

User Participation and User Satisfaction in Information Systems  
Development

A dissertation submitted for the degree of Doctor of Philosophy

by

Rahat Hussain Bokhari

Department of Information Systems and Computing

Brunel University

June, 2001

## Abstract

Information Systems (IS) are being developed and used in organizations to achieve their business goals and to enhance organizational effectiveness. The rate of systems success is questionable. One of the causes of IS failures might be user dissatisfaction with the systems. The success of an Information System is difficult to measure directly, so user satisfaction and system usage are frequently used as surrogate measures of system success. User participation in IS development has been advocated to achieve user satisfaction with the system and consequently system success. Past research findings about the effect of user participation on user satisfaction leading to system success are mixed and inconclusive. Past research has not been successful in showing whether user participation in IS development is necessary or not. So further research in this respect is justifiable. This thesis investigated the effect of user participation/involvement on user satisfaction. The effect of user expectations, and user-developer effective communications on user satisfaction has also been explored. A research model was proposed to proceed with this research. Meta-Analysis was carried out to investigate the relationship between user participation, user expectations and user-developer effective communication each with user satisfaction respectively. This thesis found some relationship of these factors with user satisfaction. The strength of the relationship (i.e. correlation 'r') was found to be 'medium' but not 'large'. The results also show that user involvement has a larger correlation with user satisfaction as opposed to user participation. The findings not only lead to the conclusions that user participation/involvement, user expectations, and user-developer effective communication have positive relationship with user satisfaction, but also contribute to the existing alternative views among IS researchers. The relationship between system usage and user satisfaction was found to be positive and of 'medium' strength and contrasts with the prevailing view that no correlation exists between them. So research findings are not only useful to resolve controversies that exists in past research but also lead to conclusions that user participation may contribute towards successful IS development and consequently user satisfaction with IS. Further, the causes of the emergence of unrealistic user expectations are explored and suggestions for future research are made.

## **Acknowledgements**

A research activity may be a collaborative endeavour in its nature. Sincere thanks are due to all individuals who guided and provided substantial support to me during my research work. I owe a deep debt of gratitude to Professor Ray J. Paul for his kindness, generosity, guidance, and encouragement throughout my study. This dissertation would not have been completed without his unending support and patience. I am also grateful to Professor Robert Macredie for his enthusiasm and advice.

I would like to express my sincere appreciation to all those who sent not only their publications, dissertations, and unpublished papers but also for their prompt replies regarding my queries. In particular, I thank Dr. Mark I. Hwang, Central Michigan University, USA for his valuable opinions and advice.

Thanks must be extended to Ms. Pam Osborne, Mrs. Carolyn Bailey, Mrs. Shirley Hatch, other staff members and computer support staff for their favour and co-operation.

Finally, I am forever indebted to all my family members: mom, sisters, wife and particularly my kids Aun Bokhari, and Fizza Bokhari for their unreserved love, sacrifice, and encouragement during my PhD studies. I would like to pay my sincere thanks and also express my love to all of them.

Sponsored by: Government of Pakistan.

In the Name of ALLAH, the MOST Gracious, the Most Merciful

### **Dedication**

*To my father, the late S. Faiz Muhammad Shah who taught me that one must be determined and patient to achieve his long term goals.*

# Table of Contents

<b>Abstract</b> .....	i
<b>Acknowledgments</b> .....	ii
<b>Dedication</b> .....	iii
<b>Table of Contents</b> .....	iv
<b>List of Tables</b> .....	viii
<b>List of Figures</b> .....	xi
<b>Appendices</b> .....	xiii
<b>Declaration</b> .....	xiv
<b>1. Chapter 1</b> .....	<b>1</b>
1.1. Introduction.....	1
1.2. Information Systems and Organizations.....	3
1.2.1. IS and Stakeholders.....	4
1.3. Motivation.....	5
1.3.1. Are IS Disappointing?.....	5
1.4. Why Study User Participation?.....	7
1.5. Objectives of Research .....	15
1.6. Research Method .....	16
1.7. Dissertation Outline .....	18
<b>2. LITERATURE REVIEW</b> .....	<b>19</b>
2.1. Introduction.....	19
2.1.1. Information Technology and Organizations .....	19
2.2. Defining Information and Information Systems .....	21
2.2.1. Information: A Definition .....	21
2.2.2. Value of Information.....	23
2.2.3. An Information System (IS): A Definition .....	24
2.2.4. Information System As a Social System.....	25
2.3. Information Systems' Disappointment/Failure.....	27
2.3.1. The Notion of Failure.....	27
2.3.2. Human and Organizational Aspects in IS Failure.....	29
2.4. The Development 'Needs' of Information Systems .....	36
2.4.1. IS Development and User Requirements .....	36
2.4.2. Consequences of Deficient Requirements .....	37
2.4.3. User-Developer Communication Gap.....	41
2.4.4. User Expectations and Requirements Concern .....	46
2.5. Searching for Solutions.....	48

2.6. User Participation .....	51
2.6.1. What does Participation Mean? .....	51
2.6.2. Why is Participation Needed?.....	57
2.6.3. Effects of User Participation.....	61
2.6.4. User Participation and Past Research.....	64
2.7. The Notion of Expectation.....	67
2.7.1. Defining Expectations.....	67
2.7.2. The Expectation Gap.....	68
2.7.3. User Unrealistic Expectations: A problem.....	69
2.7.4. The Influence of User Expectations on User Satisfaction .....	71
2.8. Effective Communication and IS Development .....	72
2.8.1. Importance of Effective Communication.....	72
2.8.2. Effect of Effective Communications on Participation .....	75
2.8.3. Other Advantages of Effective Communication .....	76
2.8.4. Drawbacks of Ineffective Communication .....	78
2.8.5. Ineffective Communication and User Expectations.....	79
2.9. User's Satisfaction.....	81
2.9.1. Defining User Satisfaction.....	81
2.9.2. User Satisfaction as a System Success Measure .....	83
2.9.3. How User's Satisfaction Effects and Being Effectuated .....	85
2.10. Literature Critique.....	87
2.11. Summary .....	93
<b>3. Development of Research Questions .....</b>	<b>95</b>
3.1. Introduction.....	95
3.2. IS Success Determinants.....	98
3.3. Independent Variables .....	101
3.4. Dependent Variables .....	105
3.4.1. Determinants/Antecedents of User Satisfaction .....	106
3.5. Research Framework .....	116
3.6. Summary.....	118
<b>4. Research Methodology .....</b>	<b>120</b>
4.1. Introduction.....	120
4.2. IS Discipline and IS Research Issues.....	122
4.3. Research Approaches and Research Methods: A Definition.....	124
4.4. Common Research Approaches.....	125
4.4.1. Trends in the Use of Research Methodologies .....	128

4.5. Adopting a Research Strategy.....	137
4.6. Vote-Counting: A Step Towards Quantification .....	140
4.7. Meta-Analysis: A Quantitative Research Method .....	142
4.7.1. Defining Meta-Analysis.....	142
4.7.2. A Brief History of Meta-Analysis.....	143
4.7.3. Stages in the Meta-Analysis Process .....	145
4.7.4. Criticism of Meta-Analysis.....	152
4.8. Summary.....	154
<b>5. Data Collection and Manipulation .....</b>	<b>156</b>
5.1. Introduction.....	156
5.2. The Effect Size: A Metric of Relationship .....	157
5.2.1. The Interpretation of Effect Sizes .....	159
5.2.2. Combining Effect Sizes .....	159
5.2.3. Causes of Variations Across Studies .....	160
5.2.4. How to Deal with Replications and Methodological Weaknesses.....	161
5.2.5. Study Statistics Conversions to Effect Size .....	163
5.3. Organizing the Data Search .....	165
5.3.1. Unpublished Studies .....	165
5.4. Publication Bias: A Problem.....	166
5.4.1. Dealing with Publication Bias .....	167
5.5. Data Collection .....	167
5.5.1. System Usage Vs User Satisfaction Studies .....	169
5.5.2. User Expectations Vs User Satisfaction Studies.....	171
5.5.3. User-Developer Effective Communication Vs User Satisfaction Studies .....	172
5.5.4. User Participation Vs User Satisfaction Studies .....	172
5.6. Data Manipulation .....	180
5.6.1. Combination of Effect Sizes .....	180
5.6.2. Homogeneity Testing.....	180
5.6.3. The Statistical Significance Test.....	182
5.6.4. Fail-Safe N.....	182
5.7. Summary.....	183
<b>6. Research Findings and Analysis.....</b>	<b>186</b>
6.1. Introduction.....	186
6.2. Research Findings.....	189
6.2.1. Strength of Relationship: An Interpretation.....	189
6.2.2. Variation Across Studies: An Interpretation .....	190
6.2.3. Publication Bias: An Interpretation.....	191

6.2.4. Fail-Safe N.....	192
6.2.5. The Statistical Significance Test.....	192
6.2.6. Effects of Users' Participation/Involvement on Users' Satisfaction.....	193
6.2.7. The Relationship Between Users' Participation and System Usage.....	203
6.2.8. The Relationship Between User Involvement and System Usage.....	204
6.2.9. User Expectations and User Satisfaction Relationship.....	205
6.2.10. User-Developer Effective Communication and User Satisfaction relationship.....	207
6.2.11. System Usage and User Satisfaction Relationship.....	210
6.3. Discussion of Results.....	212
6.3.1. User Participation/Involvement Effects.....	215
6.3.2. User Expectations' Effect.....	220
6.3.3. Effect of User-Developer Effective Communication.....	221
6.3.4. System Usage and User Satisfaction.....	221
6.3.5. User Unrealistic Expectation Emergence Reasons.....	222
6.4. Summary.....	223
<b>7. Conclusions and Future Research.....</b>	<b>225</b>
7.1. Research Summary and Conclusions.....	225
7.2. Future Research Recommendations.....	233
<b>References.....</b>	<b>235</b>



## List of Tables

	<b>Page</b>
<b>Table. 3.1.</b> List of factors/variables that may affect user's satisfaction.....	103
<b>Table. 4.1.</b> Information Systems Research approaches in the context of scientific and interpretivist philosophies (Source: Gallier 1991, Page 332).....	126
<b>Table. 4.2.</b> Research methodologies in use (Source: Hamilton and Ives, 1982) .....	129
<b>Table. 4.3.</b> Comparison of research methods 1970's vs. 1980's (Source: Cooper, 1988, page 93).....	129
<b>Table. 4.4.</b> Research Methodologies in use: 1977-1985 (Source: Farhoomand, 1987, page 52, Amended in tabular form).....	130
<b>Table. 4.5.</b> Articles Classified by Research Design, 1983-1988 (Source: Orlikowski and Baroudi, 1991, page 4).....	130
<b>Table 4.6.</b> Research Methods and Endorsements (Source: Teng and Dennis, 1991, page 56).....	131
<b>Table. 4.7.</b> Empirical Articles by type (1968-88) [% calculated] (Source: Alavi and Carlson, 1992, page 54).....	132
<b>Table. 4.8.</b> Trends in use of empirical and non-empirical research methodologies: A Comparison.....	133
<b>Table. 4.9.</b> Epistemologies Used in IS Research Empirical papers by Australian Authors, 1980-1996 (Source: Ridley and Keen, 1998).....	134
<b>Table. 4.10.</b> Articles classified according to Research Methodology (Source: Lai and Mahaparta, 1997 [Tabulated from page 195]).....	134
<b>Table. 4.11.</b> Articles classified according to Research Methodology (Source: Claver et al., 2000, page 187).....	135

<b>Table. 4. 12.</b> Research Synthesis Conceptualized as a Research Project (Source: Cooper, 1988 Page 6; Cook et al., page 8-9.).....	151
<b>Table. 5.1.</b> Conversion: The 'Strength of Relationship' between two Variables (Source: Cohen, 1969 page 79).....	159
<b>Table. 5.2.</b> Formulae for transformation to 'r'.....	164
<b>Table. 5.3.</b> Sources of studies included in meta-analysis.....	168
<b>Table. 5.4.</b> Details: No. of studies included in meta-analysis for each relationship under research.....	168
<b>Table. 5.5</b> The relationship 'r' between System Usage and User Satisfaction (studies included in meta-analysis).....	169
<b>Table. 5.6.</b> The relationship 'r' between User Expectations and User Satisfaction (studies included in meta-analysis).....	171
<b>Table. 5.7.</b> The relationship 'r' between Effective Communication and User Satisfaction (studies included in meta-analysis).....	172
<b>Table. 5.8.</b> The relationship 'r' between User Participation and User Satisfaction (studies included in meta-analysis).....	173
<b>Table. 6.1.</b> Meta-Analysis Results (User Participation and User Satisfaction Relationship).....	195
<b>Table. 6.2.</b> Meta-Analysis Results (User Involvement and User Satisfaction Relationship).....	200
<b>Table. 6.3.</b> Mean Effect Sizes Differences: (Relationship of User Participation, User Involvement with User Satisfaction construct).....	205
<b>Table. 6.4.</b> Meta-Analysis Results (Relationship between User Expectation and User Satisfaction).....	206
<b>Table. 6.5.</b> Meta-Analysis Results (Relationship between User-Developer Effective Communication and User Satisfaction).....	209

**Table. 6.6.** Meta-Analysis Results (Relationship between System Usage and User Satisfaction).....211

**Table 6.7.** Comparison of current findings with past Meta-Analysis results (User Involvement and User Satisfaction relationship).....216

**Table. 6.8.** Comparison of current findings with past Meta-Analysis results (User Involvement and System Usage).....218

**Table. 6.9.** Comparison of current findings with past Meta-Analysis results (User Expectations and User satisfaction relationship).....220

**Table. 7.1.** Summary of Meta-Analysis findings.....229

## List of Figures

	Page
<b>Fig. 2.1.</b> Management, Users and System Developers Interaction/Communication. .....	46
<b>Fig. 2.2.</b> Level of User Involvement (Source: Nicholas, 1985).....	53
<b>Fig. 3.1.</b> IS Success Model (Source: DeLone & McLean, 1992).....	98
<b>Fig. 3.2.</b> A framework for UIS as a measure of IS quality (Source: Iivari, 1995)... .....	100
<b>Fig. 3.3</b> Measures of Implementation Success (Source: Lucas et al., 1990).....	115
<b>Fig. 3.4.</b> Proposed Research Framework.....	116
<b>Fig. 4.1.</b> Towards a revised framework of IS research philosophies, approaches and methods (Source: Galliers, 1997).....	127
<b>Fig. 4.2.</b> Meta-Analysis: First 15 Years (Source: White, 1994).....	136
<b>Fig. 6.1.</b> Relationship variability across studies (User participation and User Satisfaction).....	194
<b>Fig. 6.2.</b> Stem-and-Leaf display (User participation and User Satisfaction relationship).....	196
<b>Fig. 6.3.</b> Publication Bias (User Participation and User Satisfaction relationship). .....	197
<b>Fig. 6.4.</b> Relationship variability across studies (User Involvement and User Satisfaction).....	198
<b>Fig. 6.5.</b> Stem-and-Leaf display (User Involvement and User Satisfaction relationship).....	201
<b>Fig. 6.6.</b> Publication Bias (User Involvement and User Satisfaction relationship). .....	202

<b>Fig. 6.7.</b> Relationship variability across studies (User Participation and System Usage relationship).....	203
<b>Fig. 6.8.</b> Relationship variability across studies (User Involvement and System Usage relationship).....	204
<b>Fig. 6.9.</b> Relationship variability across studies (User Expectations and User Satisfaction relationship).....	206
<b>Fig. 6.10.</b> Publication Bias (User Expectations and User Satisfaction relationship).....	207
<b>Fig. 6.11.</b> Relationship variability across studies (Effective Communication and User Satisfaction relationship).....	208
<b>Fig. 6.12.</b> Publication Bias (Effective Communication and User Satisfaction relationship).....	209
<b>Fig. 6.13.</b> Relationship variability across studies (System Usage and User Satisfaction relationship).....	210
<b>Fig. 6.14.</b> Publication Bias (System Usage and User Satisfaction relationship).....	212
<b>Fig. 7.1.</b> Proposed Research Framework.....	230

## Appendices

	Page
<b>Appendix-A.</b> Common Types of Information System Failures .....	297
<b>Appendix-A1.</b> User Unrealistic Expectations Reasons.....	304
<b>Appendix-A2.</b> Taxonomy of Users Unrealistic Expectations Emergence Causes .....	305
<b>Appendix-A3.</b> Users' Realistic Expectation Formation Research Model .....	306
<b>Appendix-B.</b> Studies included in Meta-Analysis (The relationship between User Participation and User Satisfaction).....	307
<b>Appendix-C.</b> Studies included in Meta-Analysis (The relationship between User Expectations and User Satisfaction).....	319
<b>Appendix-D.</b> Studies included in Meta-Analysis (The relationship between Effective Communication and User Satisfaction).....	321
<b>Appendix-E.</b> Studies included in Meta-Analysis (The relationship between System Usage and User Satisfaction).....	323
<b>Appendix-F.</b> Studies included in exploring Users' Unrealistic Expectation Emergence Reasons.....	329

## **Declaration**

This dissertation consists of some of the material presented in the following:

Bokhari, R. H. (1998) User's Role and Information Systems Success/Failure: A Research Review, Proceedings of FAST IEEE Student Conference on Computer Science and Information Technology, Oct. 23-24, Lahore, Pakistan.

