promote research is different—it's more active than Google Scholar. In that sense, it serves my purpose of trying to promote my research [to my] peers. (S14)

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RQ2: What are the types of researcher participation in online RIM systems?

Three Levels of Participation

- Level 1: Readers
  - Researchers who may or may not have a profile in a RIMS, but they don't maintain it and do not contribute to the RIMS. They don't answer other members' questions and they don't endorse other members for expertise
- Level 2: Record Managers
  - Researchers maintain a profile in a RIMS but do not contribute to the RIMS. They don't answer other members' questions or endorse other members for expertise
- Level 3: Community Members
  - Researchers not only maintain their profiles but also answer other members' questions or endorse other members for expertise

Three Levels of Participation: Readers (138 participants)

#	Discipline Categories	Freq	% of Group
1	Business Administration	8	47.1%
2	Communication	1	14.3%
3	Computer and Information Science		
4	Education		
5	Engineering		
6	Humanities		
7	Life Sciences		
8	Mathematics	8	34.8%
9	Physical Sciences	17	29.8%
10	Psychology	15	40.5%
11	Social Sciences,	26	36.1%
12	Fields Not Elsewhere Classified (NEC)	4	40.0%

#	Seniority Levels	Freq	% of Group
1	Graduate Student	41	56%
2	Postdoc	27	27%
		16	17%
		27	38%
		27	36%

I use them [RIM systems] to locate materials. I don't use them to make myself findable … I don't use them to promote myself. I use them to find things that I might need for my own research. (S9)

Three Levels of Participation: Record Managers (148 participants)

#	Discipline Categories	Freq	% of Group
1	Business Administration	6	35.3%
2	Communication	2	28.6%
3	Computer and Information Science	8	47.1%
4	Education	4	57.1%
5	Engineering	19	32.8%
6	Humanities	12	42.9%
7	Life Sciences	23	29.1%
8	Mathematics	10	43.5%
9	Physical Sciences	22	38.6%
10	Psychology	10	27.0%
11	Social Sciences,	30	41.7%
12	Fields Not Elsewhere Classified (NEC)	2	20.0%

#	Seniority Levels	Freq	% of Group
1	Graduate Student	19	26.0%
2	Postdoc	30	29.7%
3	Assistant Professor	42	45.7%
4	Associate Professor	25	34.7%
5	Full Professor	32	43.2%

Assistant professors, full professors and postdocs had higher odds to be Record Managers than Readers when compared to graduate students

Three Levels of Participation: Community Members (126 participants)

#	Discipline Categories	Freq	% of Group
1	Business Administration	3	17.6%
2	Communication	4	57.1%
3	Computer and Information Science	4	23.5%
4	Education	2	28.6%
5	Engineering	17	29.3%
6	Humanities	4	14.3%
7		37	46.8%
		5	21.7%
		18	31.6%
1		12	32.4%
1		16	22.2%
12	[illegible] (NEC)	4	40.0%

