

Research note: Measuring the globalization of knowledge: The case of community informatics

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Abstract:

Freely accessible online, with a wide set of authors and a wider readership, *First Monday* can be seen as striving for global knowledge on the social aspects of the Internet. In a meta-analysis now underway, we found *First Monday* to be the third most prolific journal on a particular subject: local communities' uses of information technology. Our study also sheds some light on what constitutes global knowledge. The data suggests that a synthesis of English-language published knowledge is a first step. It points to a bigger agenda: reaching into the world's local settings in a proportionate and representative way. That would mean publishers outside the U.S. and U.K.; scholars in other countries; and, studies in other languages. This is what it would take to learn from all our cultures and countries.

Keywords: global knowledge | information technology | First Monday

Article:

Introduction

This research note examines a few early findings from a study of the empirical literature regarding local communities using information technologies. Particularly because *First Monday* is prominent in this literature, we want to share these findings with *First Monday's* audience. Our study's objective is to measure and assess the globalization of knowledge on this subject. We have early answers regarding what constitutes global knowledge.

In short, the globalization of knowledge is not complete, but is underway. The studies published in the English-language scholarly literature study primarily the English-speaking world. The authors are disproportionately at institutions in the English-speaking world, primarily the U.S. Their institutions are overrepresented in the literature relative to their countries' populations, but also relative to the global distribution of top-ranked universities. Moreover, the scholars tend to study communities in their own country. To move closer to global knowledge, we must reach beyond U.S. and U.K. publishers, to scholars elsewhere, and outside the English language, for a

representative picture of such a global phenomenon as our subject, the adoption of information technology by local communities. Below we explain and illustrate this reality. We are completing a full analysis, will report that separately, and also hope to publish a public use dataset including our coding. Even if this literature is only a step, we can still learn a great deal from it and help everything move forward faster.

The case of community informatics

In the past quarter century, the world has witnessed an explosion of virtual communities [1] and of research on them. People have begun to think of many social phenomena as communities. For example, conceptualizing workgroups as communities of practice brought to light social processes in work groups [2].

The place-based community is where most people in every society are born, grow up, and lead their lives. While individuals and even entire social strata do move in or out, this is where local culture is transmitted through social networks and institutions and accretes over multiple generations. Such communities experience shocks of rapid change (urban renewal, for example [3]) and yet they persist. Transgenerational continuity of local communities has been normal up to now. The permanent destruction of local communities is extremely disruptive, even life-threatening, for their residents. The main causes of this destruction include war and other disasters, such as the March 2011 nuclear disaster in Japan or plant closings in the Rust Belt of the U.S.

Community informatics (CI) is one field that has attended to local community, specifically, local community in the digital age, as it adopts information technology or adapts to a technologically transformed society. CI was first named in the U.K. and North America [4]; [5]. The term was subsequently defined and elaborated [6]; [7]; [8]; [9]; [10].

We have defined and described community informatics elsewhere [11]; [12]; [13]. But summing up the earliest definitions is useful. Community informatics enables us

to connect cyber-space to community-place: to investigate how ICTs can be geographically embedded and developed by community groups to support networks of people who already know and care about each other [14].

CI is concerned with:

those who are being excluded from this ongoing [technology] rush, and enabling these individuals and communities to take advantage of some of the opportunities which the technology is providing. It is also concerned with enhancing civil society and strengthening local communities for self management and for environmental and economically sustainable development [15].

CI is anchored in questions of social and digital inequalities, and poorer or working class people tend to be more place-bound than middle classes and elites, even if migration patterns separate them from their original homes. Joining the “space of flows” (which means, in part, the daily and adept use of digital technologies) and leaving behind the “space of place” [16] tends to require money and privilege.