Bokhari, R. H. and Paul, R. J. (2000) Users' Unrealistic Expectations: Emergence Causes and Effects, Proceedings of the ACIS Conference, December, Brisbane, Australia.

Bokhari, R. H. and Paul, R. J. "The Relationship Between Systems Usage and Users' Satisfaction: A Meta-Analysis", (submitted).

Bokhari, R. H. and Paul, R. J. "The Effect of User Expectations and Effective Communication on User Satisfaction", (submitted).

# 1. Chapter 1

## 1.1. Introduction

The basic question that motivates this research is why well technically designed Information Systems (IS) are often not used by their users (see Robey and Zeller, 1978; Markus and Keil, 1994)? In the history of Information Systems (IS), probably there has been more failure and disappointment than success (Whyte and Bytheway (1996). The term 'disappointment' may be interpreted, when a system does not meet intended business objectives and user needs, so leaves user dissatisfied. Consequently users may avoid use of the system although it exists in the organization. Systems that do not support its business objectives are unlikely to succeed (Rainer and Watson, 1995). The success rate of Information Systems in the IS field lags behind its failures (see Sauer, 1999; Remenyi and Schambreel, 1997; Smith, 1997; Serageimidis and Poulymenakou, 1996; Willcock, 1994; Hochstrasser and Griffiths, 1994). How we can avoid such failures is a question of interest among researchers. It is very difficult to measure systems' success directly, as the success of a system appears to be a multidimensional construct, so researchers have suggested and used different surrogate measures to explain systems' success. Among such measures, "system usage" and "user satisfaction" are commonly agreed, accepted and used (see Mahmood and Medewitz, 1985; Ein-Dor and Segev, 1986; Nicholas and O'connor, 1990; DeLone and McLean, 1992). Nolan and Seward (1974) suggested that user satisfaction might be used to evaluate Information Systems. The study of user related factors that affect user satisfaction and consequently system success might be a significant step towards learning about users' role in IS development. Users are an essential part of IS and their role in IS development, implementation and operation is very crucial.

There appears a generally accepted axiom that user participation/involvement in IS development is needed to achieve systems acceptance, user satisfaction and ultimately systems' success (Ives and Olson, 1984). Various research studies have explored the effect of user participation during IS development and



implementation in order to decide how much it contributes towards achieving IS success. These empirical studies have produced mixed results about the gains/improvement in terms of systems success on user participation. Differences in viewpoints/opinions among researchers have hardly proved user participation to be beneficial and productive. Past research shows inconclusive findings about the effect of users participation on system usage and user satisfaction. Further, the findings about the relationship between system usage and user satisfaction are also unclear. Such mixed findings lead to confusion about users' participation effectiveness towards achieving systems success and also about the association of systems usage and user satisfaction. Under such circumstances the reader may not be able to decide whether user participation during IS development is necessary or not? So further investigation about the effect of user participation on user satisfaction and system usage might be logical to reach some conclusion. These important issues provide the motivation for this research.

Unfortunately, the real contribution of user participation during IS development has been poorly understood. This thesis investigates:

- What are the consequences of users participation during IS development and implementation that ultimately affect system usage and user satisfaction?
- Is there any interdependency between systems usage and user satisfaction?
- What is the relative importance of the other factors such as user expectations and effective communication towards achieving user satisfaction?

The overall objectives of the study concern a search to reach some conclusions about the nature of relationship between user participation and user satisfaction, the effect of user expectations, effective communication on user satisfaction and the nature of their association. This research also aims to explore the nature and strength of relationship between system usage and user satisfaction.

## **1.2. Information Systems and Organizations**

The introduction of IS in organizations attempts to enhance organizational efficiency and effectiveness. Information Systems have become crucial to the functioning of organizations (Hicks, 1993). The basic objective of IS has always been the growth of the information resources that might be useful for organizations in their decision making and towards gaining competitive edge. Industrial interest in computer systems development of business applications started in the late 1950's (Lucas, 1974; Friedman and Cornford, 1989). Today Information Systems (IS) are an essential part of organizations. Many business activities can hardly be carried out without using IS/IT. The type of Information System is very concerned with the context of its purpose and use. A variety of systems almost computerised have been variously attributed as transaction processing systems (TPS), computer based information systems (CBIS), management information systems (MIS), executive information systems (EIS), decision support systems (DSS) etc. in IS literature. Different systems may adopt the functionality of others and some times may become indistinguishable and seem to be a subpart of the other. The major and common purpose behind such systems relates to efficient and effective functioning in organizations by resolving the problematic situations, which have been recognised as hurdles in achieving organizational objectives/goals. Information Systems are deemed to be more effective and successful if they contribute towards achieving and fulfilling organizational objectives/goals.

In today's 'information age' organizations require to arrange/utilize Information Technology (IT) capabilities more effectively. As a result the dependency/reliance of organizations on IS/IT has significantly grown during the last three decades. The trend to invest in IS/IT is also increasing albeit organizations are hardly successful in getting what they expect from growing technology (Bailey, 1993). The business community is not satisfied with computing because IS/IT is not coping with their expectations (Angell and Smithson, 1991). "IT budgets are up, but the failure rate of projects is rising" (Sabbagh, 1997 p. 3).

As people are an essential part of the organizations so their role/status might be affected on the introduction of IS in the organization. From the other way round, there might exist numerous factors related to people (users) that can affect IS development process. The occurrence of any ambiguity in the IS development process, or an uncertainty in users' acceptance of the system and its use may increase the risk of system failure (see chapter-2). Different IS development methodologies advocate user participation in the development process to assure user requirements/needs, satisfaction and system acceptance. I attempted to explore the effect of user participation in IS development. Commonly, I used the term 'IS' instead of 'Information Systems' in my thesis.

### **1.2.1. IS and Stakeholders**

The goals/objectives of an organization may be influenced by external and internal influences. Internal influences come from stakeholders (Cyert and March, 1963). The stakeholders are “all those claimants inside and outside the organization who have a vested interest in the problem and its solution” (Manson and Mitroff, 1981 p. 43). The purpose of IS/IT is to facilitate/serve stakeholders in managing and performing their tasks more effectively. As IT has been embedded mostly in organizations and business, and is almost pervasive in use, so different stakeholders are involved. Mitroff and Linstone (1993 p. 141) defined stakeholders as “any individual, group, organization, or institution that can affect as well as be affected by an individual's, group's, organization's, or institution's policy or policies”. Stakeholders could be groups of people who have a vested interest in Information Systems (IS). Those may be system analysts, managers, users, sponsors, legislators and other affected organizational members (Lyytinen, 1988a; 1988b; Willcocks and Mason, 1987). Lyytinen and Hirschheim (1987 p. 262, 263) also wrote that to confine stakeholders to users, management and IS professionals is too coarse/general and its real determination may be considered after the IS goes live. They specified the nature of IS, type of relationships to IS, depth of impact and level of aggregation as considerations to identify IS stakeholders. It might be true that users, management and system developers have their prime roles oriented towards system development and

implementation. I prefer to use the term 'user' for both, the user of the IS, or someone other who occasionally uses the system even though he/she has been primarily assigned other managerial responsibilities in the organization. They are those individuals who have an interest in using the system.

An Information System not only consists of hardware and software but also people. Each person has psychological characteristics when facing ones problem within some organizational context, and needs personally some acceptable evidence from the proposed solution (Manson and Mitroff, 1973). The definition shows the existence of people as an essential part of IS, so IS may be considered as social systems in their nature. Users [people] have their prime importance in the development and evaluation of Information Systems. Previous research showed that IS researchers mostly focused their efforts on getting feedback from users (i.e. what was the users' point of view) to evaluate the systems success/failure. The success of a system is very concerned with how much the system is beneficial to the area concerned, how much the system is being used, and up to what extent users feel satisfied with it. Such criteria in a broad way can lead to different questions when one thinks about IS failures. Why had the systems not been achieving the purpose/goal for which they were introduced, and why users do not feel satisfied with system's performance/outcome? What aspects need more attention during IS development that might be necessary to achieve user satisfaction and ultimately systems' success? Such questions argue the importance of users' role in IS development and also in evaluating IS effectiveness in organizations.

### **1.3. Motivation**

#### **1.3.1. Are IS Disappointing?**

Unfortunately, the failure of IS is common despite major advances in the technology, IS development tools, and large investments in IS development. Since the mid 1950's, Computer Based Information Systems (CBIS) are in existence. Just from the early part of this period the IS field faced "software

crises” and “system failures” due to perceived flaws in the IS development and implementation process. According to Britton and Doake (1997 p. 8) the development of large and complex systems in the sixties and early seventies were discouraging because they were i) delivered years late, ii) over budgets, iii) unreliable, iv) difficult to maintain and v) hardly delivered what was required. They termed this as “software crises”. Paul (1994) pointed out that most of the current Information Systems are disappointing and users are hardly getting what they want. Research articles and newspapers indicated a number of systems not only in UK, USA but also in others countries that are abandoned, cost overruns, behind schedules, unable to achieve organizational goals, disappointing/failures and mostly discarded on users part (discussed in chapter 2). Usually, the lessons learned from such failures may help to avoid those in future but Lyytinen and Robey (1999 pp. 85) say that "Not only have many organizations failed to learn, but they have also learned to fail".

The history of IS can be referred to for existing evidence for analysing the rate of failure/disappoints of IS as compared to the successes achieved in the IS field. Information systems may fail during development, on implementation or even when in operation. Failure literature shows the consequences of ignoring human aspects and lack of user participation during system development process. Numerous reasons behind IS failures are organizational, technical/technological, environmental, and human related. These are mentioned in chapter-2. "Expensive system failures have been attributed to behavioural and organizational factors" (Robey et al., 1989 p. 1172).

Different researchers quoted different percentage rates of IS failures differently (for example, Gladden, 1982; Lyytinen and Hirscheim, 1987; Hochstrasser and Griffith, 1994; Laudon and Laudon, 1996). The aggregate of failure rates may lead to the conclusion that disappointment/failure is more common as compared to IS success. Usually organizational and human factors have been evidenced as the main culprits for IS disappoint/failures. So the participation of those who might be affected by a new system in IS development speculated to be a reasonable step. Raynor and Speckman (1983) mentioned user participation in IS

development as a good sign towards achieving successful system implementation. Different researchers consider user participation as essential and critical for IS development and success (Powers and Dickson, 1973; Dickson and Simmons, 1970; Lucas, 1975; Yap et al., 1992; Keil and Carmel, 1995; Cavaye, 1995; Guimaraes et al., 1996a; Srivihok, 1999). On the other hand, some argue that a system might be successful without users' participation and fail even though users participated during its development (De Brander and Edstrom, 1977; Senn, 1991). Guthrie (1974 p.228) stated that many middle managers strongly advocated active user participation in IS development to achieve IS success whereas "In apparent contradiction to these high participation demands, statistical analysis of the attitude scores indicates that the participation index does not appear to be a significant attitude determinant". Hirschheim (1985 p. 295) mentioned that although user participation have positive effects on IS development but some other argue that it is inherently manipulative, and take longer time for systems development and can lead to political problems. The IS literature provides mixed, unclear and inconclusive findings regarding the benefits of user participation in IS development.

#### **1.4. Why Study User Participation?**

It has been widely argued that technology may hardly be installed and utilized properly without consideration of people who have to work with it (Mumford, 1983; Laudon and Laudon, 1996). Dickson and Simmons (1970) pointed out in 1970's that people problems are major difficulties that organizations may face during the IS development. Unfortunately, these difficulties still persist. The potential benefits of IS/IT have not been fully realized due to the poor acceptance of systems by their users (Igarria and Iivari, 1995a). The concept of involving users in the IS development has been of great interest to researchers and practitioners since the 1970's. The wisdom that user participation may lead to successful systems implementation can be traced back to theory and research in organizational behavior. The field of organizational behaviour suggests the participation of the workers in the decision making process (called PDM "Participative Decision Making") for achieving higher satisfaction (Ives and

Olson, 1984). Mitchell (1973) say that participation concerns shared decision making and the people might have the opportunity to contribute according to their competence. Locke and Schweiger (1979) noted that PDM leads to higher satisfaction as it may increase the likelihood that employees may get what they want. During participation the individual may influence the activities in which he has expertise and also may work for outcomes he values (Mitchell, 1973). Vroom (1964 p. 226) believes that participation in the decision making process may increase productivity.

