



## A SYSTEMATIC MAPPING ON SELECTION OF OPEN SOURCE SOFTWARE LICENSE: ECONOMIC AND SOCIAL PERSPECTIVE

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### ABSTRACT

Open source software license is a contract under which any software released is called open source software. In 1980's, R. Stallman formed free software foundation. It introduced GNU GPL license. Any software which is released under it is open source software and totally free of cost and has equally right to redistribute, inspect and modification of code. It attracted many contributors toward open source software. These also encouraged introducing different types of open source software license. These open source software license introduced different types of benefits for contributors. Therefore different contributors want to select different open source software license. In the end selecting open source software license became a research area. We gather motivation factors of open source software and also gather motivation factors on which individuals take decision about selecting open source software license. In this systematic mapping, we accumulate publications on the motivation factors of open source software. From the frequency of publications we found out the recent trends in this area of research. In this systematic mapping, we included evaluation research, review paper mostly. Systematic mapping is a method of gathering the research work of a particular area of knowledge. From the motivation factors of open source software, if we find out some other factors which can influence on choice of open source software license, this will become a fruitful increment in knowledge of selecting open source software license.

**Key words:** *Open Source Software, Open Source Software License, Systematic Mapping*

### 1. INTRODUCTION

License of open source software play a vital role as a motivator for an individual [13]. There are different perspective which influence on choice of open source software on an individual. Project manager takes decision for choosing of open source software license [14]. Community of software engineering is now focused toward evidence base software engineering [7,8]. Evidence base software engineering provides knowledge in each and every perspective i.e. how, when and in every context of software engineering practices [8]. Evidence base software engineering plays a vital role because it provides evidence of relevant field, which are integrated for decision making [4,5].

Systematic mapping used in other knowledge areas frequently but software researcher used it lately [2,3]. Evidence base software engineering proposed systematic mapping technique [8]. Systematic mapping technique due to its conducting research is now applied in multiple domains [9,10]. Systematic mapping tells us about the type, quality, quantity of research and results available in specific knowledge areas and systematic mapping also tells how to handle the research knowledge [1]. method of research which contains following steps (1) planning (2) conduction of research (3) selection of primary study [6]. It is, we found that systematic mapping has been used for software



testing [9] software requirement specification [10] and software architecture [12].

**2. STEP 1 PLANNING OF MAPPING**

**Point of view:** We would like to gather knowledge about the open source software license with respect to decision in choosing license.

**Research Question:** Based upon the point of view these are our Question. What research has been done on the motivation factors for open source software? What research has been done on the selection of open source software license?

**Search strategy:** Our search strategy have following keyword, search strings and search engine:

**Keywords:** our research keywords are “open source software”, ”libre software” , “free software”, “license”, “licence”, “copyright”, “copyleft”, “intellectual property right” , “motivation factors”, ”attracting factors ”,”review”,” comparative analysis”, ”exploratory study”, ”philosophical paper”, “article”, ”evaluation research”, “case study”. we think that these key words are appropriate for our research.

**Search string:** our search strings are following: OSSand software patents and “license” or “licence”, “OSS“and “copyright law” and “license” or “licence” etc.

**Search engine:** we use advance search of following search engine named IEEE, Science Direct, ACM, Springer link, and google scholar.

**Inclusion criteria:** we included book, review paper, comparative analysis, evaluation research, article, philosophical paper, exploratory study, case study. This literature is that which reported data about our research idea

**Exclusion criteria:** we exclude those studies those do not report data about our research idea

**3. STEP 2 CONDUCTING RESEARCH**

We searched papers from Elsevier, IEEE, Springer link, ACM, Google and GoolgeScholar. We found 759 papers. We choose those publication We choose those publications which published in last ten years. The detail of found papers is given in table 1

**Table 1**

Search Engine	Publications
IEEE	75
Science Direct	47
ACM	549
Springer Link	35
Google, Google Scholar	53
Total	759

In IEEE, Science Direct, Springer Link, ACM, we follow advance search and in that we search papers by the keywords in abstract. From search results, we 18 choose primary studies, because in these studies literature material reported data about our interest. Detail about studies with respect to their search engine is given below in table2.

**Table 2**

Search Engine	Primary Studies
IEEE	5
Science Direct	4
ACM	2
Springer Link	1
Google, Google Scholar	6
Total	18

**4. STEP 3 SELECTING RELEVANT PAPERS**

In this, we selected those publications which reported data about the motivation factors for which an individual takes part in open



source software. We also included those publication which reported influential factors for taking decision in choosing open source software license. Detail of relevant studies is given below in table 3.

**Table 3**

Search Engine	Relevant Studies
IEEE	1
Science Direct	3
Springer Link	1
Google, Google Scholar	6

**5. STEP 4 ANALYZING AND BUILDING MAP:**

In this, we selected the primary studies by studying abstract and full length paper which are described in table 4 and built map on the basis of their concepts and years of publications. We took concepts on X-axis and years of publication on Y-axis.

