

# *DRM vs. CC: Knowledge Creation and Diffusion on the Internet*

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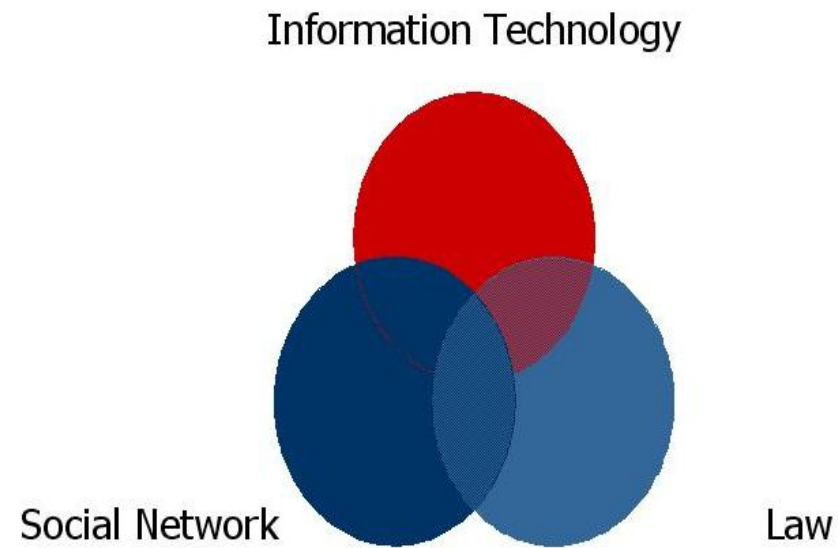
*2006/10/13*

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## *Interdisciplinary Study: Information and Law*

- ☞ *Intellectual Property (IP) War covers the Technology, Legal, Business, Social Implication*
- ☞ *Two initial focuses:*
  - ✓ *Digital content and software legal issues*
  - ✓ *Privacy protection legal issues*
- ☞ *The social and legal engineering of science (or culture and arts) has largely lagged behind the technical engineering and investigation that it seeks to facilitate.*
- ☞ *Our ultimate goal is to marry information technology to law with social network modeling technique*

# *Information Technology, Law, and Social Network*



## *Innovation (or Knowledge) Creation and Diffusion Network (ICDN)*

- ☛ *An **innovation** is an idea, practice, or object perceived as new by an individual or other unit of adoption.*
- ☛ ***Diffusion** is the process by which an innovation is communicated through certain **channels** over time among the members of a **social system**.*
- ☛ *The innovation-decision process: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation.*