Dickson and Simmons (1970, p. 69) suggested that the nature and details of the system being developed must be explored and discussed with those who will be affected. The general approach to involve users in system development and implementation concerns with achieving user satisfaction with IS. The user's role in implementing a system successfully might be of prime importance. According to Senn (1991 p. 31) the basic purpose of involving users in the IS development is concerned with:

- Get the right system
- Get the system right
- Get right with the system

The need of user participation/involvement in IS development has been recognized as an important factor, so it has been studied frequently by IS researchers. Straub and Trower (1988 p.23) stated that user involvement must be considered in explaining the success of IS. Averweg and Erwin (1999) studied various success factors critical to Decision Support Systems (DSS) success. According to them, half of the organizations among 14 agreed upon that user involvement is critical towards achieving DSS success. As far back as the 1970's, Dickson and Simmons (1970 p.68) say, "participation by those who will be affected by the system is essential". Powers and Dickson (1973 p. 156) say, "user involvement is critical to the success of MIS project". According to Robey (1979 p. 537), users concerns are critical towards system success, so to involve users in

the design efforts are argued to be logical. Alter (1978 p. 33) says that systems developed with lower initiation and participation experienced higher incidence of implementation difficulties. Guimaraes et al. (1992 p. 425) says that user participation/involvement produces favourable user attitudes and commitment towards the system, so it is likely to promote system usage and user satisfaction. Robey (1979) mentioned a strong positive relationship between user attitudes and system usage. Yoon et al. (1995) found user involvement as an important factor in achieving user satisfaction and ultimately system success. According to Lin and Shao (2000), user participation in IS development may increase user satisfaction with the system. User participation in IS development is believed to achieve numerous benefits such as better understanding of the system, avoiding unimportant features, system ownership, decreasing resistant, user satisfaction, acceptance to change, and exchange of information and experiences (see Lucas, 1974a; Robey and Farrow, 1982; Hirschheim, 1983; Baronas and Louis, 1988; Anderson, 1989; Hawk and Aldag, 1990; Igarria and Guimaraes, (1994); Guimaraes and McKeen, 1995; Lin and Shao, 2000). According to Saarinen and Sääksjärvi (1990 p. 25), user participation in IS development can be of great value, but the practitioners should emphasize the quality of user participation instead of relying on its "magic power". The other way round, Markus (1983) argues that systems development in a highly political environment, so it might be more successful when users' involvement is held to be at minimum or tightly controlled. Guimaraes and McKeen (1995, p. 879) argue that despite many potential benefits, however, user participation is no panacea. There are many situations where user participation may actually be counterproductive.

The relationship between i) user participation in IS development/implementation and user satisfaction and ii) user participation and system usage remained of great interest among IS researchers. Although researchers claim that user participation is important in IS development/implementation, unfortunately past research has produced mixed findings about the effects of user participation on user satisfaction and system success (see Ives and Olson, 1984; Cavaye, 1995). Hirschheim (1985) stated that research studies report 1) user participation in IS development may have its positive effect, 2) it may lead to political problems, 3)



might be extremely difficult to operationalize, 4) systems may take longer time to be developed, and 5) participation may be inherently manipulative. In this light it looks reasonable to quote the opinions/findings/analysis of various IS researchers about past research relating to user participation in the systems development process. For example:

Regarding the definition of user involvement, Swanson (1974 p. 178, 179) comments that what is meant by "involvement" is rarely clear, and hardly has something been done for its measurement in research situation.

Baronas and Louis (1988 p. 111) say that "... there is significant evidence that little is known about how strategies of user involvement work -- if and when they do. No theoretically grounded explanation for links with system success has been established, nor has a consistent meaning of user involvement been developed".

Edstrom (1977 p. 590) stated that "...in certain cases involvement may still lead to failure while in other cases good results can be obtained without the involvement of the user".

According to Senn (1991 p. 35) "User involvement in the systems development process does not guarantee IS implementation success. Likewise, its absence does not automatically doom a project to failure"

Although there is a general belief that participative design positively contributes in terms of some measures of system performance, but there exists a little empirical evidence to substantiate this widely espoused belief (King and Rodriguez, 1981 p. 717).

Although user involvement has long been considered an important determinant of systems success, however the empirical research have not demonstrated its benefits (Guimaraes et al. 1992 p. 410).

Furest and Cheney (1982 p. 567) says that user involvement in IS development is believed to be important but their research findings do not support this claim.

Hirschheim (1985 p. 296) states that "The relationship between user participation in systems design and system use, system quality, and user attitudes is far from clear".

Ewusi-Mensah (1998 p. 33) states that "user involvement which is widely recommended as crucial to successful systems development may be necessary but is not sufficient criterion for system completion or implementation success".

Ives and Olson (1984 p. 586) conducted a critical review of user involvement and system success and said " ... much of the existing research is poorly grounded in theory and methodologically flawed; as a result, the benefits of user involvement have not been convincingly demonstrated". They also added "Not only has empirical research been unable to foresee when and what types of user involvement are appropriate, it has not convincingly demonstrated that user involvement contributes to system success" (Ives & Olson, 1984 p. 601).

Srinivasan and Davis (1987 p. 69) say that the concept of user participation is more far reaching than has been traditionally understood.

Tait and Vessey (1988 p. 92) also speculated that mixed findings about the effect of user involvement on system success may be due to either 1) research on user involvement is rarely based on strong theory, or 2) the studies on user involvement are methodologically flawed.

Baroudi et al. (1986 p. 232) states that the results of empirical studies relating user involvement to system quality, systems usage, user attitude, and user satisfaction are far from conclusive. They attributed such mixed findings to the flaws that "the operational definition of user involvement is imprecise" (p. 232).

Barki and Hartwick (1989 p.53) say that despite considerable efforts have been made to study user involvement, the understanding of involvement construct in the IS field remains mostly descriptive and somewhat shallow. Empirical results remain weak, in spite of a number of recently conducted, methodologically sound studies. They argue that "...the IS user involvement research suffers from the lack of a solid conceptual foundation" (pp. 61).

Saarinen and Sääksjärvi (1990 p. 26) made their comments regarding contradictory findings about effect of user participation on IS success and said " ... On the one hand, the frameworks used, and the measurement of the key concepts of participation and success have often been inadequate. On the other hand, the search for a possible causal relationship on the basis of aggregated variables (for example, participation in general) may have led to contradictory results. They further added that such controversial findings are due to the vague and narrow conceptions of both user satisfaction and system success (p. 28).

Hartwick and Barki (1994 p. 440) posited that mixed findings about user participation effects on systems success may be due to the presence of intervening variables affecting the relationship between user participation and systems success.

DeLone and McLean (1992) states that participation effect on subsequent success of Information Systems using user satisfaction without considering system quality and information quality might vary.

Cushing (1990) attributed inconclusive findings of past research to weaknesses in theoretical support, and methodological rigor.

Hawk and Aldag (1990) say that measurement bias may overstate the benefits of user participation. According to them user may overstate their participation for successful systems and understate for failure ones when they assess their participation as well as system success.

Doll and Torkzadeh (1990) argued that user involvement measurement weaknesses have restricted our understanding of the nature and efficacy of user involvement. The conflicting results, in part, may be due to lack of such adequate measures.

Guimaraes and McKeen (1995 p. 880) say that research on user participation has been plagued by inconclusive and contradictory results due to poorly grounded research or methodological flaws (i.e. lack of proper theory, measurement, and methodology), and omission of contextual factors.

Regarding disagreement among researchers about the benefits of user participation in IS development, Hirschheim (1985 p. 295) stated that proponents and opponents hold their beliefs more on intuition rather than on empirical grounds. Further research endeavours to offer definitive statement on value of user participation in IS development either suffer from methodological difficulties or have been inconclusive.

Saleem (1996) attributed contradictory and inconclusive findings of past research to non-consideration of contingent factors that might affect.

".... empirical studies are not able to show consistently that there is a causal relationship between user participation and system success; research provides mixed results" (Cavaye, 1995 p. 311).

"Yet for all the work that has gone on, it remains unclear whether the question of how to involve users to create system success has been answered or if it is even the right question. The current literature on user involvement does not provide a satisfactory basis for managing and leveraging user involvement in systems development and implementation" (Senn, 1991 p. 31).

Lucas et al. (1990 p. 12) say that "While the notion of user involvement is intuitively appealing, but there is still little evidence of exactly how it affects measures of implementation success".

Kappelman and McLean (1991 p. 339) say ".....the relationship between participation of users in the information system development process and the success of the developed information systems is either not particularly important, or that there are possibly moderating and/or intervening variables that are important to this relationship which have not as yet been identified"

Newman and Noble (1990 p. 89) stated that the "precise nature and consequences of user involvement have been insufficiently explored empirically". They argued that mixed findings might be due to a limited operational definition of user involvement. User involvement might differ at different stages during systems development so its consequences have not been fully explored.

Garrity (1994 p. 41) concluded that past research has not accounted for the type of the system investigated, so inconclusive findings regarding user participation and system success may be due to cross system comparisons.

"In spite of the many studies in this area [User Participation], findings are not consistent or cumulative" (Cavaye, 1995 p. 331). She added that inconsistent findings are due to the fact that "..... participation is a nebulous term that is difficult to define clearly; it is a concept with many dimensions".

Despite assumption that user participation in the design of IS would lead to successful outcome in terms of more system usage, greater system acceptance, and increased user satisfaction, the empirical research so far has been unable to demonstrate its benefits. The findings are still mixed and fragmented (Lin and Shao, 2000, pp.283-284).

The above mentioned arguments can be summarized as: i) lack of proper theory, ii) imprecise definitions of participation and involvement constructs, iii) measurement problems, and iv) lack of consideration of intervening variables might be the common causes of inconclusive and contradiction findings.

The concept of user participation and user satisfaction has been a subject of research since 70's (Gallagher, 1974; Swanson, 1974). The relationship between user participation and user satisfaction is an intriguing one because participation is almost thought to be necessary for system success whereas user satisfaction has been accepted as a surrogate measure of success. Despite research on user participation for the last three decades, there is not yet any conclusive evidence that had showed user's participation as a necessary condition for user satisfaction and ultimately systems success. It may happen that system is unsuccessful even user participated and successful without user participation (De Brabander and Edstrom, 1977; Cavaye, 1995; Roth and Bartholome, 1994).

The research regarding user satisfaction is also not beyond criticism for its inconsistent theoretical definitions, measurement instruments, and also operationalization (see Jenkin and Ricketts, 1985; Srinivasan, 1985; Melone, 1990;

Galletta and Lederer, 1989; Klenke, 1992; Thong and Yap, 1996). Such aspects are argued to be the cause of inconsistencies among studies and might be problematic towards achieving some cumulative evidence across studies (Kim, 1989). Thong and Yap (1996 p. 607) stated that "user satisfaction is a complex variable with many theoretical and operationalization issues still to be resolved". Keeping in view both of the aspects such as: 1) the wide spread axiom about the necessity of user participation in IS development, and 2) the existing controversial findings among researchers about its effect on user satisfaction leading to systems success, I argue that further research to explore the effect of user participation on user satisfaction and consequently systems success is justifiable, and also might be supportive in solving the existing controversies.

## **1.5. Objectives of Research**

According to Hirschheim (1985 p. 295), "The disagreement between those who feel participation is beneficial and those who see it as detrimental is not easily resolved as these positions are generally strongly held and based on the interpretation of limited, and often contradictory data. Proponents and opponents hold their beliefs more on intuition than on empirical grounds". Further research to explore the effect of user participation on user satisfaction might be supportive towards some conclusions. Secondly, past research showed the adoption of system usage as a direct function of sense of user satisfaction with IS and vice versa. The relationship between system usage and user satisfaction is found to be contradictory and inconclusive within the IS literature. Kim (1989) suggested further research on the relationship between user satisfaction perspectives and system usage. Mawhinney (1990, p. 954) says, "Although these two variables [system usage and user satisfaction] have been widely used, researchers tend to use one or the other, but seldom use both. Little has been done to establish a relationship between these two variables ....". This research attempts to find the effect of user participation on user satisfaction and system usage in order to resolve the inconsistencies within past research results.

User satisfaction may also be taken as a measure of a user's belief about how well the IS meets user expectations. User expectations might be affected by users, organizational and IS characteristics (see Shirani et al., 1994). Stakeholders' expectations fulfilment might be a basis for achieving user satisfaction and system's success (Ginzberg, 1981; Lyytinen, 1988; Szajna and Scamell, 1993; Marcolin, 1994). Keeping in view the importance of user expectations, Szajna and Scamell (1993) made a call to explore the causes of unrealistic expectation emergence/evolution as future research. This thesis intends to interrogate how user expectations and user-developer effective communication influence user satisfaction, and also about what are probabilistic reasons that may cause emergence of unrealistic expectations. Such considerations lead to the following general research questions or intentions:

Primary "Questions":

- 1) Investigate how user participation may affect system quality, information quality, system's usage, and finally user satisfaction.
- 2) Investigate what relationship exists between systems usage and user satisfaction.
- 3) Investigate the effect of user expectations, and user-developer effective communication on user satisfaction.

Secondary "Question":

- 4) Investigate the reasons that may cause user expectations to be unrealistic.

## ✓ 1.6. Research Methods

Past research findings in the context of user participation and its effects on dependent variables (i.e. systems usage, user satisfaction) have not found the ultimate effect of user participation. Different endeavours to offer more definitive statement on the value of user participation in IS development either suffer from

methodological difficulties or have been inconclusive (Hirschheim, 1985 p.259). Many methodological and theoretical flaws among previous studies have been supposed to be liable for inconsistent findings. Although some efforts (for example Ives & Olson, 1984; Cavaye, 1995) have been made to accumulate the previous findings in this regard, this mostly depends upon qualitative analysis that is usually unable to evaluate the strength of the non-significant findings, although these may have some weak effects. These reviews attempted to explore the drawbacks that caused such inconsistencies in past research. There may be some benefit to the research community if one were to accumulate and resolve the past inconsistent findings quantitatively in order to ultimately explain the contribution of user participation towards achieving user satisfaction leading to systems success.

More or less in every discipline the literature shows different findings of studies on the same subject. Such findings from contemporary research seem to be mixed and inconclusive. It is hard to say that two researchers may perceive, or conduct the same study in the exactly same fashion. Researchers' views/opinions may differ with each other regarding their findings about the same problems. It seems hard that a single study may resolve all major issues in this context. To synthesize and analyse the inconsistent findings, 'meta-analysis' has been adopted as a research method. The accumulation of knowledge from the results of different studies on the same subject may contribute more towards exploring the facts. It may happen that different studies on the same subject may have different findings (i.e. as in this study). In such situation researchers ask for more research on the question. Keeping in view such different findings on the same issues one may get confused and as a result may be unable to reach some final conclusion. In other words, a reviewer can only say that the data are inconclusive and require more research on the topic, albeit several experiments or studies have already been carried out.

Methodologists in different disciplines have been developing an antidote to the chaotic output of contemporary research. Meta-analysis is a quantitative approach that enables researchers to discover the consistencies in a set of inconsistent



findings in order to arrive at conclusions more accurate and credible than presented in any one of the primary studies (Hunt, 1997). Meta-Analysis uses statistical procedures to integrate research findings across studies. So meta-analysis as a research method is supposed to be more appropriate to seek answers for proposed questions such as those mentioned above. This method is widely used in education and psychology. MIS researchers (Pettingel et al., 1988; Alavi and Joachimsthaler, 1992; Hwang and Thorn, 1999; Mahmood et al., 2000) have also used it in their research to integrate findings across studies.