**Table 4**

No	Primary studies
1	Kevin Crowston, Kangning wei, James Howison & Andrea Wiggins,2009 “Free/Libre OSSDevelopment What We Know and What We Do Not Know”, Syracuse University School of Information Studies
2	Richard Kemp,2009, “Current developments in Open Source Software”, Kemp Little LLP, London, UK
3	Berni Dwan, “Open source vs closed”
4	Shun-ling Chen,” Free/OSSLicensing”
5	Josh Lerner, Jean Tirole,2005, “The Scope of Open Source Licensing”, Harvard University and NBER
6	Kasper Edwards,2004, “An economic perspective on software licenses—open source, maintainers and user-developers”, Department of Manufacturing Engineering and Management, Technical University of Denmark
7	Josh Lerner and Jean Tirole, 2002, “some simple economics of open source software”
8	Alexandre Gaudeul, 2004, “OSSDevelopment Patterns and License”, University of Toulouse
9	Param Vir Singh, Corey Phelps, David A. Tepper, 2010, “Determinants of OSSLicense Choice A Social Influence Perspective”, School of Business Carnegie Mellon University,
10	David A. Wheeler, 2007, “Free/Libre OSS(FLOSS) License Slide”
11	Masashi Ueda, 2005 ,” Licenses of OSSand their Economic Values”, Research Center of Socionet work Strategies, Kansai University
12	Juho Lindman, Anna Paajanen and Matti Rossi, 2010, “Choosing an OSSLicense in Commercial Context A Managerial perspective”, Information System Science, Aalto University School of Economics Helsinki, Finland
13	Namjoo Choi, Indushobha Chengalur-Smith, 2009,” An Exploratory Study on the Two New Trends in Open Source Software: End-Users and Service”, College of computing and information University at Albany, SUNY
14	Adel Khelifi, Manar Abu Talib, Mohamed Farouk, Habib Hamam,2009,”Developing an Initial Open-Source Platform for the Higher Education Sector—A Case study: Alhosn University”
15	Chaim Freshmen and Neil Gandal, 2007, “OSSMotivation and Restrictive Licensing#”
16	Daniel M German, Massimiliano Di Penta, Julius Davies, 2010“Understanding and Auditing the Licensing of Open Source Distribution”, University of Victoria, Canada
17	Sharon Belenzon, Mark Schankerman, “Motivation and Sorting in OSSInnovation”, Fuqua School of Business, Duke University
18	J`urgen Bitzer, Wolfram Schrettl, Philipp J.H. Schr`oder, ”Intrinsic Motivation versus Signaling in OSSDevelopment**”Free University Berlin



These are the relevant studies which we selected from the primary studies. These studies reported

us the more focused data about our interested area. Which are described in table 5.

**Table 5**

No	Relevant studies
5	It focuses on initial exploration of the determinants of open source license Choice.
6	It focuses on the behavior of agents under three license regimes
7	It highlights the extent to which labor economics.
8	It focuses on the choice of license terms along the development of a piece of software.
9	It focuses on social influence model of open source on license choice
12	It focuses on the choice of OSSL in managerial context
13	It focuses on the OSSLs in respect of users and developers as well as support and service of OSS
14	It focuses on the cost of developing an IT project for an university and adopt OSSL for that to serve community
15	It focuses on the contribution level of an individual in open source software.
17	It focuses on the variability of contribution from developers with respect to license and project characterizes.
18	It tells that why developers contribute on OSS and how their quality is better.

**Build Map:** On the basis of relevant published studies we built a map which reported the frequencies of publication on our research area. We take years of publication on y-axis and

reported material on x-axis. We take reference number which we shall use in our study and place them among their focus perspective and publication year.

2000					
2001					
2002				[7]	[7]
2003					
2004					[6,8]
2005		[5]			
2006				[20]	
2007				[15]	
2008				[19]	
2009				[13,14]	
2010	[9]		[12]		
	Decision on social perspective	Decision on economic perspective	Decision on commercial perspective	Intrinsic motivation	Extrinsic motivation

**6. DISCUSSION**

We use systematic mapping accumulation of motivation factors for selecting open source software license, because literature tells about this that selection of license is influence by some motivation factors, which agree to anybody for selecting a specific license for his product. Our systematic mapping will help the those

researchers, which are interested in working in this area, because this mapping tells them the frequencies of publications about selecting license and other motivation factors on which there is need to do work on them and try to know their influence on an individual. At the end of this discussion we discuss our lesson learnt and



limitation of our systematic mapping. We use this mapping to evaluate the knowledge area on the motivation factors of open source software with respect to selecting of license. In this perspective we found out studies which reported knowledge about our research area. This technique provides trustful and satisfactory results. For conducting this mapping we are two people who worked with fully dedication for one month and as a result we are able to map our research area. One is research scholar and other is his supervisor. We restrict our systematic mapping to the motivation factors which can influence an individual in selection of open source software license. Limitation of our systematic mapping is that we do not include that publication which is not accessible for us.

## 7. CONCLUSION

In this systematic mapping, we found the publication on the intrinsic (social) motivation factors of open source software. We also found the publication on the extrinsic motivation (economic) factors of open source software. We also found selecting of open source software license on the base of economic, social and commercial (managerial) perspectives. In future, we will try to find out some other motivation factors both economic and social perspectives for selecting the open source license. These will be our research question in future what are the motivation factors in selecting an open source software license with respect to economic and social perspectives in software community? Are the results of RQ1 are in accordance with perception of local (Pakistani) open source software community?

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