—*Diffusion of Innovations, Fifth Edition, Everett M. Rogers*

# *Innovation (or Knowledge) Creation and Diffusion Network (ICDN) on the Internet*

☞ *What do you mean ICDN on the Internet?*

✓ *Art and culture derivative network*

✓ *Research paper citation network*

✓ *A real ICDN on the Internet But we don't know yet!*

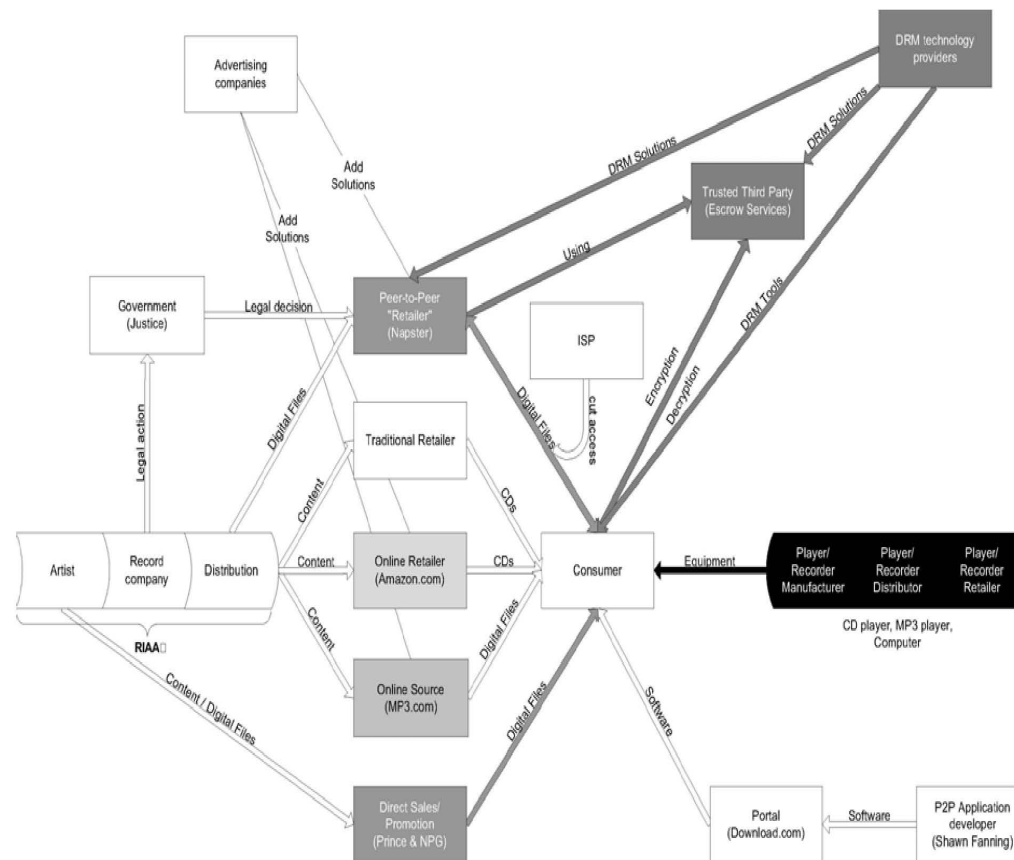
☞ *Do you think ICDN is another social network?*

☞ *Can you keep track of ICDN on the Internet?*

☞ *How do you keep track of ICDN on the Internet?*

☞ *What are the implications of law and legal system for ICDN on the Internet?*

# ICDN for Music Value Chain



—Content and Control, Digital Media Project, Harvard Berkerman Center

# *Innovation Promoters or Impediments?*

☞ *What factors are the promoters (or impediments) of future innovation and creativity?*

- ✓ *Creation of Internet, WWW, P2P, and other information technology*
- ✓ *Deployment of Google for searching of Web pages, papers, books, and news*
- ✓ *Deployment of Internet Archive*
- ✓ *Adoption of all rights reserved (DRM)*
- ✓ *Adoption of some rights reserved (CC)*
- ✓ *Law and associated legal system for DRM (or CC)*
- ✓ *Business model for DRM (or CC)*

## *Internet, WWW, and P2P Effects*

- ➡ Enable massive and effective knowledge (or innovation) and information distribution (or diffusion)*
- ➡ Enable effective searching and sharing of knowledge (or innovation) and information*
- ➡ Enable large scale of social network analysis*
- ➡ Great impact on Intellectual Property (IP) rights concepts*



## *Problems for Digital Rights Management (DRM)*

### *What are the problems for DRM?*

- ✓ *Most of DRMs are closed systems so interoperability is a big challenge.*
- ✓ *Inflexible licensing for creator, distributor, and consumer*
- ✓ *Fair Use treatment is unclear*
- ✓ *Licensing metadata, e.g. XrML, ODRL did not fully deploy and solve the above problems yet!*

### *Solution: Paradigm shift from DRM to CC (or Science Commons (SC))?*

## Creative Commons (CC)

- ☞ *The CC enables **copyright** holders to grant some of their rights to the public while retaining others through a variety of licensing and contract schemes including dedication to the **public domain** or **open content** licensing terms.*
- ☞ *The intention is to avoid the problems current **copyright laws** create for the sharing of **information**.*

—Wikipedia

## *Creative Commons (conti.)*

*CC licenses provide a flexible range of protections and freedoms for authors, artists, and educators. They have built upon the "all rights reserved" concept of traditional copyright to offer a voluntary "some rights reserved" approach.*

*—Creative Commons*

## CC Status

- ☞ *CC licensing expressions for Commons Deed, Lawyer readable, and machine understandable*
- ☞ *CC licensing is for declaration rather than for strict law enforcement*
- ☞ *CC licenses count is 140,000,000 ranging from music, films, political blogs, textbooks, and MIT Open Courseware*