Community informatics is “an extension from ‘organizations’ to ‘communities’ of the ‘sociotechnical’ approach to systems design” [17]. And elsewhere: “Research in CI brings together theories of information and communication technologies with the pragmatic field of community development” [18]. And the object of analysis is quite specific:

Inherent in CI is the need to understand how knowledge is shaped and shared in communities, to investigate the underlying information phenomena and processes we find when we take “community” as our unit of analysis [19].

Close to a decade after these definitions, a great many people have carried out research in this area. Technology has spread to where it was previously unknown. We need to update our definition of the field based on empirical knowledge. As society experiences the disruptions of the information revolution, CI asks questions that are fundamental to social cohesion and the sustainability of what we have thought of as normal social life. Because of this, scholars need a comprehensive, global, and current picture of the field.

What is the empirical literature and what does it tell us? Where are the agreements, the disagreements, and the gaps? These are our overarching research questions. To find answers, we made a systematic collection of the empirical literature and we are beginning to code and analyze it. The first coding included several measures for place. This presented us with interesting answers as to what extent this literature provides a global picture. As the title of this note puts it, we have a measure of the current globalization of published knowledge on a particular subject.

Method

Our data is a collection of 563 items: journal articles, book chapters, and conference presentations. It spans eight disciplines and 22 years, 1990–2011. Each item reports empirical research about a specific local community or communities and its (or their) use of information technology. Information technology is defined as digital technologies of all kinds, including mobile phones. This is our operationalization of the category “empirical community informatics research.”

We collected the published papers, chapters, and presentations from a set of journals, edited books, and conference proceedings. To select the journals, we identified eight disciplines either that we knew or that we expected to be producing relevant research about local communities using information technology, based on an informal survey of our colleagues. Our team includes people with research foci in the fields of archives, ITD (information technology for development), library and information science, museums/public history, and the two linked fields of social informatics and community informatics.

We also examined management information science (MIS) and sociology. MIS is a field that began earlier, when the private sector began to adopt computer technology, and we expected that they would publish studies of communities as well as businesses. Sociologists are among those who have formulated and debated theories of the information society. They were also the leaders in community studies some decades ago, and we hoped to find relevant articles there as well.

We identified the three top journals in each field, using published rankings and the assessments of librarians and other colleagues. We identified the five top journals from the two closely related fields of community informatics and social informatics. In total we reviewed 24 journals.

The edited books and conference proceedings are those that we have used in research and teaching for the last 15 years. They stand out as early and consistent efforts to organize CI scholarship.

The edited volumes and conferences suggested the starting year of 1990 for the journal scan. While community technology was in place as early as the 1960s (e.g., PLATO) and 1970s (e.g., Berkeley Community Memory) and there were two conferences of record before then, DIAC 1987 and 1988, those two conferences did not include any empirical research on local communities. The year 1990, four years before the graphical web and the popularization of the Internet, seemed to mark the rise of relevant empirical work in edited books and conferences.

We searched the tables of contents, abstracts if any, and full texts of the journals, books, and conference proceedings to identify empirical work on local communities using information technology. The result was a collection of 563 items: 367 articles and 196 chapters or conference presentations published from 1990 to 2011. The journal articles are detailed in Table 1.

Table 1: Collection of empirical research on local communities using information technology.					
Discipline	Journals	Dates scanned	Articles scanned	Articles collected	Collected as percent of scanned
Social Informatics/Community Informatics (224 articles)	<i>New Media & Society</i>	1999–2011, June	546	62	11%
	<i>Journal of Community Informatics</i>	2004–2010, Issue 3	214	54	25%
	<i>First Monday</i>	1996–2011, May	992	45	5%