## 1.7. Dissertation Outline

The main objective of the study is to arrive at some conclusions by analysing inconsistent findings on the subject. In the current chapter I discussed briefly the previous research findings about the effect of user participation on user satisfaction and system success. I also discussed how these findings lead to confusion about the user participation role in IS development. Chapter-2 concerns the literature review and critique of existing literature. Chapter-3 explains the proposed framework of the research. It examines different factors relating to user satisfaction that are being influenced by user participation. In chapter-4, a brief of commonly used research approaches in the IS discipline and an elaborate discussion on meta-analysis as a research approach is presented. Further, the benefits/drawbacks of meta-analysis is discussed. Chapter-5, deals with the techniques used for data collection and conversion in this research. In Chapter-6, research findings and analysis are presented. Research limitations and further research recommendation are mentioned in Chapter 7.

## **2. LITERATURE REVIEW**

### **2.1. Introduction**

This chapter describes a detailed review of existing literature on IS development. In the previous chapter it was mentioned that success of IS in organizations is not so encouraging. Past research shows that system success lags behind failures. Different reasons may cause system failures. These are described in this chapter. As already mentioned that among different suggestions that might be adopted for successful IS development, user participation during IS development has been well recognized and advocated in IS literature. Unfortunately, the benefits of user participation have hardly been explored in terms of system success and past research findings are inconclusive. Keeping in view such situation further research regarding effect of user participation on user satisfaction is argued in the last chapter. Further, how user expectations and user-developer communication may affect user satisfaction are mentioned as research objectives. A detailed literature review regarding above mentioned aspects may provide more knowledge in this respect.

#### **2.1.1. Information Technology and Organizations**

Information Technology (IT) is the coming together of the existing computing, communication and control engineering technologies. It affects the way we live, work and enjoy ourselves and our future ability to compete in the "information Society".' (Department of Industry cited in Piercy, 1984 p. 1). Similarly, others also have argued that:

- The term IT was “coined to make the convergence of two technologies that had traditionally been separate: computing and communication” Kempner (1987, cited in Checkland and Holwell, 1998 p. 9).
- IT has emerged due to computer and communication technologies (Willcocks and Lester, 1993; Lucas, 1994; Jackson, 1997).

- IT represents the technical perspective and includes telecommunications, computers and automation technology (Peppard, 1993, p. 5; Earl, 1992 p. 21).

Thus, the term IT describes the fusion of technologies such as computing and communication. Being the convergence of different technologies (Zuboff, 1988, Peppard, 1993), IT is a multi-disciplined field. It has facilitated organizations by providing needed information to cope with rapid changes in their environment. IT is being used in organizations to increase their performance and to achieve an edge on the competition. IT applications are providing services more than that of traditional data processing. It does not contribute only in routine operations but in deciding strategies. IT provides opportunities for people to perceive and do new things in new ways (Cornford and Smithson, 1996; Checkland and Holwell, 1998). People are an essential part of organizations. They think about IT as a problem-solver. It is a common belief that IT has its profound impact on individuals, business and organisations (Zuboff, 1988; Earl, 1992).

Different evidences show patterns of growing IT expenditures for the last two decades (see Keen, 1991; Byrd and Marshall, 1997; Bicknell, 1995; Johnson, 1995 cited in Keil, 1995; Willcocks and Lester, 1993). Now the question arises, up to what extent have organizations been successful in achieving their expected benefits and goals at the cost of such expenditures on IT? Unfortunately many IT applications are not as successful as they are supposed to be. Existing examples show disappointing patterns of return from IT investments. For example a report from the US states that federal agencies incurred cost of 17 billion dollars from 1989 versus 9 billion dollars in 1982 for computer applications, where these systems did not work as planned or had not been delivered in time (Flynn, 1992). The effective use of IT depends upon how users adopt and utilize it.

The use of IT can not be treated as separately but includes human, social, and organizational aspects. The impact of IT may not be restricted to only in software/hardware, or in computerised decision making but in the application of solution to problems, enhanced human-human communication and at best utilization of information itself. People are an essential part of systems and

organizations. Thus success of Information Systems concern with individuals' [users] performance but not IT only (Angell and Smithson, 1991), so the systems should reflect the needs and interests of those who might be its probable users.

## **2.2. Defining Information and Information Systems**

### **2.2.1. Information: A Definition**

The word information is derived from the Latin verb 'informare', to give shape or form to (Metcalf and Powell, 1995). Mostly the term 'Information' refers to 'processed data' in the literature. Galliers (1987, p. 4) states information as "collection of data, which when presented in a particular manner and at an appropriate time, improve the knowledge of the person receiving it in such a way that he/she is better able to undertake a particular activity or make a particular decision". Avison and Fitzgerald (1995 p. 12) stated that "The information expresses what is meant clearly, with nothing left implied". Some viewed information as 'data plus meaning' (Checkland and Scholes, 1990; Marcus, 1997) and distinction between the data and information is context dependent (Avison and Fitzgerald, 1988; 1995). Data is context free and may be viewed as raw material from which information may be attributed. The 'Information' is result of a process in which individuals attribute some meaning to the data. Data are not interpreted whereas information has a specific meaning and use to the recipient in a particular context. It has been recognized that information comes from data that have been processed for its usefulness to serve some specific purpose (Davis, 1974; Lucas, 1982; Verrijn-Stuart, 1987; Robb, 1997).

Information has deep concern with people because they can use it to reflect their values and beliefs. People can decide in the light of available information to do something. An information may only reduce an uncertainty when it confirms something. (Lucas, 1978; 1982; 1994) considered it as tangible or intangible entity that serves to reduce our uncertainty about some state or event. Dretske (1981 p. 44) says that "Information is that commodity capable of yielding knowledge, and what information a signal carries is what we can learn from it".

Literally 'any thing', 'set of signs', or 'knowledge' that may be used for taking an action could be an information (Manson and Mitroff, 1973 p. 475; Murdick, 1980 p. 11; Bell and Wood-Harper, 1992 p. 2).

Information is the prime need of organizations for finding and solving their problems in addition to taking some decision in pursuit of organizational objectives (Peppard, 1993; Wilson, 1993). So the purpose of information is to control action in an organised system thereby to operate the organization (Scarrott, 1989). It also facilitates communication among the participants and organizations. It may only be advantageous to participants if relevant and meaningful. Fox (1983 cited in Metcalfe and Powell, 1995 p. 124) emphasise on 'meaning' and said "the information carried by a sentence, or set of sentences, is determined by meaning, and, hence, is relative to meaning". It shows the importance of 'meaning' in understanding the information. Common attributes such as relevance, completeness, accuracy, timeliness, clarity, conciseness, reliability, accuracy and up-to-date may be considered as essential for quality of information. These attributes may affect the usefulness of predictable decisions (Nichols, 1977; Clare and Stuteley, 1995; Wilson, 1993, Martin and Powell, 1992).

Land (1985, 1987) says that an 'information' may be descriptive, probabilistic and qualitative.

- Descriptive information, often highly structured. It concerns to:

1. *Description of the rules that govern or constrain the affairs of the real world.*
2. *Description of the state of the real world.*
3. *Description of changes in the state of the real world.*

- Probabilistic information, inferred on the basis of assumptions. It concerns to:

1. *Predictive information those deal with future planning activities.*

2. *Information which attempts to describe the real world by means of inferences from a set of observations or measurements of the real world.*

3. *Information derived from a model of the real world.*

- Qualitative information, concern to information such as:

*Explanatory, qualifying and qualitative, patterns and norms, judgement, values, attitudes and powers, and theories, hypothesis, and conjectures.*

Information is processed data to which individuals attribute meanings and is context dependent. All information usually needed to be presented with proper details, accuracy and at the right time to the recipient. Although personal and situational factors may influence interpretation of information (Lucas, 1982). Robb (1997, p. 11) wrote, “ With ‘good’ data and ‘good’ Information System’, we shall find ‘good’ solution to our problems and make ‘good’ decisions”. Keeping in mind the above citations and combining those lead to the concepts of ‘Information’ as processed data with meanings, enable to improve recipient’s knowledge, reduce his/her uncertainty about some event and appear to be meaningful, useful and purposeful towards taking some action or decision in some specific context.

### **2.2.2. Value of Information**

The word ‘information’ may be the best to express the facts and meanings that an observer attributes to it (Checkland, 1981). The meaning of information may vary with recipients concerned. Data by itself does nothing but when a particular person interprets it in his own context and meanings then it seems to be a valuable information. It may happen that information useful to one person may be useless to another. The value of the information is crucially dependent on how it is perceived by the recipient. Metcalfe and Powell (1995 p. 128) wrote, “ perceiver’s concern give birth to information, nothing else can”. The value of the information is concerned to the individual’s needs and depends upon who used it, when and in what situation and how much it reduces the uncertainty in decision making (Ahituv and Neumann, 1987; Davis, 1974; Lucas, 1978, Lucas 1982).

Some argue it worthless unless it is a surprise to the recipient (Lucas, 1982 p. 27; Lucas, 1994 p. 40). Surprise value may intimate about the existence of a problem and is determined by an amount of response that a piece of information evokes (Metcalf and Powell, 1995). They considered the value of information as “the change in expectations invoked by the information”.

‘Information’ might be considered as an essential part of organizational operating procedures. The information use is part of performance of the management dealing with organizing different activities. Peppard (1993, p. 5) states “Information is life blood of any organization and every thing an organization does involves using information in some way”.

Information is supposed to be more valuable when structured. Lack of structure in creation, distribution and receipt of information may make it useless (Remenyi and Schambreel, 1997). For every organization to be successful, effective use of information is the key criteria. For any of the functions such as planning, controlling, organizing and decision making in organizations, the information is a critical resource. Stamper (1973, p. 13) considered information as: “It is information that holds organizations together and drives them along”. Information has its impact on the recipient if relevant. Mathieson and Ryan (1994) stated that information received by any individual play a part towards forming his attitudes. For example, an information may make an individual's attitude towards a particular objective more positive if he perceives the information relevant and positive. No Information System can exist without ‘information’ although there is no agreement over what information actually is (Mingers, 1997).

### **2.2.3. An Information System (IS): A Definition**

There are plenty of definitions of Information Systems available within literature (e.g. Wood-Harper et al., 1985; Ein-Dor and Segev, 1993; Peppard, 1993; Martin et al., 1994; Lucas, 1982; 1994; Angell and Smithson, 1991; British Computer Society cited in Cornford and Smithson 1996; Robb, 1997). Buckingham et al., (1987, cited in Avison & Fitzgerald, 1995 p. 13) defined IS in a broader way as:

“a system assembles, stores, process and delivers information relevant to an organization (or to society), in such a way that the information is accessible and useful to those who wish to use it, including managers, staff, clients and citizens. An Information System is a human activity (social) system which may or may not involve the use of computer”. The distinctive themes of IS definitions concern to idea of purposefulness, goal direction and defined need; notion of information itself, its flow and its use in decision making; relationship with organizations within which IS exist; and the notion of its distinct components (Cornford and Smithson 1996 p. 10). Keeping in view above citation one may refer:

An Information System for means of acquiring, assembling, storing, processing, presenting and disseminating information in an organization and between organizations to support its control and operation, achieve its objectives/goals and in satisfying real needs of its users.

Usually IS deal with planning and decision-making functions in order to facilitate the stakeholders in carrying out their activities effectively. The effectiveness of the system states the extent to which the user of the system is able to enhance his performance to attain the objectives and goals of an organizaion. The major goal is to provide needed information to its users (Metcalf and Powell, 1995). Checkland and Scholes (1990 p. 55) states that an Information System, in a true sense, entails data manipulation and meaning attribution. The machines do data manipulation whereas attribution of meaning is uniquely a human act. The information may only be productive if the user knows what means ‘information’ and how to interpret it (Lucas, 1982). The importance of information is apparent in a sense that it facilitates users in carrying out their needed activities and decision-making to achieve organizational goals. Better and more timely information may enhance decision makers performance and reduces the risk in any decision situation.

#### **2.2.4. Information System As a Social System**

The technology is designed with its most technical efficiency and human beings have to fit in with, the computer system that results (Willcocks and Mason,



1987). Information System may be more or less IT based and people are an essential part for the application of computer technology. The objectives of developing Information Systems (IS) is concerned with organizational improvement by solving its performance problems and gaining strategic advantage. IS in organizations can improve the performance of people through the use of IT (Sprague and McNurlin, 1993). It indicates that Information System usually consists of “IT” and “people” and both are inter-related. People not only produce IS but are an important part of its functioning. Lewis (1994, p.3) stated that Information Systems are not merely collection of data processing procedures and machinery but complex combination of both machines and people.

The success of an Information System is very much related to its use that depends on its related people (i.e. users). If the system was found to be not useful by its users then it will fall into disuse and leads to failure. As people are an integral part of Information Systems so are called social/human activity systems (Checkland, 1981; Avison and Fitzgerald, 1988; Angell and Smithson, 1991; Bell and Wood-Harper, 1992; Land, 1992; Willcocks and Lester, 1993; Ewusi-Mensah, 1997). According to Land (1992 p. 6) “Information systems are essentially social systems of which information technology is but one aspect”. Similarly Davis, et al. (1992 p. 294) considered Information System as a ‘social system’ that uses IT. Wood-Harper et al. (1985 p. 9) also considered Information Systems as social systems that rely to an extent on IT but technology is only a component. An Information System not only consists of hardware, software but at least a person with his psychological characteristics facing some problem within some organizational context and needs some evidence for its solution that may be through the mode of representation (Manson and Mitroff, 1973). The Information Systems have their concern with organizational, social/human aspects in addition to technology. Information Systems are social systems whose behaviour is heavily influenced by goals, values and beliefs of individuals and groups and also by performance of technology (Angel and Smithson, 1991).

According to Land (1985, p. 215) “an information system is a social system, which has embedded in it information technology”. Although advanced

technology plays its part in development of IS but it can not prevent the overall system from being a social system. It is not possible to design a robust, and an effective Information System by incorporating significant amount of the technology without treating it as a social system. It leads to the argument that it may not be possible to design an effective IS without treating it as a social system. People being essential part of the system, their role during development and even after implementation can not be ignored. As per system developers view “ the success of the system from user’s viewpoint is guaranteed – if the system is used” (Willcocks and Mason, 1987 p. 3). Unless the people (stakeholders) use the system, the system seems to be worthless and wastage of resources. Information Systems’ use facilitate users in planning and managing different functions such as operation, management, and decision making in organisations (Davis, 1974; Lucas, 1978; Bell and Wood-Harper, 1992). Information System can not be considered as only technology artefact, but people as one of its part. Considering an Information System in the absence of people seem to be meaningless as its development and use can not be isolated from people’s presence.