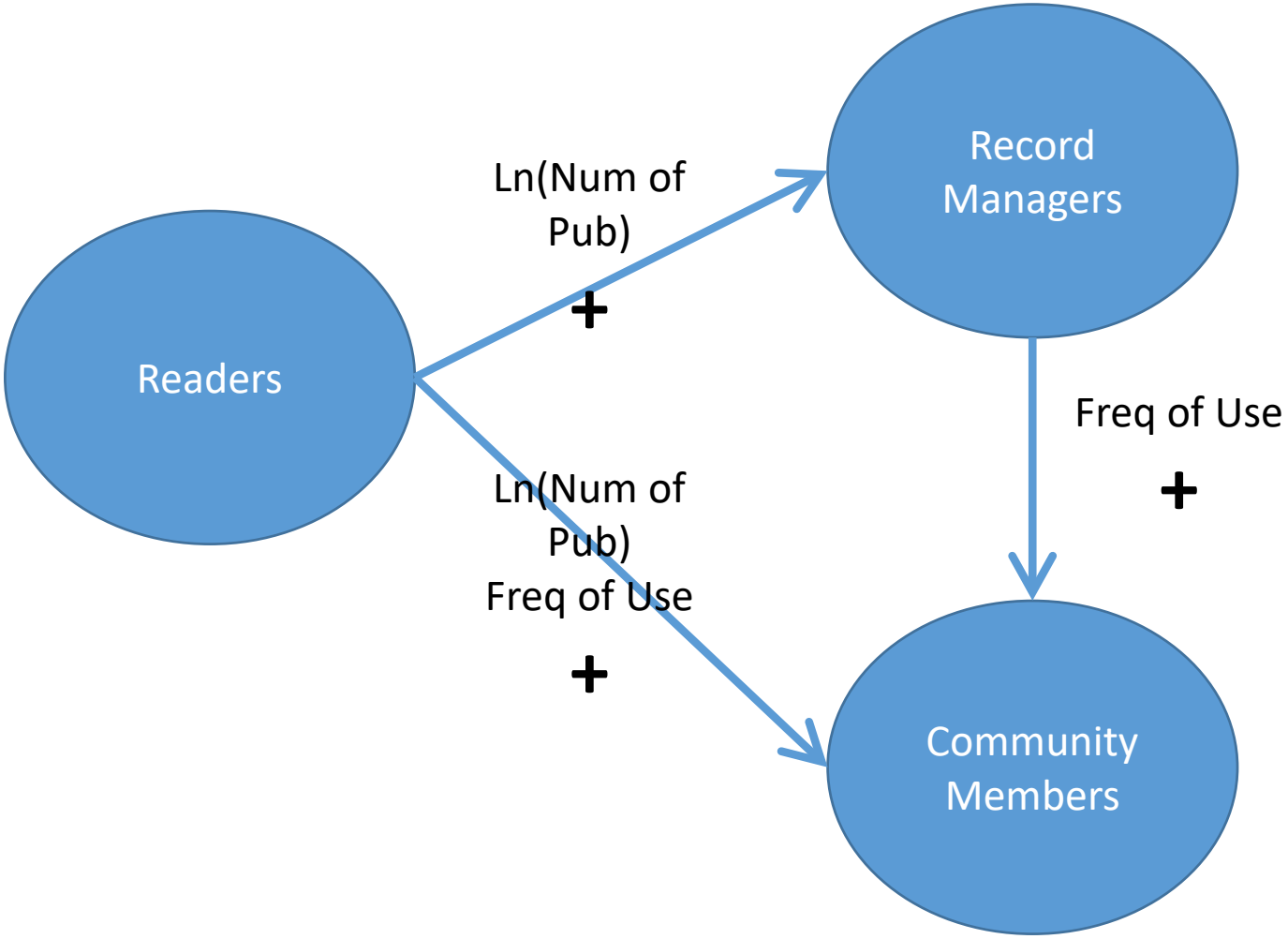
#	Seniority Levels	Freq	% of Group
1			
2			
3			
4			
5	Full Pro[illegible]or	15	20.3%

There were no statistically significant differences in the odds of different seniority levels when Community Members was compared to Record managers

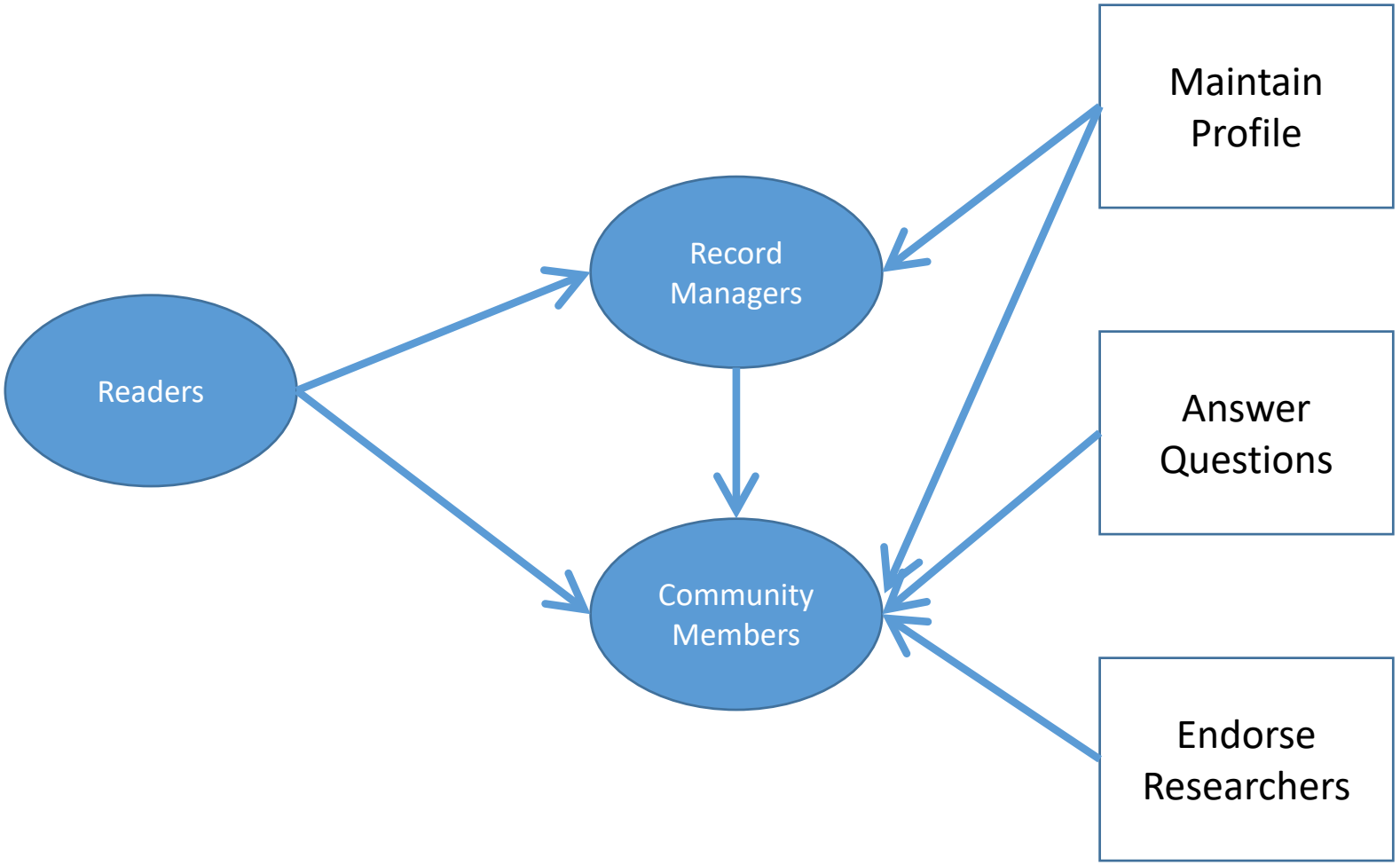
Life Sciences researchers had higher odds to be Community Members than Record Managers or Readers when compared to Humanities researchers