	<i>Information, Communication & Society</i>	1998–2011, Issue 5	633	35	6%
	<i>The Information Society</i>	1990–2011, Issue 2	246	28	11%
Information Technology and Development (71 articles)	<i>Information Technologies and International Development</i>	2003–2011, Summer	219	33	15%
	<i>Electronic Journal of Information Systems in Developing Countries</i>	2000–2012, Volume 50	360	27	8%
	<i>Information Technology for Development</i>	1990–2011, Issue 3	338	11	3%
Library and Information Science (44 articles)	<i>Journal of the American Society for Information Science and Technology</i>	1990–2011, July	3,537	21	1%
	<i>Public Library Quarterly</i>	1990–2011, Issue 2	336	13	4%
	<i>Library Trends</i>	1990–2011, Spring	880	6	1%
	<i>Library Quarterly</i>	1990–2011, July	836	4	0.4%
Management Information Science (10 articles)	<i>Information Systems Research</i>	1990–2011, June	496	4	1%
	<i>Journal of Management Information Systems</i>	1990–2011, Summer	209	3	1%

	<i>MIS Quarterly</i>	1990–2011, June	344	3	1%
Museums/Public History (13 articles)	<i>International Journal of Heritage Studies</i>	1994–2011, Issue 2	351	8	2%
	<i>Museum Management and Curatorship</i>	1990–2011, Issue 3	315	4	1%
	<i>Public Historian</i>	1990–2011, Summer	264	1	0.4%
Archives (5 articles)	<i>Archival Science/Archives and Museum Informatics</i>	1990–2011, March	294	4	1%
	<i>American Archivist</i>	1990–2011, Summer	310	1	0.3%
	<i>Archivaria</i>	1990–2011, Issue 1	258	0	0%
Sociology (2 articles)	<i>Social Problems</i>	1990–2011, Issue 2	602	0	0%
	<i>American Journal of Sociology</i>	1990–2011, Volume 116	774	0	0%
	<i>American Sociological Review</i>	1990–2011, June	756	0	0%
All journals			14,110	367	3%
Edited books and conference proceedings		1987–2012	914	196	21%
All			15,024	563	4%

The edited books and conference proceedings are detailed in Table 2, and full citations are also provided in the bibliography.

Table 2: CI's key edited books and conference proceedings.

Note: For full citations see bibliography.

Edited books and conference proceedings	Dates scanned	Articles scanned	Articles collected
<i>Directions and Implications of Advanced Computing/Conferences</i>	1998–2008	191	5
<i>Emerging Communities</i> /ed. Bishop	1993	26	4
<i>Ties That Bind</i> /Conferences	1994–1995	41	13
<i>Public Access to the Internet</i> /eds. Kahin, Keller	1995	17	1
<i>Public Libraries and the Information Society</i> /eds. Thorhauge, Segbert	1996	23	5
<i>Public Libraries, Communities, and Technology: Twelve Case Studies</i> /pub. Council on Library Resources	1996	12	12
<i>Reinventing Technology, Rediscovering Community</i> /eds. Agre, Schuler	1997	16	1
<i>The social shaping of information superhighways</i> /eds. Kubicek, Dutton, Williams	1997	19	0
<i>Cyberspace Divide</i> /ed. Loader	1998	12	1
<i>High Technology and Low-Income Communities</i> /eds. Schön, Sanyal, Mitchell	1998	16	2
<i>Communities in Cyberspace</i> /eds. Kollock, Smith	1999	12	1

<i>Community Informatics: Enabling Communities</i> /ed. Gurstein	2000	26	15
<i>Digital Divide Doctoral Student Workshop/Conference</i>	2001	23	1
<i>Community Informatics: Shaping Computer–Mediated Social Relations</i> /eds. Keeble, Loader	2001	19	8
<i>Communities and Technologies/Conferences</i>	2003–2011	115	27
<i>Social capital and information technology</i> /eds. Huysman, Wulf	2004	14	1
<i>The Network Society: A Cross Cultural Perspective</i> /ed. Castells	2004	19	2
<i>Community Practice in the Network Society</i> /eds. Day, Schuler	2004	15	4
<i>Shaping the Network Society: The New Role of Civil Society in Cyberspace</i> /eds. Schuler, Day	2004	16	1
<i>Networked Neighbourhoods</i> /ed. Purcell	2006	16	2
<i>ICTD/Conferences</i>	2006–2012	204	71
<i>Constructing and Sharing Memory</i> /eds. Stillman, Johanson	2007	29	13
<i>eChicago/Conferences</i>	2007–2009	33	6
All edited books and conference proceedings		914	196