—Introduction to Science Commons

## *Science Commons (SC)*

- ☞ Science Commons (SC) is a subset of CC for accelerating the scientific research cycle while CC is fostering the innovation of culture and art.*
- ☞ SC was launched in early 2005.*
- ☞ SC serves the advancement of science by removing unnecessary legal and technical barriers to scientific collaboration and innovation.*
- ☞ Scientific research paper or data are sharing via self archiving with **Author Addenda**.*

## Science Commons (SC) (conti.)

### Objectives:

- ✓ Built on the promise of *Open Access* to scholarly literature and data, *Science Commons (SC)* identifies and eases key barriers to the movement of information, tools and data through the scientific research cycle.
- ✓ Long term vision is to provide more than just useful contracts. They will combine our publishing, data, and licensing approaches to develop solutions for a truly integrated and streamlined research process.

—Science Commons

## *Science Commons (SC) (conti.)*

### *Target Areas:*

- ✓ *Scholarly Publishing*

- ✓ *Licensing Policies*

- ✓ *The realization of the Semantic Web for science*

### *Publishers who Endorse: Public Library of Science, BioMed Central, and Springer's OpenChoice*

*—Introduction to Science Commons*

# *Innovation (or Knowledge) Creation and Diffusion Network (ICDN) Portal*

☞ *Just name a few:*

- ✓ *Thomson ISI for SSCI (SCI)*
- ✓ *Google or Google Scholar*
- ✓ *NEC/IST CiteSeer*
- ✓ *Library Portal*
- ✓ *Society Portal, e.g. ACM, IEEE*
- ✓ *Google-Print*
- ✓ *OALster or Citebase for Open Access (OA) of E-Prints or D-Space*



