

# A Study of Software Reuse and Models

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## ABSTRACT

This paper aims to provide a base for software reuse and its models through systematic study of papers. The paper identifies the scope, recent trends and future scope of software reuse and its models.

### Keywords

Components, Software reuse, Models.

## 1. INTRODUCTION

Software reuse is the process of creating software systems from existing software rather than building them from scratch. The paper focuses on issues in software reuse domain. It emphasizes on reuse factors causing barriers and favoring enhancement in reusability. It predicts scope, recent trends, and future in software reuse. Our analysis is based on systematic search of journal and conference paper. So far no one has carried out research related to above topic.

There were interesting issues to analyze; we posed some research question described in Table 1. The underline motivation for all questions was our goal of investigation and improvement of software reuse models. These questions guided the design of the review process.

The remaining part of this paper is organized as follows section 2-Literature review, Section3-describes study process i.e. how the papers were classified section 4- reports the study results, section 5-summarized the main recommendation for future research on software reuse models.

## 2. LITERATURE REVIEW

Frakes and Terry (1996) – was first person to propose metric and models on software reuse. He suggested models based on cost benefits, assessing the maturity, the degree of reuse, the failure modes, and reuse library metrics [22].

Models are given on basis of reusability. Models are proposed on basis of process, metrics, framework, neural network.

Kung-kiu, Zheng Wang classified components on basis of syntax, semantics and composition.

## 3. RESEARCH METHODOLOGY

### 3.1 Searching and selecting papers

The main criteria for including journal, conference paper and other paper are the papers on Software Reuse models. Papers were searched based on manual reading of titles, abstracts of published paper in journals written in English. These journals were identified through reading reference lists of reuse papers, and searching on internet. The above study is based on number of available papers at that time.

The paper gave an understanding and visual picture of areas on reuse models. It may also serve as a basis for deeper investigation of findings.

### 3.2 Research Questions

Papers were identified and classified according to the reuse areas and topic listed in the Table 2. The paper aims at answering the Research Question listed in Table 1. It is likely that some of the papers may have been incorrectly classified. This will be refined and improved in future by including maximum number of research papers as you see here.

### 3.3 Information Sources

We have searched and collected information from various sources which are listed in references.

- www.acm.org
- www.ieee.org
- www.sciencedirect.com
- Various Springer Journals
- Elsevier Journals
- Conference papers (National and International)

Research Question	Main Motivation
1) Which and how many journals include most paper on Software Reuse?	Identify List of Journals
2) What are the barriers to Software Reuse?	Identify recent trends & opportunity.
3) What are the factors increasing degree of the reusability?	Identify trends and opportunity
4) Which are the proposed models on Reuse?	Identify trends and opportunity

Table 1. Research Motivation

### 3.4 Threats to Validity

The main validity threats of this study are publication selection bias and misclassification. Though we have tried to search through the journal and conference on issue by issue basis but still there are chances that some paper may be missed. Some relevant sources of data were not employed because of the inaccessibility to those journals.

## 4. RESULTS

### 4.1. Which and how many journals include most paper on Software Reuse?

We found papers on software reuse in many journals which are listed below. Most important journals which have paper on software reuse papers are IEEE Transaction on Software Engineering [1, 2, 3, 4, 24], ACM SIGSOFT Software Engineering Notes [5, 22, 23]. Some others journals are International Journal of Computer Application [12, 26], International journal on Engineering science and Technology, International journal on computer science and Software Engineering etc.

### 4.2. What are the barriers to Software Reuse?

Some of the most investigated barriers of software reuse are low investment, no specific process, lack of adaptation of process, no systematic approach, lack of support from management, lack of technical engineers interest, insufficient resources, low resource allocation, financial constraints i.e. cost high, lack of tool support, no repository, negativity effects, one dimensional solution, lack of specification for components, lack of certification of components, lack of review of requirements, lack of core competencies of organization, lack of tools and techniques, [1,5,14,17].

### 4.3. What are the factors increasing Reusability of Reuse?

Some of the factors which facilitates reuse of software are reducing process risk, complying to standards, developing repositories, reuse organizational support, making reusability generic, certification of components, increasing commonality among application, tools support for retrieving components, solving problems associated with organization, management, process, assets, trust, culture, technology, architecture [1,6,9]

### 4.3. Which are the proposed models on Reuse?

Models are suggested by research community. Some of the proposed models are [22, 44] on - Reuse cost-benefits [41], Maturity assessment, Amount of reuse, Failure modes [43], Reusability metrics, and Reuse library metrics.

Some other approaches for assessing the reusability of software components as per Fazal-e-Amin [27] are by proposing models, process, metrics [40], framework [38], neural network. Other models are on reusable components [16, 24]. Some researchers have proposed models on reuse based on various techniques like Neuron-Fuzzy [29], Genetic Algorithm.

Researcher have suggested model on software components. Software components models are classified based on Semantics [24] (classes, object, architecture units), Syntax (Object oriented programming languages, programming languages with IDL mappings, Architecture Description Languages) and Composition (object based and architecture based).

## 5. CONCLUSION

Software reuse has the area of search should be increased. The paper should be searched manually and on internet. The positivity of the result increases by increasing searching in all direction.

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