Assistant professors, postdocs, and, associate professors had higher odds to be Community Members than Readers when compared to graduate students

Frequency of Use, Number of Publications, Age, and RIMS Participation



Participation Levels, Activities, and Motivations



Motivations for Maintaining a RIMS Profile

Scales	M	α
Promote Research • To make my authored content (e.g., papers, datasets, presentations) more findable • To make my authored content more accessible	5.92	0.82
Enhance Status • Maintaining my profile is critical to my work • I earn respect as a researcher by maintaining my research profile • I feel that maintaining the quality of my profile improves my status as a researcher • Inaccuracy in my profile can have a negative effect on my status as a researcher	4.51	0.76
Enjoyment • I enjoy maintaining my profile • It feels good to keep my profile current, accurate, and complete	4.34	0.9
Support Evaluation • To correct inaccuracies in my profile introduced by the automated curation... • To generate an accurate CV • To help potential employers find me • To help the evaluation of my research productivity and impact	4.28	0.58

Amotivations for Maintaining a RIMS Profile

Scales	M	α
Lack of Institutional Pressure • My institution does not require me to maintain my profile • I am not expected to maintain my profile by my supervisor • Not many researchers in my department or lab maintain their profiles	5.5	0.87
Lack of Enjoyment • I do not enjoy maintaining my research profile • I find maintaining my profile tedious	4.9	0.87

Motivations for Answering Questions in a RIMS

Scales	M	α
Expertise (Self-efficacy) • I am confident in my ability to provide answers that others consider valuable • I have the expertise required to provide valuable answers for others	5.50	0.85
Build community ties • I strengthen ties between other researchers and myself by answering their questions • I expand the scope of my association with other researchers by answering their questions • I expect to receive help from others in answering my questions in return • I believe that my future requests for information / knowledge will be answered	4.86	0.85
Enjoyment • Answering questions is pleasant • It is fun to answer questions	4.53	0.91

Amotivations for Answering Questions in a RIMS

Scales	M	α
Cost • I do not have time to answer other members' questions • I find answering questions burdensome	5.41	0.78
Lack of impact on status • I do not find the questions asked in the RIM system interesting • I do not earn respect as a researcher by answering questions from other members • I do not feel that answering questions improves my status as a researcher • Not many researchers I know answer questions in the RIM system	4.45	0.82
Lack of pressure from RIMS • I am not prompted by the system to answer the question	4.39	NA

Motivations for Endorsing other Researchers for Expertise

Scales	M	α
Expertise (Self-efficacy) • I am confident in my knowledge to endorse other researchers for expertise • I have the knowledge required to endorse other researchers for expertise	5.41	0.93
Enjoyment • I enjoy endorsing other researchers for expertise • It feels good to endorse others for expertise • It is fun to make endorsements	4.47	0.87
Build community ties • I strengthen ties between other researchers and myself by endorsing them for expertise • I expand the scope of my association with other researchers by endorsing them for expertise • I expect to receive endorsements for expertise from others in return	4.43	0.84

Amotivations for Endorsing other Researchers for Expertise

Scales	M	α
Low perceived value • I do not expect to receive endorsements for expertise from others in return • It does not really make a difference whether I endorse other researchers for expertise • I do not think these kinds of endorsements are useful in general	5.11	0.81
Cost • I do not have time to endorse other researchers for expertise • I find endorsing other researchers for expertise burdensome	4.95	0.86
Lack of enjoyment • I do not enjoy endorsing other researchers for expertise • It feels uncomfortable to endorse others for expertise	4.35	0.86