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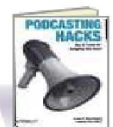
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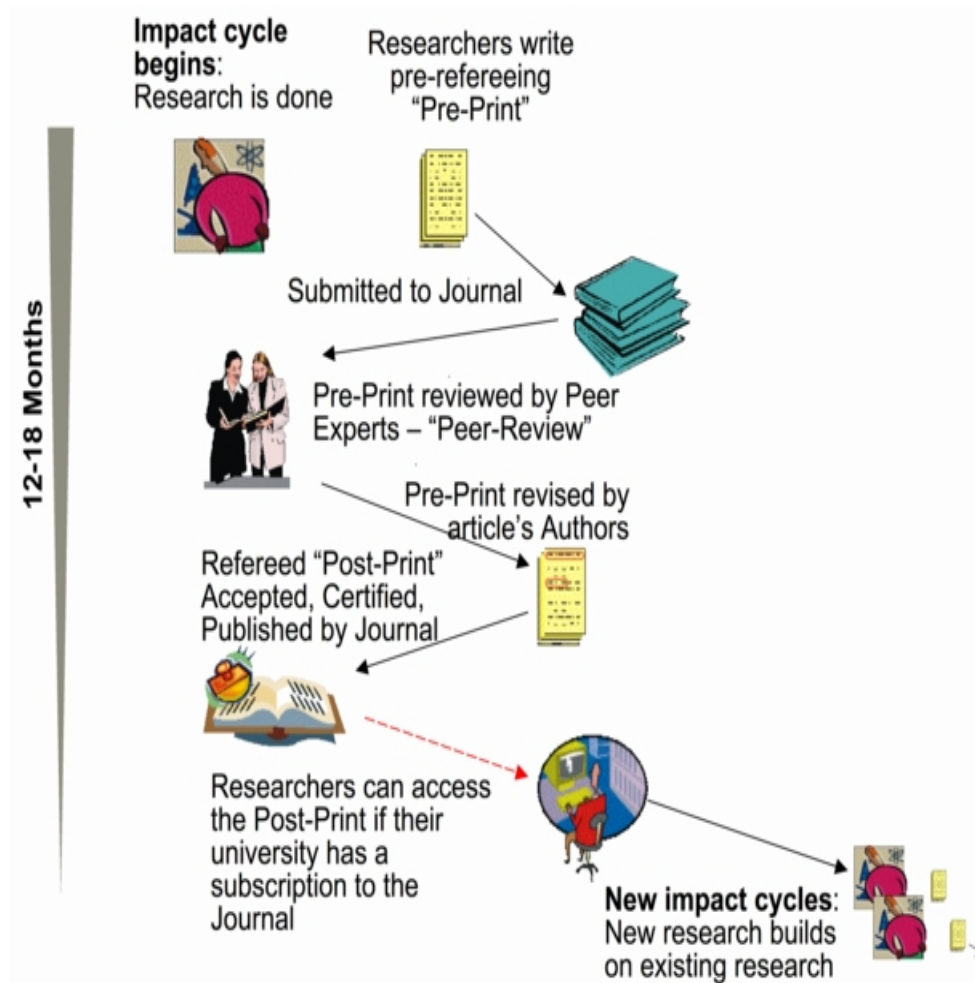
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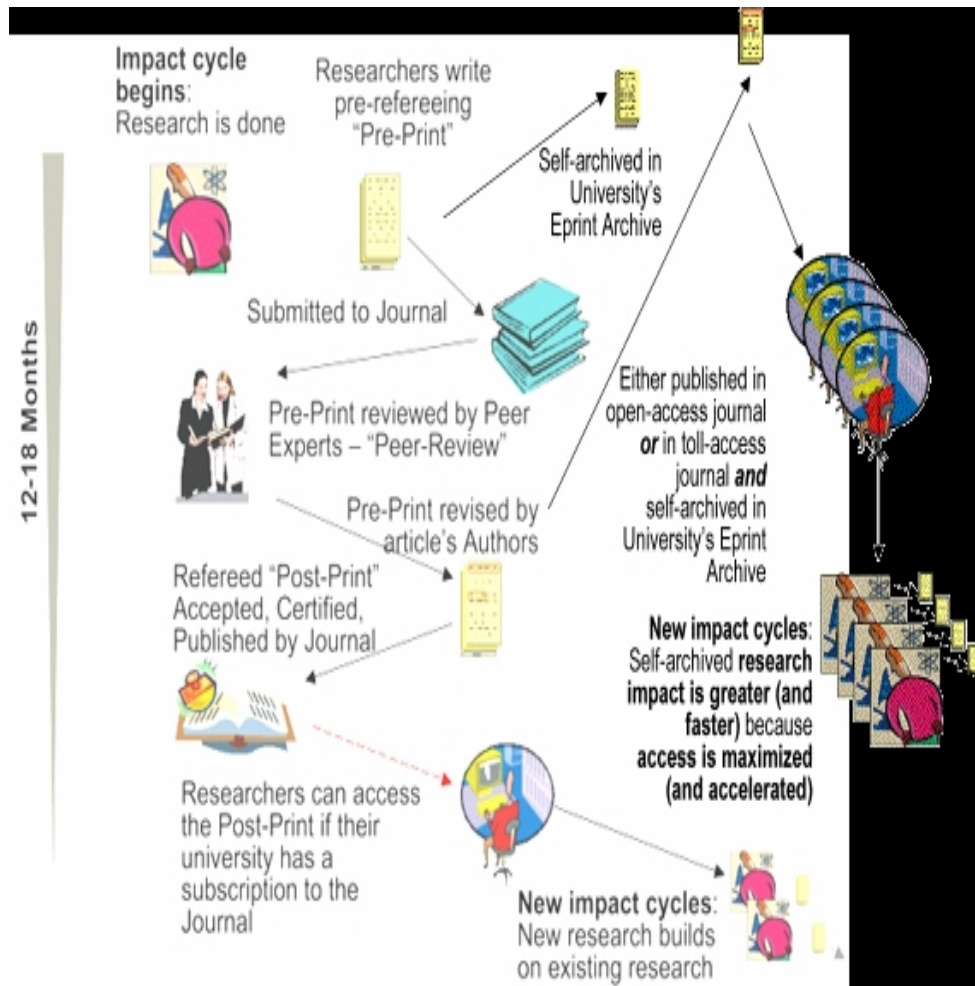
## *The Road to Open Access: Reciprocity: Limited Access, Limited Impact*