## **2.3. Information Systems’ Disappointment/Failure**

### **2.3.1. The Notion of Failure**

Failure means “not achieving a favourable outcome that was aimed at ” (The Concise Dictionary). IS failure is not a new topic. Poulymenakou and Holmes (1996) reported that notion of systems failure may be traced back to Camier (1958) who discussed failure in the very first issue of the *Computer Journal*. The IS failure phenomena is also well presented in Lucas (1975) and Brooks (1995). Any kind of system whether technological or organizational may suffer failure. Failure implies a problematic and undesired situation (Sauer, 1993). It indicates performance of the system below some stated standards. Failure is an observation about some thing not behaving as required but not a thing in itself. It depends upon observer’s perception and judgement. Judgement means difference between required objectives and the actual performance of the system (Bignell and Fortune, 1984). The term ‘failure’ has different senses depending upon one’s

specific perspective he adopts and it conveys a family of meanings (Lyytinen and Hirschheim, 1987). Some argue that it might be easier to define, identify and agree upon failure than success (Davis et al., 1992). Failure can be interpreted as shortfalls between desired goals and actual performance, difference between expectations and actual outcomes. If stakeholders' objectives are not being met by the system (i.e. the gap between existing and the desired situation appears to any stakeholders group) then it may be regarded as 'failure' or disappointing. Land (1992a) posits that when user are unable to achieve the anticipated benefits from the new system then they may resist or reject it. It appears that Information Systems either succeed or fail and there is no other way (Lyytinen and Hirschheim, 1987; Lyytinen, 1988b). The IS failure or success ultimately has its impact on organization's success as a whole.

The problems with IS development and implementation are so widely spread that to discuss IS failures never be a surprise. IS literature shows that somewhere between one-third to half of all systems may fail, even some researchers quoted higher rates (Lyytinen, 1988b). Generally when required objectives/goals are not being delivered by any system or its overall performance observed to be below the real expectations of stakeholders then the system may be termed as disappointing/failure. The failure of the system is concerned with failing to take in to account the objectives and interests of all those with a stake.

Since mid 1960's the subject of disappointing/unsatisfactory/failure of IS has been under discussion. Ackoff (1967) observations about failure appears as "Contrary to the impression produced by growing literature, few computerized management information systems have been put in to operation. Of those I've seen that have been implemented, most have not matched expectations and some have outright failures". Failures occur from complex interaction of factors broadly concerning to human and technical ones. It is evident from IS literature that despite the increase of our knowledge, advancement in IT and induction of numerous IS development methodologies, the systems do continue to fail in one or the other way. Thus failure may be evidenced in underutilized systems, systems unable to increase organizational efficiency/effectiveness, systems

abandoned or systems that do not provide return on investment, poor systems quality and performance (Allingham and O'Connor, 1992; Ewusi-Mensah and Przasnyski, 1994; Ballantine et al., 1998; Lyytinen and Robey, 1999). Brynjolfsson (1993) used the term 'IT Productivity Paradox' regarding 'disappointment' and 'poor performance' observed in IT on returns. Similarly, Mahmood (1995) mentioned that empirical studies show a little or no evidence about the IT investment and corresponding productivity, so IT productivity paradox still remains a major puzzle. System failures are a continuing fact that exists. "The IS community faces a paradox: despite impressive advances in technology, problems are more abundant than solutions: organizations experience rising costs instead of cost reduction, IS misuse and rejection are more frequent than acceptance and use" (Lyytinen, 1987 p. 4).

According to OASIG (1996 p. 12) report "Up to 90% of IT projects fail to meet their goals. 80% are late and over budget. 40% are abandoned". The failure rate of IT projects is high (see Mahaney and Lederer, 1999). According to recent survey of IT managers view in USA and in UK, the risk of IT projects failure is increasing (Moad, 1998). The increasing failure rate of IT application require that failure reasons should be explored and mitigated for achieving successful systems. The success of the system may not only require to identify the negatives and reactive but positives and proactive strategies for its implementation (Davis et al., 1992). Human and organizational problems are found to be more pervasive, so are discussed further.

### **2.3.2. Human and Organizational Aspects in IS Failure**

Information Systems may fail during development, on implementation, or in operation due to numerous reasons that may fall in different contexts. Many efforts have been made to devise some standard ways of designing, developing and implementing systems. Information system failure is very much situational dependent (Poulymenakou and Holmes, 1996; McBride, 1997). IS failures are rarely a results of solely technical problems but the interaction of technical, social, cultural and political elements that result in a failed IS. The success of IS

depends upon more than technical competence and its roots lie in the social and organizational context (McBride, 1997). Why IS run over budget, abandoned during development, require expensive maintenance or turned to be failure remained a continuous debatable issue/challenge for the researchers. Consequently, the introduction of new Information Systems in organizations may bring about changes in organizational structure, traditional working practices, culture, interdepartmental relations, power and resources distribution (Doherty and King, 1997; Anderson, 1997), so the roots of IS failure or success lies in social and organizational contexts.

According to OASIG (1996) report, organizations' inadequate attention to human and organizational factors is one of the reasons causing IT failures. Smith (1988) blamed insufficient planning, ineffective management and user feelings as a cause of expert systems failures. Numerous research studies/reviews (Lucas, 1975; Bostrom and Heinen, 1977; Franz and Robey, 1984; Lyytinen and Hirschheim, 1987; Markus, 1983; Sauer, 1993; Ewusi-Mensah and Przasnyski, 1994; Poulymenakou and Holmes, 1996; Remenyi and Schambreel, 1997; Kim, 1997; McBride, 1997) have contributed their best to explore numerous factors relating to technical/technological, people, political, organization and its environment aspects that usually cause systems to be disappointing/failure. For a system to be effective and successful both technical and human aspects are argued to be critical. There is a general consensus that most of the IS failures occurs due to organizational and behavioral problems. Lehaney et al. (1999 p. 33) say that "Evidence from the IS domain suggests systems failure may be due, at least in part, to concentration on technical rather than human issues in the development process". They further stated that in case IS development methodologies do not place enough emphasis on human interests can cause IS failures (p. 35). Bikson and Gutek (1983) found organizational problem more critical towards system implementation rather than technological. Organizational issues are more responsible to failures rather than technical ones (Lucas, 1975; Long, 1987; Smith, 1988; Ewusi-Mensah and Przasnyski, 1994; OASIG, 1996; Lehaney et al., 1999). Condon (1978 cited in Cronan and Means, 1984) pointed out different reasons related to management as one of the major culprits in

causing system failures. The failures may also be blamed on hardware faults, shoddy requirement analysis, programming errors, unforeseen technical difficulties, under estimation of costs and time schedules.

Levinson (1985 p. 288 cited in Long, 1987 p. 228) stated "while 1960s were the era of hardware failures, and 1970s of software deficiencies, the issues for system failure in 1980s have become organizational and managerial". Morgan and Soden (1973) studied 10 large MIS failures and blamed management and personnel rather than technology as a cause of failures. Similarly, Bickson and Gutek (1984 cited in Long 1987, p. 218) stated that a major study of 2000 US firms that had implemented office systems at least 40% failed to achieve intended results while less than 10% of failures were attributed to technical failure. It means within 40% of failures 36% were due to human and organizational problems. Not only technological but also human and organizational problems have been evidenced as major causes of such IS disappointments/failures. Anderson (1997) noted that emphasis on technical aspects and ignoring social and organizational factors usually cause clinical IS failures.

There is growing evidence that majority of reasons concerning to Information Systems failures are human and organizational. Liebenau and Smithson (1993) blamed organization's management for their blindness about errors/flaws that remain undetected until it is too late. Similarly Ewusi-Mensah (1998) also found lack of management of the project as one of the cause of project abandonment in his case study in spite of users participation and sufficient budget. Some others identified management, and the negligence of human factors during IS development as causes for disappointing systems (Bjorn-Anderson and Hedberg, 1977; Willcocks and Mason, 1987; Williams, 1993; Madon, 1993). Mingers (1995) argued that IS failures occur as a result of limitations with conventional IS design methodologies that concentrate on technical solutions but pay little attention to business and organizational settings. Sauer (1993) noted social and behavioural factors as more important than technological aspects that cause IS failures. Alavi (1984) argued that various basic problems are behavioural in addition to technological. Earl (1992) concluded that lack of human consideration

in the development of IT projects can often leads those projects to failure. Willcocks and Mason (1987) pointed out that systems designed and implemented with little concern for social, organizational aspects usually face human problems at operational stage. Human factors, but not technology, make the difference between acceptance and rejection, and success and failures of a system (Angell and Smithson, 1991). Laudon and Laudon (1996) states that systems may be technical successful but organizational failure because of failure in the social and political process of building a new system. It may happen that same system that is successful in one organization may fail in others, as it is not acceptable to the users. For example, Reijonen and Heikkilä (1999 p. 55) noted that an Information System slightly incompatible with work process, and a bit awkward to use otherwise technically functioning, may be implemented in one organization but abandoned in a similar organization. Similarly, Baronas and Louis (1988 pp. 111) state that a system with excellent technical designs alone can not insure system's success. Other researchers also pointed out 'lack of system acceptance' by users as a cause of IS failures rather than technical ones (Lucas, 1975; Edstrom, 1977). Nickerson (1981) pointed out different reasons both technical and social expressing why people avoid the use of a system even they might benefit from its use. Kaiser and Srinivasan (1982) noted user and system staff differences which may arise from their incompatible attitudes as one of the causes of IS failures. These attitude problems may cause a cultural gap. The cultural gap between stakeholders (i.e. IT and business personnel) is argued to be a hindrance in achieving full benefits of IT (Grindley, 1992; Perring, 1992; Poulymenakou and Holmes, 1996). The above mentioned facts show that the success of IS will not only be gained from technology alone but individuals.

Lewis (1994, p. 2) states “understanding information-systems has in the past been often equated with understanding the enabling technology, with the result that too much attention has been given to technical issues and too little to the needs of organization and the impacts upon those within it”. The consequence of what is technically possible and ignoring what is organizational desirable may lead to IS disappointment/failure. Smith (1988) also argued not to blame technology alone for systems failure but planning and management problems have also their

adverse effects towards systems success. Human factors may affect the development, use and ultimately the effectiveness of IS. Doherty and King (1997) pointed out that 60% of IT professional perceived organizational issues more important than technical. Long (1987) identified 10% office automation applications failure due to technical problems whereas 90% attributed to organizational and managerial issues. Anderson (1997, p. 89) states that the critical issues in IS implementation are of social and organizational nature and not solely technical. The success or failure of an Information System is usually determined by the user and organizational acceptance rather than just technical matters (Smith, 1997).

The above facts evidenced in studies (Dickson and Simmons, 1970; Lucas, 1974a, 1975; Markus, 1983; Dagwell and Weber, 1983; Long, 1987; Lyytinen, 1988a, 1988b; Angell and Smithson, 1991; Ewusi-Mensah and Przasnyski, 1994; Avison and Fitzgerald, 1995; Anderson, 1997; Doherty and King, 1997; OASIG, 1996; McBride, 1997; Avison and Shah, 1997; Odedra-Straub, 1993; Lehaney et al., 1999) lead to conclusion that commonly human and organizational factors are more likely to be problematic rather than technical towards systems to be disappointing/failure. Clarke and Lehaney (1999 p. 3) pointed out in their study of IS within British tourism industry that over concern on technical rather than human issues in IS development are the root causes of IS failures. It does not mean that technical or technological problems may never exist. Land (1992a) mentioned that the system technical features such as actual performance of the system in terms of response time, security, help facilities and expected functionality might affect system success.

It appears that human related problems exist since mid 60's and even today. Martinsons and Chong (1999) reported human factors as major culprits for IS failure rates nearly 70% in Canada and 60% in Malaysia. IS/IT may help people in performing their jobs eventually productive to the organization if they will use IS/IT more willingly being an effective user. Keeping in view the above mentioned facts a considerable efforts need to be directed towards introducing IS



that users accept, use and be satisfied with its performance. Different factors related to users such as:

- user resistance (Keen, 1981; Markus, 1983; Hirschheim and Newman, 1988; Franz and Robey, 1984; Land, 1992a; Anderson, 1997; Jiang et al., 2000)
- user satisfaction/dissatisfaction (Ginzberg, 1981; Bailey and Pearson, 1983; Ives et al., 1983; Baroudi et al., 1986; Doll and Torkzadeh, 1988; Sauer, 1993; Kim, 1997)
- user expectations (Faerber and Ratliff, 1980; Doll and Ahmed, 1983; Lyytinen and Hirschheim, 1987; Lyytinen, 1988a, 1988b; Suh et al., 1994; Ryker et al., 1997; Lane et al., 1994; Henry and Martinko, 1997; Palvia, 1996; Marcolin, 1994)
- user attitudes (Lucas, 1975; Lucas, 1978a, Robey and Zeller, 1978; Swanson, 1981; Lyytinen and Hirschheim, 1987)
- users' avoidance of system usage (Lucas, 1975; Markus, 1983; Nickerson, 1981; Markus and Keil, 1994)

may affect eventual system status (i.e. successful or failure), thus highlight the importance of user's concern towards IS development and implementation. For example, voluntary users may use the system infrequently or may not use it (Lucas, 1975), or user may resist mandatory use of the system (Markus, 1983; Franz and Robey, 1984) which is an indication of their negative attitudes. In both cases the potential benefits of the system can not be gained. Complicated and difficult system development problems are non-technical (i.e. human and organizational) and are challenging.

The development of IS is really a complex task. It is even hard to predict system success or effectiveness on implementation. It may also be true that some times users avoid use of the system although it works technically well. For example, studies (Schmitt and Kozar, 1978; Markus and Keil, 1994; Anderson, 1997) provide an evidence of the systems that are 'technically working' but not

supposed to be successful. On the other hand, the users are dissatisfied but the system exists because there is no other alternative (see Bonnor, 1995). Unless the users do not use the system fully and be satisfied with it, the system can not be deemed to be successful. Such failure is more disturbing where the systems continue to remain in existence but contribute nothing, so are useless. The systems developed and implemented with little social and organizational concern may face human problems. The human problems can emerge at any stage, for example, during development, implementation or when the system is operational. The existence of IS failures can not be considered because of technology alone (O'Connell, 1994; Polymenakou and Holmes, 1996; Avison and Shah, 1997), but social and organizational factors.

Information Systems have not been always successful but may face failures. The factors causing such failures are interrelated. It has been evidenced that different factors relating to human may influence system development process. For example individual differences (Zmud, 1979), users expectations (Ginzberg, 1981; Szajna and Scamell, 1993; Henry and Martinko, 1997; Palvia, 1996; Marcolin, 1994), user-developer communication gap (De Brabander and Edstrom, 1977; Boland, 1978; Bostrom, 1989; Gillard, 1992), user satisfaction (Bailey and Pearson, 1983; Ives, et al., 1983; Doll and Torkzadeh, 1988), user attitudes (Lucas, 1975, Tait and Vessey, 1988; Goodhue, 1986, 1988), user resistance (Hirschheim and Newman, 1988; Angell and Smithson, 1991; Lawrence and Low, 1993; Jiang et al., 2000), but not limited to these aspects only. Despite extensive research the notion of failure still remains poorly understood and unexplored. "IS discipline still lacks of the detailed understanding of the nature, issues and factors affecting failure" (Poulymenakou and Holmes, 1996 p.35). Lyytinen and Hirschheim (1987) stressed the need to understand those factors that may cause IS failures. The study of IS failure reasons may help in learning the root causes of failure, understanding and explaining problems of IS, and finding solutions. The lessons learned from it may not only be applied in future to predict and avoid failures but in building successful systems. Information Systems may fail during development, implementation and when

they are in use. Common type of failures such as correspondence failure, process failure, interaction failure and termination failure are discussed in appendix-A.