In studying community, scholars often decide to gather measures of community residents (individuals) and then to infer about the larger social organization (community). This is often useful but not ideal, because a community is more than the sum of its individuals. Network logic tells us that groups and organizations in communities represent central social nodes. So community organizations are often involved in community studies and in CI. Following this reasoning, we began our analysis of the content of the literature we collected by coding for local institutions as well as for place. Initial questions included:

1. Place: What places in the world have been studied for their local community use of information technology? What institutions are carrying out this research? Where are the publications?
2. Community organizations: What studies involve a local organization as a research partner, a study setting, or a program site or partner?

Findings

This section starts with a measure of research growth and then reports three findings regarding place, measuring the place studied, the institution of the first author, and the publication itself. It also reports findings regarding local organizations.

1. First, the data suggests that community informatics, that is, empirical research on local communities using information technology, continues to grow. The 1990s yielded an average of six studies per year; since then the figure is 36 studies per year.
2. Place (community studied). The communities that were studied are not representative of the world's population. Rather, studies carried out in English-speaking countries dominate (71 percent), primarily the U.S.

Table 3: Across the 563 studies of local communities using information technology, the communities being examined were disproportionately in English-speaking countries (with asterisk; 71 percent of all).

Place studied	Articles	As percent
U.S.*	175	31%
India*	78	14%
U.K.*	39	7%
Australia*	27	5%
Canada*	25	4%
South Africa*	21	4%
Netherlands	9	2%
Singapore*	8	1%

Uganda*	7	1%
Hong Kong*	6	1%
China	6	1%
Finland	5	1%
Ireland*	5	1%
Italy	5	1%
Malaysia*	5	1%
Ghana*	5	1%
All other single countries	113	20%
Multiple or anonymized countries	24	4%
All	563	100%

What’s more, some areas within countries are much examined, most of all South India (53 studies) and California (27 studies). That likely reflects Silicon Valley and the IT cities of Bangalore, Chennai, and Hyderabad. South India is home to just 22 percent of the population of India but the setting for 67 percent of the articles that examine India. So CI projects in IT–oriented local economies have attracted a disproportionate share of research interest so far. Similar imbalances are seen across the 50 U.S. states and the District of Columbia. Researchers could explicitly go elsewhere, or could take a moment to sum up all the studies in one area.

One additional measure of place is to compare the presence of rural and urban communities in the set. By 2008 just over half of humanity lived in cities. But only 23 percent of the studies focus solely on rural communities. If more research would focus on rural areas as they get better connected, it could help them sustain their residents.

- Place (first author’s institution). U.S. universities provide 40 percent of the articles, the U.K. and its other former colonies another 31 percent. See Table 4.

Table 4: Across the 536 empirical studies of local communities using information technology, the first authors’ institutional affiliations were disproportionately in English–speaking countries (with asterisk; 67 percent of all).

Institutional affiliation of first author	Articles	As percent
U.S.*	224	40%
U.K.*	54	10%
India*	40	7%

Australia*	28	5%
Canada*	21	4%
South Africa*	16	3%
Norway	14	2%
Netherlands	13	2%
Hong Kong*	11	2%
Singapore*	8	1%
All other countries	83	15%
Unknown	51	9%
All	563	100%

Ten institutions provided seven or more articles:

- Microsoft Research India, 18 articles
- University of Washington, 16
- University of California, Berkeley, 10
- Georgia Institute of Technology, eight
- University of Oslo, eight
- Massachusetts Institute of Technology, eight
- Monash University, eight
- University of Michigan, seven
- University of Illinois at Urbana–Champaign, seven

Five of these institutions are schools of information. One single private research institute, Microsoft Research India, is a top provider of articles. A total of 61 percent of the studies are carried out in the country of the first author's institution and there is more to learn regarding the transnational patterns of scholarship in this field.