—EPrints Handbook



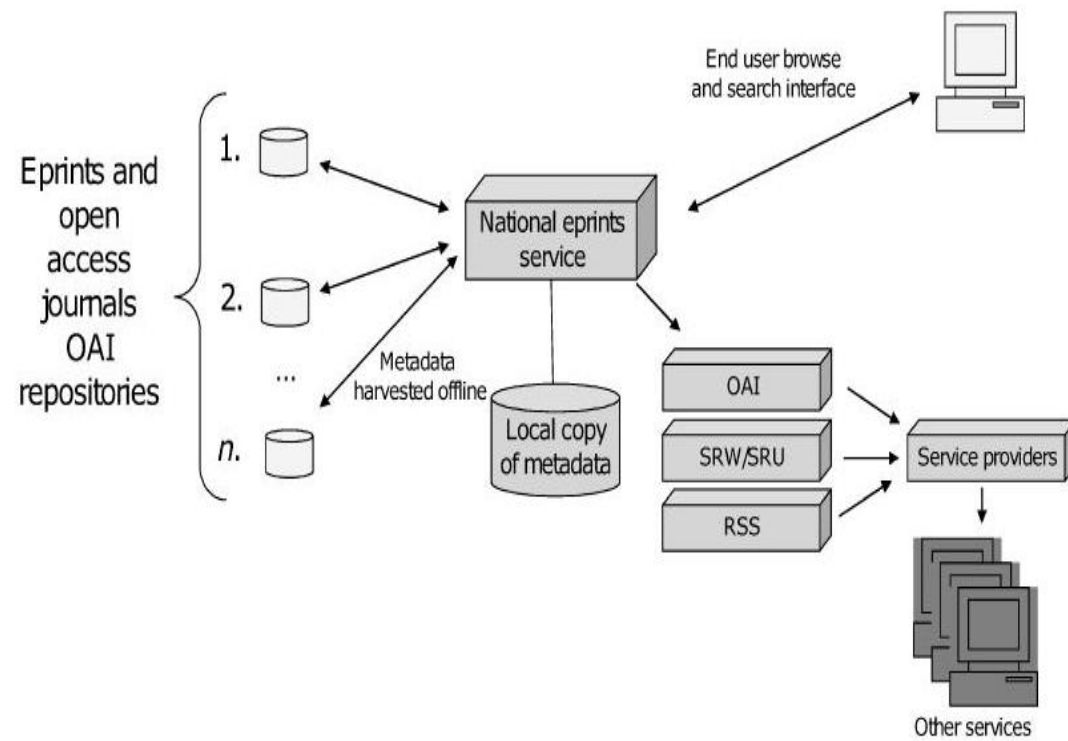
## *The Road to Open Access: Reciprocity (conti.): Maximized Research Access and Impact Through Self-Archiving*



—EPrints Handbook



## *The Harvesting Model for E-Prints*



—Alma Swan, et al.

## *Science Commons: Open Access Status*

- ☞ Self Archiving for Preprints, Postprints, and Open Access Journals*
- ☞ Some common worries and prejudices that many academics hold about Open Access (or Self-Archiving):*
  - ✓ Copyright*
  - ✓ Peer Review*
  - ✓ Preservation*
- ☞ Citation Impact for ISI, Web/URL, and Google Scholar*

## Science Commons: Open Access Status (conti.)

- ☞ 70% of the 103 publishers surveyed by Eprints.org have adopted self-archiving policy
- ☞ 92% of the 8853 journals survey are green, i.e., they endorse author self-archiving of either the preprints or postprints of articles.
- ☞ Stand on the shoulders of giants *But* we need to find out who are the real giants of journals, articles, or authors for each research subject?
- ☞ We also need to discover what (and how) are the innovation (or knowledge) diffusion mechanisms from these real giants?
- ☞ Do you think this is a real paradigm shift w.r.t. innovation (or knowledge) creation and diffusion network?