## **2.4. The Development ‘Needs’ of Information Systems**

### **2.4.1. IS Development and User Requirements**

The impetus for the development of a new Information System is generally triggered by the perception of a problem with an existing system. The technological aspects of the Information System represent the ‘tool’ that provides services to organisations that enhance their capabilities and productivity. The effectiveness of an Information System may be judged on its ability to produce desired results in accordance with the aims and goals of its development (fitness for purpose). Whether it addresses the real information needs of users and provides a ‘better’ solution to problems is questionable and hinges on whether it does the ‘thing right’ rather than do the ‘right thing’ (Flynn, 1992). The emphasis is upon “producing the right system rather than producing the system right” (Friedman and Cornford, 1989 p. 175) that may cope with organizational goals and be capable to fulfil user needs. The fulfilment of user information needs is the first step that must be satisfied to acquire user satisfaction with the system. Tafi and Shirani (1997) mentioned user information needs, system needs as an essential part of end user computing needs. Cyert and March (1963) indicated that IS that meet users information needs may reinforce satisfaction. Lawrence and Low (1993) also mentioned information and the quality of system might affect user satisfaction.

The essential element of system development deals with what is being required from the system. Users who mostly have to work with the system are prime source of system requirements and requirements always need to be properly communicated to system developers for the desired system. Not only users but system developers also have their key role in the system development process (Ackoff, 1967; Alavi, 1984; Iivari and Karjalainen, 1989). During IS development, the users and system developers have their prime role to specify

and to investigate system specifications for a new system. Any ambiguity in specifying requirements completely by users or in investigation by system developers usually affect the IS outcome that appears as the system hardly meets user needs. Scharer (1981 cited in Cronan and Means, 1984) pointed out several reasons having their adverse effects in elicitation of user requirements. She posited that insufficient system requirements are one of the most common reasons for system failures. Due to cultural differences the system developers may face difficulties to work with users to develop systems that can effectively meet their needs. Cronan and Means (1984) pointed out that users and system developers may experience communication problems during IS development. They also argued that systems developers feel that users always face problems in articulating what they want and users on the other side blame system developers for lack of communication skills. Generally it is admitted factor that users have great deal of difficulty in communicating their needs to system developers. The assumption that users know what they need and convey to system developers is probably not always be true (Nickerson, 1981). Non-ambiguous information requirements are positively related to user satisfaction (Montazemi, 1988), so it may be speculated that ineffective communication during requirement capturing consequently adversely affect user satisfaction.

#### **2.4.2. Consequences of Deficient Requirements**

User needs of the system verbalized by them require proper encoding into system requirement by system developers. One of the essential activities during this process is the complete determination of user 'requirements' as these often form the basis of the desired system. Users being part of the existing system may know better about it. Requirements emerge from user and system developer interaction. System developers may be knowledgeable in computing technologies but users may be more familiar with their business requirements. It is difficult that users may fully identify their requirements as they learn with the on going IS development process, so lead to a situation where users may go on changing their mind 'what they want'. Although a number of difficulties such as variety and complexity of information requirements, complex patterns of user-developer

interaction, user's unwillingness, and constraints of human as information processors, human problem solving behaviour may exist in obtaining user requirements (Davis, 1982; Turner, 1987; Davis and Olson, 1985). If requirements had not been identified clearly then users' needs are hardly to be fulfilled. So how a system can be expected to perform satisfactorily. It results unsatisfactory system that cause users dissatisfied (Bostrom, 1989; Avison and Fitzgerald, 1995). Some others also noted that one of primary causes of MIS failure is user needs that are not fully understood before being translated into design (Morgan and Soden, 1973; Scharer, 1981 cited in Cronan and Means, 1984; Oz, 1994). The occurrences of any error or ambiguity in user requirement may ultimately affect overall outcome of Information System. Clear understanding of users about their needs and how effectively these are conveyed to and gathered by system developers always affect the system being developed. Complete and error prone requirements are the basic need. It may not be expected that a system may perform satisfactorily when requirements are incomplete and erroneous. Generally, researchers highlighted the importance of accurate and complete user requirements elicitation for development of Information Systems that may be expected to meet user needs (Flynn, 1992; Valusek and Fryback, 1987; Mittermeir et al., 1987; Darke and Shanks, 1997; Flynn and Jazi, 1998). The users being important part of an IS, their commitment is central to the success of a system, but this and the process of requirements 'capture' are not unproblematic (Davis, 1982; Turner, 1987; Flynn, 1992; Suh et al., 1994; Flynn and Jazi, 1998). Problems can appear from:

- The dialectic between user and system developer (Curtis et al., 1988).
- System developers interests and loyalties with their profession causing conflicts with users (Lyytinen, 1988a).
- Users' desire to influence IS design and differing goals between system developers and users may cause conflicts among them (Robey and Farrow, 1982).

- System developers' difficulties in understanding user problems, alongside user's lack of knowledge about the system design process. It affects their ability to increase systems development productivity and to apply IT (Turner, 1987; Lyytinen, 1988a; Curtis et al., 1988).
- The cultural gap between the users and developers, and developers lack of confidence on users that they might be productive towards system development (Remenyi et al., 1997).

More importantly, it is implicitly assumed that requirements are known from the outset and can, in fact, be 'captured' (Turner, 1987). This can be argued to be fallacious and many researchers propose that users do not know their requirements at the outset and would often not know what elicited requirements actually 'mean' (Ackoff, 1967; Turner, 1987; Flynn, 1992). Oliver and Langford (1987) have mentioned interesting 'myths' kept by system developers about users such as: 'they did not know what they want', 'keep on changing their minds', 'react emotionally and illogically' and 'resist change'. Similarly, Hirschheim and Shafer (1988) identified that main belief about users can explicitly specify their requirements is almost contrary as evidenced practically. Users often have a preconceived notion of what they want from the system but may not be able to identify clearly their information processing problems (Alavi, 1984). He also noted that system developer's effort to demonstrate the logical design to users after development of user requirement could face communication obstacles due to lack of language problems. This highlights the fact that different cultural assumptions and backgrounds of users and system developers can cause communication problems that impact the process of requirements elicitation and understanding. Information Systems are part of social systems so difficult to be specified in wholly technical terms. Mingers (1995 p. 20) argued that technical orientation of system developers leads to a gap between 'what the user wants' and 'what system developer thinks the user wants'. It is due to communication gap between them that impede the developers to know the needs of users. IT people did not realise the extent to which they did not know what the business really wants (Kadebhai, 1998). The existing facts have been well recognized in IS

literature (Clement and Van den Besselaar, 1993; DeSanctis and Courtney, 1983; Alavi, 1984; Valusek and Fryback, 1987; Flynn and Jazi, 1998; Verrijn-Stuart and Anzenhofer, 1988). System developers usually face difficulties in clearly communicating user needs and understanding user problems (Lyytinen, 1988a). Thus, a good deal of requirements capture may involve speculation on the part of both system developers and users (Valusek and Fryback, 1987; Curtis et al., 1988; Bostrom, 1989; Flynn and Jazi, 1998; Verrijn-Stuart and Anzenhofer, 1988).

The impact of incomplete/deficient, erroneous, or unclear requirements may be argued to be problematic for Information System development on following counts that are more common.

- Resulting in a high-burden for system maintenance, and also affects system's quality (Flynn, 1992; Markus and Keil, 1994; Ambler, 1995).
- Causing re-execution of earlier phases of development process, resulting in cost overruns and further delays (Curtis et al., 1988; Bostrom, 1989; Flynn, 1992; Ko, 1999).
- System may not expected to perform satisfactorily (Bostrom, 1989).
- Reduce the likelihood of systems success (Doherty et al., 2000).
- Frustration among system developers and users, incomplete and less effective systems (Ko, 1999).
- Users may become dissatisfied with the system (De Brabander and Their, 1984; Avison and Fitzgerald, 1995).
- Systems may lead to failures (Morgan and Soden, 1973; Laura, 1981; Kaiser and Srinivasan, 1982, Lyytinen and Hirschheim, 1987; Markus and Keil, 1994).

Complete and unambiguous requirements are one of the solutions to avoid negative consequences. User participation is often encouraged in order to elicit

and ensure user requirements more rigorously (Cavaye, 1995; Ambler, 1995). The central notion of participation is to ensure that the system being developed is indeed what user desires. Mingers (1995) not only emphasized the importance of user participation in requirement elicitation but throughout system development process. Cronan and Means (1984, p. 29) argued "A procedural model incorporating fundamental communication theory into the project design and development of computer system is needed. Operational step-by-step procedures that ensure adequate communication between data processing personnel and user/clients should be emphasized". Bostrom (1989) found that improved communication between user and developers could enhance their ability to develop complete and accurate user requirements. Williams (1993) suggested good communication skills for project managers to get good understanding of user requirements. For example, on client's claim about inadequate functional specifications of CONFIRM project, the developer personnel passed comments such as "these documents describe the expected functionality in general terms; they do not provide sufficient detail for a developer to understand what the user is expecting" (Oz, 1994 p. 31). Clearly defined requirements may represent what user expects from the system. User needs should be unambiguous and needed to be clearly communicated to developers. User participation and better communication may provide an opportunity to both users and system developers to elicit and ensure accurate user requirements.

### **2.4.3. User-Developer Communication Gap**

It has been recognized within IS literature that user and systems developer interaction and co-operation during systems design and implementation is needed. It has been argued that interaction among participants may directly affect success of the system (McBride, 1997). User-developer relationship found to be positively correlated with user attitudes towards a new system (Barki and Hartwick, 1994). User-developer communication deals with the degree to which user and system developers communicate and exchange information with each other. The user-developer communication may be characterised as cross-cultural communication, so use of unfamiliar words that are most domain specific on both



the part usually cause a communication gap. As Boland (1978) says that an Information System is not something that system developers will provide to the manager but something they will discover together. Both users and system developers have their needs to be aware of what is going on concerning IS project. They can learn from each other and their interaction seems to be supportive in finding and developing some solution of the problem. The individual differences may result in developing different attitudes towards systems development. Previous research indicated the differences between users and developers in the area of beliefs, attitudes and personalities that may occur (Urquhart, 1997). Lack of effective communication between users and developers is one of the causes for implementation problems (De Brabander and Thiers, 1984) and lack of IS success (Edstrom, 1977; Kaye, 1990; Keider, 1984). Ebadi and Utterback (1984) stressed the importance of better communication among stakeholders for projects to be successful. They found a positive correlation between frequency of communication by investigators and innovation/project success. According to them "contact with others stimulates the researchers creativity, interest, and knowledge which are essential for success in problem solving" (p. 573). Rademacher (1989) found developer's communication skills a critical factor in system success. Jeffery and Lawrence (1986) also stressed the need for communication among user management, IS management and general management for achieving successful Information Systems. Similarly, Teo and Ang (2000) stressed the need for effective communication of the IS personnel with management to obtain their support and commitment for development projects. They also argue that the communication among them may also enable the top management to better understand the potential and capabilities of the IS department.

According to Curtis et al. (1988), the diverse background of members of system development team could make the ability to communicate and co-ordinate the activities an extremely important issue for them to work successfully. Having effective communication with the sources of information one may be able to find not only needs of the system but also means how such needs should be met. Ewusi-Mensah (1998) pointed out the poor interaction of IS staff and user group

that results no consensus on objectives of IS projects as one of the causes of project abandonment in his case study. Differences in opinions require to be discussed for constructive achievement. Kahai et al. (1995) pointed out regarding meeting impacts that initial differences in opinions have a negative effect on individual's satisfaction. Poor communication among stakeholders may cause resistance, and friction among them (Land, 1992a). The impact of interpersonal communication skills during IS development can not be ignored, so the involved users and designers need to develop such skills (Karten, 1991). A widespread introduction of IS in every area of life requires the need for clear communication between users and system professionals during IS development for the clarity of system objectives. Keeping in view users and system developers' concern during system development, it appears that both of them being from different backgrounds may hold different interests, and priorities. For example, system developers approach the problem for optimised technical solution whereas users prefer solutions capable to facilitate them in performing their organisational tasks perfectly. Systems development may be conceptualized as a joint effort reaching towards some better solution of the problem. The process of system development may be thought as a mutual learning process between users and system developers (Boland, 1978).

Information Systems literature showed that system developers have their loyalty with their profession and they pursue their own interests, while users have their own interests and goals, so it causes conflicts among them (Newman and Rosenberg, 1985; Lyytinen, 1988a; Newman and Noble, 1990). Guimaraes et al. (1996a) argued that developers with poor communication skills might be unable to acquire critical information/knowledge that may cause system failures. The lack of communication may not only affect joint efforts but also cause of conflicts and misunderstanding among those who are involved. Poor communication have its negative effects and may cause conflicts among the groups involved in IS development (Bostrom, 1989; Franz and Robey, 1984) and lead to user resistance to change (Land, 1992a). Fowler and Walsh (1999) mentioned that despite good intentions at the outset of IS development, the time and resources pressures, political tensions among stakeholders may hinder

communications, and consequently leads to un-agreed compromises that produce gaps between what users expect and what IS designers provide.

Another drawback that hinders better communication is user's unawareness about technical terms often used by system developers during meetings and discussions. All these factors may cause communication to be ineffective among them (Verrijn-Stuart and Anzenhofer, 1988; Lyytinen, 1988a; Bostrom, 1989; Conrath and Mignen, 1990; Laudon and Laudon, 1996). The position/status kept by system developers and users is also critical. The position/status asymmetry can create a sense of power imbalance depending on the situation. Such imbalance of power has negative effects towards communication between different groups. It could be that either of the groups may ignore the communication of the other (Lukes, 1974). The above mentioned problems may create a gap among the participants termed as a 'communication gap'. The effects of communication gap could be resistance to change (Wilcox, 1994), difficulties in eliciting/understanding user requirements, formation of user unrealistic expectations (DeSanctis and Courtney, 1983; Suh et al., 1994; Watson, et al., 1993, 1993a), and lack of system success (Kaye, 1990). Bostrom (1989) also pointed out poor communication between user and developer as a source of error in defining system requirements and associated it with user dissatisfaction. Richardson et al. (1980 cited in Cronan and Means, 1984) indicated lack of user-developer communication as one of the problems in designing a required system. Cronan and Means (1984) argued that an error in design due to ambiguities in system requirements often cause approximately one-third of data processing budget spent on reworking. Some times it may happen that unclear/too much communication from IS department may create/raise users expectations and when the delivered system does not match user expectations then users feel dissatisfied (Watson et al., 1993, 1993a; Cooper, 1998).

System developer's interpretation of user's desire 'how the system may be' is also critical, so any gap ultimately affects the system's outcome. System developers some times blame users as they expect too much (Cronan and Means, 1984). Kaiser and Srinivasan (1982) pointed out lack of understanding of user

problems by system developers as a cause for system failures. Jiang et al. (1998) speculated system developers' lack of communication skills in interviewing users as source of problems that may cause IS failures. They showed that both users and system developers perceived this problem differently.

Users and system developers being from different backgrounds/culture may perceive things differently. Some times both of them may hold different concepts about the same reality (i.e. semantic gap). It can occur frequently in development process (De Brabander and Thiers, 1984). For example, user and system designer can view the same situation in different ways, what user perceives as a bug, the system developer considers it as a feature (de Abreu and Conrath, 1993). The other way, what looks good to the analyst may not be so impressive to the user (Wood-Harper et al., 1985 p. 12). What it shows is 'communication gap'. Better understanding, interaction and communication between users and systems developers may provide an opportunity to cope with communication gap. The latter may help users to translate and communicate their needs properly that are required for a workable system. It may also be speculated that user expectations in terms of their needs may also be realised properly.