4. Place (publications). With regard to publications, all the journals are edited and published in North America and the U.K. except for one in Hong Kong. There is a center to empirical research in CI: the five social informatics/community informatics journals published 40 percent of the 563 studies. The journals in information technology and development published the second most (12 percent) and the library and information science journals the third most (8 percent). The most productive journals for empirical research in community informatics are:

- *Journal of Community Informatics*, 25 percent of their articles met our criteria
- *Information Technologies and International Development*, 15 percent
- *The Information Society*, 11 percent
- *New Media & Society*, 11 percent
- *The Electronic Journal of Information Systems in Developing Countries*, eight percent

- *Information, Communication & Society*, six percent
- *First Monday*, five percent
- *Public Library Quarterly*, four percent
- *Information Technology for Development*, three percent
- *International Journal of Heritage Studies*, two percent.

For the remaining journals in our survey, less than two percent of articles met our criteria.

5. The local institution. Table 5 confirms our expectation that CI often attends to local institutions; 99 percent of articles mention local institutions in some significant role. Local governments are highly visible, as are non-profit organizations, that is, the civil sector. These may be the biggest actors in community technology projects, or they may be over-represented in the studies relative to their actual roles.

Table 5: Local institutions examined in 563 empirical community informatics articles.

Note: Sometimes more than one sector is examined in an article.

Local institutions	Articles	Articles as percent
Government	332	59%
Non-profit organization	291	52%
Commercial	220	39%
Higher education	152	27%
No local institution	7	1%
All	563	100%

Conclusions

These findings support several conclusions. They affirm a growing scholarly focus on local communities using information technologies. They suggest several publications, institutions, and local communities as centers for this work, and a U.S. and English-speaking country focus. This might be qualified by biases in our sample: our own research interests led in selecting the disciplines, and most of all, we searched in the English-language literature. If we could look at second authors, or at nationality of authors, the findings might shift somewhat. We can only commend scholars who carry out work on a modest budget by studying nearby communities.

But for more complete, accurate knowledge about local community in the information society — which is itself a global phenomenon — we must find the rural communities, the go beyond the world's technopoles, and in the end, rely on other languages. For instance, more than 1,300 research articles were found on community or rural informatization in one of China's journal databases [20]. But they were in Chinese and could not be included in this study.

One last note: Because of past and continuing global inequalities, scientific research capacity is not evenly distributed around the world. But it is distributed. Table 6 suggests that if we include research from outside U.S. research institutions we can begin to draw on the world’s wisdom, which itself extends so far beyond the world’s universities and research institutes. For instance, what can come out of the top universities in Africa to help us understand African communities using information technology? South Africa dominates the African studies in our set. The rest of the continent is very underrepresented. Yet Africans have embraced open access journal publishing — very likely a storehouse of knowledge on this subject as well as others.

Table 6: Ranking the articles by region (first author’s institution and place studied) as compared to population [21] and top 1,000 universities [22].

Regions	Institution of first author	Rank by institution	Place studied	Rank by place studied	World population	Rank by population	Top 1,000 universities (CSIC)	Rank by top universities
North America	246	1	200	1	5%	5	394	2
Asia	83	3	134	2	60%	1	113	3
Europe	120	2	93	3	11%	3	413	1
Africa	24	5	66	4	15%	2	5	6
Oceania	32	4	30	5	0.5%	6	35	5
Latin America	7	6	26	6	9%	4	40	4
Multiple/Unknown	51		14					
All	563		563		100%		1,000	

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2. Lave and Wenger, 1991.
3. Fullilove, 2004.
4. Gurstein, 2000.
5. Keeble and Loader, 2001.
6. O'Neil, 2002.
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10. Veinot and Williams, 2011.
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