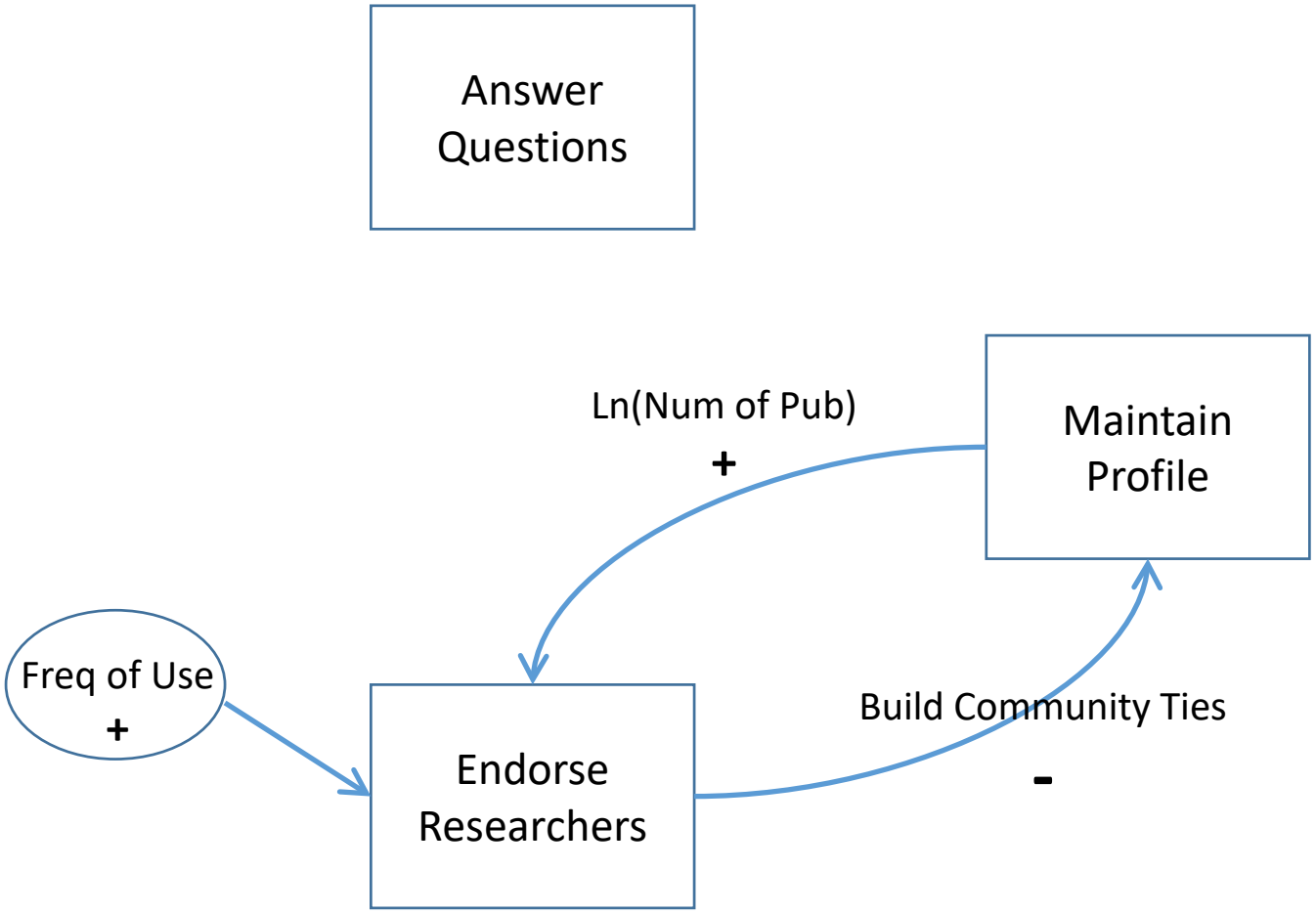
Activities and Motivations

	Promote research	Enhance status	Enjoyment	Support evaluation	Expertise (self-efficacy)	Build community ties
Maintain a profile	1	2	3	4		
Answer questions			3		1	2
Endorse researchers			2		1	3

Activities and Amotivations

	Lack of institutional pressure	Lack of enjoyment	Cost	Does not affect one's status	Lack of pressure from RIMS	Low perceived value
Maintain a profile	1	2				
Answer questions			1	2	3	
Endorse researchers		3	2			1

Activity Relationships



Next Steps and Future Research

- Develop design recommendations for RIMS based on the study's findings
- Researchers' RIM needs and priorities are dynamic. How can data collection processes be optimized?

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