# *Social Network Analysis (SNA) Criteria*

- ☞ *Several important criteria w.r.t. knowledge creation and diffusion:*
  - ✓ *In-degree and Out-degree*
  - ✓ *Centrality*
  - ✓ *Betweenness Centrality*
  - ✓ *Patterns of Connected Components*
  - ✓ *Structure Holes*
- ☞ *Are those SNA criteria shown as **Power Law Distribution**?*
- ☞ *How do you achieve the automatic annotation and extraction of meta-data on Innovation (Knowledge) Creation and Diffusion Network (ICDN)?*

# Centrality in the Social Network of Researchers

Indegree		Closeness		Structural Holes		Publications		Impact	
Name	Value	Name	Value	Name	Value	Name	Value	Name	Value
Steffen Staab	119	Ian Horrocks	0.476	Ian Horrocks	113	Steffen Staab	81	Rakesh Agrawal	684
Dieter Fensel	114	Steffen Staab	0.469	Steffen Staab	105	Dieter Fensel	69	Daniela Florescu	191
Stefan Decker	95	Dieter Fensel	0.468	Dieter Fensel	99	Mark Musen	65	David Kinny	180
Enrico Motta	81	Frank van Harmelen	0.467	Frank van Harmelen	91	Ian Horrocks	57	Ora Lassila	166
Frank van Harmelen	59	Stefan Decker	0.458	Stefan Decker	80	Alexander Maedche	53	Honglei Zeng	153
Raphael Volz	59	Rudi Studer	0.438	Rudi Studer	63	Rudi Studer	50	Stuart Nelson	117
Ian Horrocks	55	Enrico Motta	0.434	Guus Schreiber	48	Amit Sheth	47	Michael Wooldridge	91
Sean Bechhofer	48	Sean Bechhofer	0.427	Enrico Motta	44	Katia Sycara	46	Ramanathan Guha	85
Katia Sycara	48	Carole Goble	0.425	Raphael Volz	43	Frank van Harmelen	42	Donald Kossmann	83
York Sure	47	Ying Ding	0.424	York Sure	43	Carole Goble	42	Sofia Alexaki	61
Carole Goble	46	Guus Schreiber	0.421	Tim Finin	43	Wolfgang Nejdl	42	Laks Lakshmanan	60
Guus Schreiber	46	York Sure	0.408	Sean Bechhofer	42	Stefan Decker	41	Paolo Atzeni	57
Rudi Studer	46	Peter Crowther	0.407	Katia Sycara	41	Tim Finin	41	Michael Uschold	56
Peter Crowther	40	Alain Leger	0.405	Carole Goble	36	Chen Li	41	Richard Fikes	56
Deborah McGuinness	37	Raphael Volz	0.405	Ora Lassila	27	Enrico Motta	40	Ray Ferguson	55
Ying Ding	35	Herman ter Horst	0.403	Chen Li	26	Nicola Guarino	34	Boris Wolf	53
Jean Francois Baget	34	Jim Hendler	0.401	Richard Benjamins	25	John Domingue	33	Michael Lincoln	50
Jim Hendler	33	David Trastour	0.401	Matthias Klusch	24	Gio Wiederhold	30	Fereidoon Sadri	46
Pat Hayes	32	Richard Benjamins	0.400	Michael Sintek	23	Anupam Joshi	30	Yannis Labrou	45

SWWS, ISWC chair (8)

W3C co-chairs (2)

Journal of Web Semantics (3)  
IEEE Intelligent Systems (2)

Figure 5: Centrality in the social network of researchers reflects real world status

*Application of Semantic Technology for Social Network Analysis in the Sciences,*

*Peter Mika*

# Research Agenda

☛ *Interdisciplinary studies of law, social network model and the semantic web for knowledge creation and diffusion on the Internet:*

- ✓ *Regarding to social network and legal system modeling, automatic extraction, annotation, and analysis large scale of empirical data on innovations from the Internet*
- ✓ *Ontology-based annotation of social network, e.g., innovation creation and diffusion network (ICDN), to validate the feasibility of legal systems, e.g., DRM or CC*
- ✓ *Advances in social network theory of innovations, including comparative insights into the social, technological, and legal factors*
- ✓ *Experiments and insights as to how social network and legal system aspects might be 'factored into' the information technology itself, e.g., knowledge management system from semantic web perspective.*