The problem of effective communication is not only restricted to users and developers but the communication gap between users and management, management and developers is also critical towards system development. Cronan and Means (1984, p. 29) stated "Problems in management could exist in the composition of the data processing design team, the relationship between management and data processing personnel, and the relationship between data processing and users (Clients)". The adverse effects of ineffective communication and symbolic interaction among the three stakeholders can not be waved out as it has its deep concern towards system development outcome. Among other stakeholders the three (i.e. users, management and system developers) have their role almost critical towards system development and its success. The process of interaction and effective communication among them may seem to be very beneficial and valuable in IS development process. It can be represented as:

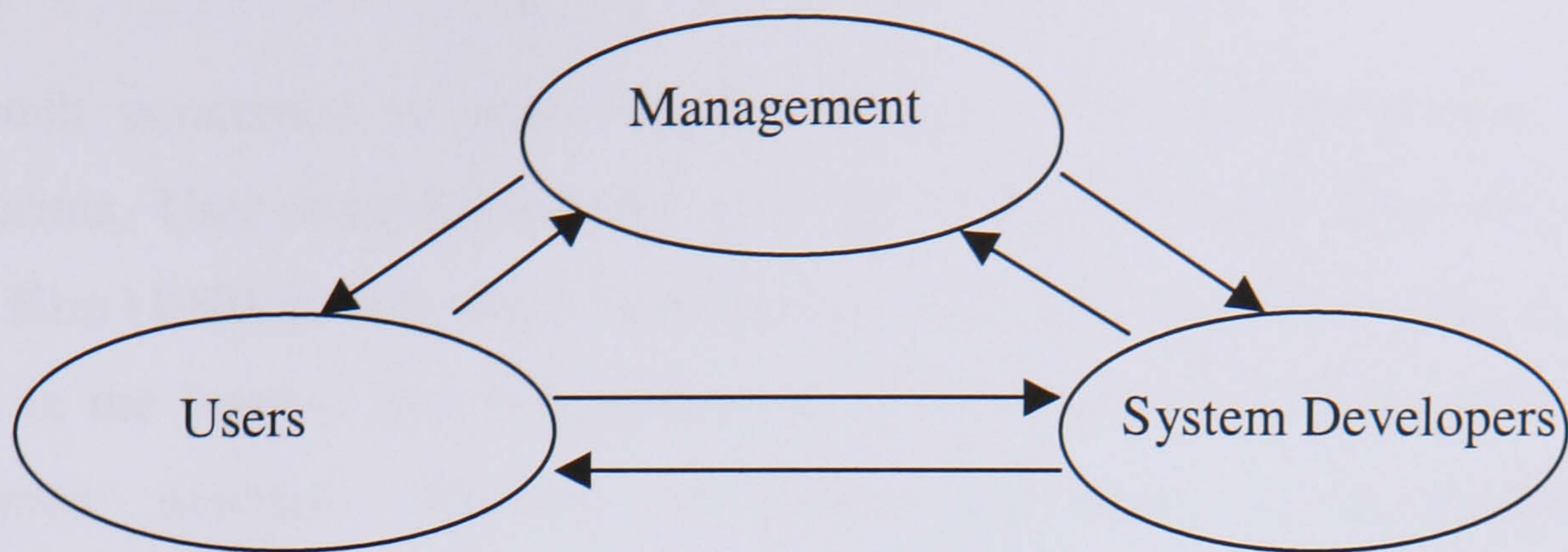


Fig.2.1. Management, Users and System Developers Interaction/ Communication.

Ewusi-Mensah (1998) stressed the importance of communication and interaction among stakeholders and said "The need for all three stakeholders to communicate with each other is essential for the success of the [IS] project development process. Consequently, if the level of interaction and communication required of any pair of stakeholders fall below that which is expected, depending on the size and complexity of the [IS] project, the entire development process may be affected". The effective communication is the prerequisite for cooperation among the individuals for successful implementation of projects (Badiru, 1988). The reliable and effective communication between all those involved in IS development projects, especially between technical specialists and other stakeholders are vital for its success (Rees, 1993). Cushing (1990) argue that success of an Information System is inversely related to the degree of friction that exists between user and developers during IS development. They also stressed to focus on the process of interaction and communication between user and developers in IS research. In addition to different reasons (Davis, 1982; Davis and Olson, 1985), the communication gap also has its adverse effect on user requirement elicitation. The importance of effective communication and interaction is discussed further in next sections

#### 2.4.4. User Expectations and Requirements Concern

The determination of complete user requirements are critical towards system success (Davis, 1982). One of the objectives of Information Systems Development methodologies is to define user requirements completely and accurately but difficulties still exist to capture those fully. User expectations are

very much concerned to user desires and have deep concerns with user requirements. User expectations appear in the form what users need from the system. Kim (1990, p.185) wrote “user expectations are communicated to system analysts in the form of user information needs during early stage of the system development process”. Whether the system will meet user's information requirements is deeply concerned with knowledge of those requirements and inclusion of those in the system at the time of development (Allingham and O'Connoer, 1992). Deficiency in user requirements may cause negative effects towards fulfilment of user expectations. User requirement determination gap may create discrepancy between user expectations and system developers interpretation of user expectations in terms of his needs and consequently influence user satisfaction (Kim, 1990). What users actually want and what they get is crucial. User satisfaction may be determined by a match between user information needs and the information provided by the system. According to (Cooper, 1998 p. 188), the degree to which reality achieved or exceeds expectations produces the level of satisfaction that in turn produces the perceived level of success.

Information System development process is a learning process for the potential users. No doubt user requirements may go on changing but always needed to be conveyed completely. Users always expect their needs to be fulfilled by the system whereas ambiguities within requirements may produce a barrier in achieving expected system outcome and negatively effect overall system's effectiveness. How a system can cope with user realistic expectations and lead to success when user's basic needs have not been included in the design completely.

Poor communication between users and system developers may not only cause ambiguities in user requirements but also cause unrealistic expectations on users part. The adverse effects could appear as IS hardly meet user needs and organizational objectives/goals, so require more maintenance that usually cause cost overruns and delays. Such situations may hinder user expectations to be fulfilled from the system. So deficient requirements are one of the causes of non-fulfilment of user expectations regarding system's performance. Users may also

keep unrealistic expectations due to other various reasons relating to individuals himself, organization and external factors relating to environment (see Bokhari and Paul, 2000). Giving attention and listening to user properly about what they need, and educating them about technology capabilities may align their expectations to be realistic.

## **2.5. Searching for Solutions**

Despite large investments in computer based systems the IS disappointments/failures are an existing fact and many efforts to develop successful systems deemed failure. A plethora of reasons already mentioned are related to technical, technological, political, behavioral, social and organizational issues and cause failures. Such issues/problems may arise during IS development, implementation and even when the systems are in operation. Irrespective of the stage, such issues/problems may cause system abandonment, cost overruns, behind schedule and eventually disappoints/failures. Researcher made their efforts to explore such reasons and also attempted to find some alternative solutions to cope with the situation. To understand the problems of system failures, the study of the factors that inhibit to achieve successful systems may provide guidelines to find some solutions. As already mentioned that organizational and behavioral issues are more problematic towards achieving successful systems as compared to technical and technological ones. A number of methodologies consisting of system design and development tools were introduced for systematic IS development process. Technology alone can not be a solution for each problem, as people [users] are prime part of organizations and systems, so their importance can not be ignored. The bigger the system, the more likely the development process will require input from its employees (Karten, 1991).

The introduction of IS in any organization may require changes in the existing organizational settings. People are essential part of organizations and might be affected by such change. Various factors relating to people, organizational structure and culture, technology, tasks are part of IS development (Avison and

Shah, 1997). Various users related factors such as individual characteristics, prior user expectations, magnitude of the change, usefulness of the system may influence user attitude towards change (Jiang et al., 2000). Such factors (i.e. relating to users, system developers, management) invite attention of researchers and need further exploration.

The adverse effects of ambiguous system requirements, communication gap, and their concern with user expectations have already been discussed. IS literature has emphasized the importance of user participation in system design almost in all phases of systems development to deal with existing problems. Land (1992a) posits that user participation/involvement and communication among stakeholders may be favourable towards successful system implementation. Fowler and Walsh (1999) also highlighted the need of users true participation and effective communication in IS development. They mentioned that pseudo-participation and unagreed compromises between user and system developers can create a gap 'what users expect and what designers provide'. Such a situation may leave the user dissatisfied with the system. Powers and Dickson (1973) found user involvement useful in clarifying systems objectives leading to system outcome acceptable to users. Senn (1991) argues that one aspect to involve users in IS development is to obtain an agreement, even consensus, about the characteristics and uses of a new system. Among alternative solutions prescribed to tackle the problems, the participation/involvement of users in IS development was the mostly suggested and investigated during last three decades. It is speculated that user participation should affect the extent to which IS may satisfy information needs of users whereas without participation the system may hardly meet user's needs.

Measuring an Information System in terms of its success is also problematic. Various factors relating to cost/benefits, achieving organizational goals, keeping users satisfied with the system objectives and performance, systems flexibility to survive in dynamic environment and many others need to be included in order to observe systems success. There hardly exist some direct measures to evaluate a system but surrogates. This research attempts to study some of the aspects



relating to users (i.e. user participation, user expectations, user-developer effective communication) and their effects towards user satisfaction (i.e. the mostly used surrogate of system success). Its use as surrogate measure for IS success stems from the fact that prime stakeholders in any organization are the users themselves. So their satisfaction with the system may indicate that system objectives are being met. As users are part of the systems and eventually they have to run them, so their participation during IS development speculated to be productive.

Participation may provide an opportunity to the users to influence the design of the eventual system, so consequently the system may provide the needed features and functions. User participation in the development process can provide them the opportunity to explain their requirements to system developers properly and also to keep in touch with 'what is going on'. User participation during IS development seems to be supportive in capturing non-ambiguous requirements. Davis (1974) argues that reducing uncertainty associated with user requirements may contribute towards successful system development. User participation, motivation, and their commitment may also influence systems success (Land, 1992a). Kaye (1990) noted that successful systems were associated with user involvement (i.e. 75%) or consulted periodically (i.e. 25%) at all stages. He also mentioned that if users are involved up to limited extent or absolutely not involved then it negatively affects systems success. Lucas (1978a) suggested user involvement in IS development to attain user favourable attitudes and commitment. Avison and Shah (1997) argue that user participation can lead to system acceptance and users may be likely to use the system more. Various aspects related to users such as user participation, user satisfaction, user expectations, user attitudes, user resistance, user-developer interaction/effective communication, involvement of management, and others like as effect of organizational factors/culture, management of the implementation process, and systems complexity are observed to be researched for finding solutions to the problems in IS literature. User participation is believed to be an important factor in achieving user acceptance, user satisfaction, formation of realistic user expectations about the system, creating a sense of user ownership of the system,

and engendering user support and commitment to change and is discussed in next section.

## **2.6. User Participation**

### **2.6.1. What does Participation Mean?**

The introduction of an IS in any organization is more than a mere technical change. It may cause different changes in organization that might affect its users. One way of looking after users interests is to provide them the opportunity to take part in IS development. Participation of different groups (i.e. stakeholders) in IS development may help in maintaining group norms that may help in coping with the change process. For a system to be successful, the co-operation, co-ordination and support from stakeholders seem to be critical. Users have their prime importance in IS development. Their participation in system development may provide them the opportunity to discuss their objectives, and realizations with management and also with the development team. Participation refers to ‘taking part’. One may only be considered as participant when he contributes something during system development. Participation from different stakeholder groups may be needed at different stages. For example senior management may have to agree for IS introduction within the organization whereas middle management and other employees may take part in requirement analysis, design, testing and implementation of the system.

The various activities relating to user and his behaviour during system development process is termed as user participation (Barki and Hartwick, 1994; Cavaye, 1995; Ishman, 1998). Robey et al. (1989) defined participation as the extent to which users are engaged in activities related to IS development. User may participate in different ways and at different stages of the system life cycle. Barki and Hartwick (1994) outlined it as direct (participation through personal action); indirect (through representation of others); formal (using formal groups, teams, meetings); informal (through informal relationships, discussion, tasks); performed alone (activities carried out by himself) or shared (activities performed

with others). Participation could be either at one or other stages and may be in any of the forms described above. Avison and Fitzgerald (1995) stated that effective management of system development and implementation requires user participation at all stages. Similarly, Land (1992a) argues that for effective introduction of new technology into the workplace it is essential that those who are affected may be involved. Participation may include a variety of activities, responsibilities and behaviours performed by users and system developers during system development (Ives and Olson, 1984). Ives and Olson (1984) considered user involvement as participation by representatives of the users' groups. Some others considered user involvement as a process of interaction between system developers and users or their representatives (Newman and Noble, 1990). Several attributes of participation such as type, degree of participation, contents, extent, formality and influence have been identified (Cavaye, 1995).

In the light of the theories 'participative decision-making' (PDM) and 'planned organizational change', the researchers suggested user participation to be helpful in improving system quality and system acceptance (see Ives and Olson, 1984). According to Land (1982), user participation may protect user interests and might be supportive to harness the skills, knowledge and understanding of participants that is required to develop a system which best fits with organizational needs. Users who participate actively are likely to develop positive attitudes, and beliefs that the system is important and personally relevant, and consequently participation influence systems quality, and user knowledge of the system (Barki and Hartwick, 1989). Participation may occur in decision making, system development and also in the implementation process. Land (1982) argued that participation in decision making alone is not the only way to gain full benefits of participation but also needed in IS design/development process.

Different variables such as system quality and system acceptance acting as intervening mechanism between user participation and the system outcomes commonly deal with cognitive and motivational factors (Locke and Schweiger, 1979). Their framework explains the psychological base of participation's effects on satisfaction. Cognitive factors concerning system quality include improved

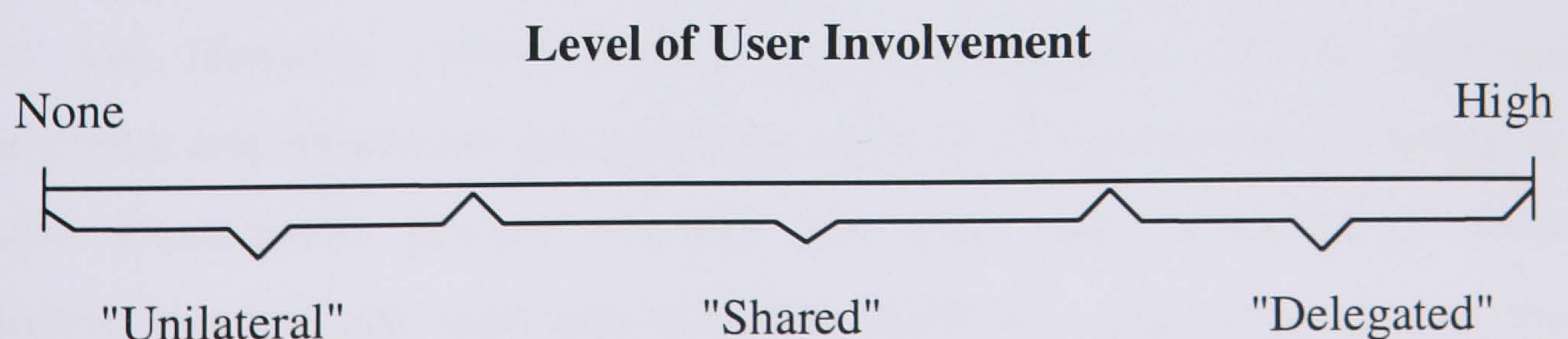
understanding of the system, improved assessment of system needs, improved evaluation of system features, whereas motivational factors leads to system acceptance, perceived ownership of the system, increased commitment to the system, and decrease in resistance to change (Ives and Olson, 1984). Some others also argue that through cognitive mechanism the user participation may contribute towards system quality by improving communication, and increasing information, knowledge and understanding of users (Doll and Torkzadeh, 1989; King and Lee, 1991).

**(a) User Participation and Involvement Defined**

The term of user involvement has been extensively discussed in IS development literature. Kappelman (1995 p. 66) says that "...there is no universal definition for involvement construct in any field". Swanson (1974 p. 178) noted that what is meant by "involvement" is rarely clear. He stated that involvement between manager and MIS correspond to their "entanglement" in the pursuit of their respective ends. He mentioned involvement in terms of:

- 1) *cooperatively involvement*, as the activities of manager and MIS facilitates the attainment of the ends of the other.
- 2) *inquiry involvement*, as managers involvement in inquiry process
- 3) *priori involvement*, as managers involvement in MIS design, implementation and operation.

Nicholas (1985) mentioned a number of levels of user involvement such as "unilateral", "shared", and "delegated".



Approach To User Involvement  
Fig.2.2. (Source Nicholas, 1985)

In a unilateral approach the management describe the system but the users are responsible to implement it. In the shared approach the required input is collected from users by the users that are assisting IS developers or designing the system by themselves whereas in the delegated approach the user is responsible for the system work, with system design available for advice and consultation.

Ives and Olson (1984 p.590) described the degree of user involvement as follows.

1. ***No involvement.*** Either users are not invited or they themselves are unwilling to participate.
2. ***Symbolic involvement.*** User's input is requested but ignored.
3. ***Involvement by advice.*** Advice from user is solicited by interviews or questionnaires.
4. ***Involvement by weak Control.*** User have "sign off" responsibility at each stage of IS development.
5. ***Involvement by doing.*** User is a design member or is the official "liaison" with IS development group.
6. ***Involvement by strong control.*** Users may pay directly for new IS development from their budgets or user's overall organizational performance evaluation is dependent on the outcome of the development effort.

It has been claimed that concepts of user participation and user involvement are distinct and have different meanings, whereas previously both terms were used interchangeably (Barki and Hartwick, 1989; 1994; Hartwick and Barki 1994). Barki and Hartwick (1994) defined 'user participation' as the activities, assignments and behaviours performed by users or its representatives during the system development process whereas the term 'user involvement' refers subjective psychologist state reflecting the importance and personal relevance that a user attaches to a given system. (Kappelman and McLean (1991 p. 339) defined user participation as the "*observable behavior* of information system users in the information development process" and user involvement "as a need-

based attitude or *psychological state* of users with regard to that process and to the resultant information system”. Behaviours are visible actions but psychological states are always invisible. The empirical evidence shows that user participation and user involvement both are independent constructs (Jarvenppa and Ives, 1991; Barki and Hartwick, 1994). User involvement construct is distinct from user participation, although associated with participation. Kappelman and Mclean (1991) empirically found user involvement as an intervening factor between user participation and user satisfaction. It has been evidenced that the correlation between user involvement and user satisfaction is 'large' as compared with user participation and satisfaction (see Barki and Hartwick 1994; Kappelman and McLean, 1991). Similarly, Hwang and Thorn (1999) found user involvement more positively correlated to systems success as compared to user participation. User involvement has been evidenced as an intervening variable between user participation and user satisfaction (Hartwick and Barki, 1994; Kappelman, 1995). Kappelman (1995) further considered user involvement effects as process involvement (i.e. subjective attitude towards IS development task) and user system involvement as psychological identification of users with respect to the Information System itself. He found a positive correlation between process involvement and system involvement and states that participation induces process involvement, which intervenes in the relationship between participation and system involvement (p. 76,79).

### ***(b) Facets of User Participation***

“Participation is not a clear-cut, homogenous concept: in practice it takes many forms and can occur at many levels” (Cavaye, 1995 p. 313). As it varies like direct, indirect, formal, informal and in terms of users or only representatives. Mumford and Henshall (1979) proposed three forms of participation termed as consultative participation, representative participation, and consensus participation.

- Consultative participation deals with leaving the decisions relating to system design and job structures with system design group although there is a great

deal of consultation and discussion with users department. The objectives and job satisfaction needs are to be consulted with users. The design group consults members from the user side, interact with them by exchanging ideas and noting responses.

- Representative participation requires involvement of user group representatives of all grades of staff from user department. Management selects representatives. This idea was based on “no-one has the right to design a work system for some one else and that the role of the expert should be to help the worker to design his own work system” (Mumford and Henshall, 1979 p. 6). It provides the opportunity to users and system developers to work together on equal terms. On the other hand it has also some disadvantages. Whether representatives really represent their constituents is questionable. Land (1982) added that their colleagues might see participants as hostage of the design team.
- Consensus participation deals with providing opportunity for all user’s staff to participate in the design process continuously. This type of participation may avoid the problem that representatives are not interpreting the interests of their group properly. Even a representative group was formed but user’s staff elected that group. The role of group deals with receiving and giving ideas from and to colleagues and allowing them to contribute towards final decision being taken. The group is responsible for two ways communication between design staff and users. Experts from the design group regarded as both users in their own right, in addition to facilitating and ensuring technically design.

The above mentioned facts show user participation/involvement as a complex concept. Considering the effect of user participation/involvement during IS development it may be speculated that the extent of user participation/involvement on user satisfaction and eventually system success might be mediated by the factors that influence pattern of user participation or user involvement.

### 2.6.2. Why is Participation Needed?

A central notion of the participation concept is that of allowing people the right to have a direct influence on matters that concern them in their work and decisions about change that might occur due to the introduction of IS in an organization and likely to affect them (Bjorn-Anderson and Hedberg, 1977; Clement and den Besselaar, 1993). Some argue that the problems associated with the introduction of IS/IT in the organizations can be overcome by increasing user participation in system development, understanding user characteristics and their needs, and organizational factors that affect user needs (Yaverbaum, 1988). User participation approach is commonly used to facilitate communication and collaborative efforts in decision making regarding IS development activities. Various IS methodologies have recognized and advocated the need of user participation in the IS development process at different stages. It may be useful in exchanging views regarding user requirement elicitation, system objectives/goals and system's successful implementation. Various IS researchers stressed the need of user participation. For example:

Godbout (1988/89 p. 71) say that "...since it is virtually impossible to develop a system without a contribution of some kind from end users, user involvement is more a given than an approach".

Nicholson (1970 cited in Swanson, 1974 p. 178) states that the total involvement of the users seems to be the key for system's success.

Powers and Dickson (1973 p. 156) posit that "User participation is crucial to the success of the MIS projects".

Lucas (1975 p. 4) says that "it is virtually impossible to develop an information system in isolation; many groups in the organization are involved".

Senn (1978 p. 23) stated that " .. successful management information systems efforts require the direct **involvement** and **participation** of the managers who will use the system outputs".



Swanson (1974) suggests that user involvement in IS development may benefit in terms of users appreciation of the system. It means that user may have positive attitude concerning to the system whereas users positive attitude may influence systems usage (Barki and Hartwick, 1989).

Locke and Schweiger (1979) stated that individuals participation may increase the likelihood that they will get what they want (i.e. increased value attainment).

Franz and Robey (1986) asserts that users involved during design process see the systems as more useful.

Nicholas (1985) argues that user involvement may reduce negative system impacts and user resistance.

Bjørn-Anderson and Hedberg (1977) mentioned that user participation enables users to develop realistic expectations and might be useful in reducing resistance to change.

Ravichandran and Rai (1999/2000) say that user participation may improve user developer interaction and communication, and user may feedback on system features. Without user active participation the development efforts are less likely to be successful.

Fowler and Walsh (1999 p. 6) mentioned that "...through user participation potential [user] resistance may be resolved leading to easier implementation and more effective [system] usage".

Hirschheim (1989 p.199) says that "The active involvement of parties to be effected gave them a feeling of "ownership" which generally led to a higher degree of commitment by the users and operators".

Godbout (1988/89 p. 77) posited that "Early involvement of users also ensures that the project will not be launched on assumptions, or focus on objectives, that have little relevance to user needs".

Nicholas (1985 p. 24,25) says that user involvement not only serve the purpose of more useful and useable systems but also reduces the negative system impacts and user resistance to the system.

Not only user involvement but the involvement of management has been recognized as fruitful towards achieving system success. For example, Cerullo (1980) found managers/users positive attitude and managers participation as critical factors towards successful development of IS. DeSanctis and Courtney (1983) also stated top management involvement as an important factor in IS development.

Garrity (1994) viewed system development as a learning and joint problem-solving task. He states that "participation by users is necessary to both educate analysts about their problem solving domain, and to be educated by information analyst about the information technology domain" (p. 36). The interaction between system development staff and users in addition to their joint efforts are expected to be advantageous for system's acceptance and performance. User participation is required more when information requirements may only be obtained from users and the system acceptance is critical.

Information Systems have been considered as socio-technical. The socio-technical approach stressed on the interaction of people and technology and considered participation as its central feature. The introduction of IS in an organization may result a change that might affect organizational structure, working relationships, and status and responsibilities of individuals. The main purpose behind such change is the need to ensure the profitability of the organization. Yeates and Cadle (1996) stated that implementation of a new system may bring different changes in organizational structure, individual's responsibilities and business activities, thus this change is not a technological one but a social. In order to include social aspects in such change process, participation of users is normally required (DeSanctis and Courtney, 1983; Yeates and Cadle, 1996). Unless individuals want a change, how a new system may be effective towards achieving required objectives. It has been argued that

technology may hardly be installed and utilized properly without considering people who have to work with it (Mumford, 1983; Laudon and Laudon, 1996). It's not so simple to decide, who should be involved, when, and what should be his role.

The concept of participation implies that individuals who have to use the system should be involved in system development process. Ives and Olson (1984) advocated those to be involved in IS development who have to provide inputs, use outputs, and run the system. It has also been argued that user participation/involvement is more important at definitional stage where user requirements and system objectives are to be specified (Ives and Olson, 1984). Users intentions to participate or not, depend on their desires/willingness and consequently affect participation to be productive. User willingness may arise if proposed system is perceived to be important to them (Cavaye, 1995). On the other way how much user participation/involvement is desired by system developers also affects user participation (Gibson, 1977). Lucas (1974a) suggested that user participation could be more productive if users have been convinced that their participation will ultimately contribute towards IS development. According to Doll and Torkzadeh (1988), participation could be more effective if users desire it, and have relevant information/skills. Not simply user participation but user control during development is also advocated (Sanders and Courtney, 1985).

Lucas (1974a) stressed user participation during system development in order to gain benefits such as ego-enhancing, user commitment to change, user satisfaction and reducing user resistance. Users know more about their jobs so their participation could improve the knowledge of system developers about the system being developed. User participation may help them in understanding the nature of user's working environment. It also contributes towards mutual determination of user requirements, developing relative influence and users' perceptions of system usefulness (Franz and Robey, 1986). It may improve system quality by assessing user requirements accurately and avoiding unneeded system features (Robey and Farrow, 1982), and user understanding of the system

(Lucas, 1974a; Robey and Farrow, 1982). Bonnor's study (1995) shows that unless the users are engaged in requirement analysis, the system leaves users dissatisfied and consequently is avoided by users. Butler and Fitzgerald (1999) stated that users may develop favourable attitude towards a new system and are more committed towards using it if they participate in its development. They argued that user participation might be less effective if issues related to change remain unresolved. Lack of user participation/involvement in the development process may effect system usage, user satisfaction and ultimately system success (DeSanctis and Courtney, 1983, Bonnor, 1995).

A report of OASIG (1996) pointed out that despite the claim that the trend of 'user participation' in system development is increasing but users do not have a strong influence on systems development. Their role seems to be limited only to help system developers to define user requirements and users may be rarely influential towards system design. It is also added (page, 14) that "Users do not generally have a substantial or sustained influence on system development, which has a major adverse effects on subsequent performance".

### **2.6.3. Effects of User Participation**

The effects of user participation in terms of IS design efforts, system acceptance, success and user satisfaction has been widely considered in IS literature. The IS development process is evolutionary and consists of different stages termed as system life cycle. Participation by top management, and users at different stages in IS development has been advocated by IS researchers. The main emphasis on user participation stems from the concern to avoid unneeded system features, post implementation problems and to include users' system needs. Some argue that user participation at early stages of IS development is more beneficial and appropriate and may lead to more successful system development (Keil and Carmel, 1995; Cavaye, 1995). Others argue that participation in analysis, design, and implementation may be more productive (Hirschheim and Klein, 1994). Cronan and Means (1984) quoted that the IBM task force recommended user involvement in defining requirement and prioritizing processes. They also

pointed out that both users and developers agreed that more user involvement leads to more system acceptance. Ultimately the users have to use the system so to ensure that the system may be acceptable to the users, the participation of users is desirable. According to Avison and Fitzgerald (1988), user participation may benefit in achieving user commitment and satisfaction with the system. Damodaran (1996) suggests that to achieve the positive outcome from the system the users have to exert influence throughout the systems development process. Some researchers even suggested participation/involvement of managers in design process (Ackoff; 1967; Swanson, 1974) or to be involved in creating, maintaining and setting an environment for effective user involvement that may encourage users to play a better role in the development process (Damodaran, 1996). User participation allows users interests to be explored and act as motivation towards them. Users having skills and knowledge can contribute positively towards system development and the system may be supposed to deliver users and organization's needs according to their requirements. Users working knowledge of business functions can provide important input during requirement elicitation on their participation.

The need to include users in IS development mostly depend upon the system being developed. The type of the system is an important factor in deciding about user participation. Some argue that systems those are highly structured and well-defined or which require more technical expertise, hardly need user participation/involvement (Ives and Olson, 1984) whereas the systems consisting unstructured tasks need user participation/involvement (Edstrom, 1977). User participation is more appropriate for complex systems (Kim and Lee, 1986) and it may decrease the risk for their failures (Tait and Vessay, 1988). However it is almost common axiom within IS literature that participation may lead to successful IS development. Some argue user participation [involvement] is more gainful at some stages than others during system development (Edstrom, 1977; Ginzberg, 1981; Ives and Olson, 1984). How effectively users participate, has a big influence on acceptance and success of the resulting system (Checkland and Scholes, 1990; Clement and den Besselaar, 1993). Simply involving users do not guarantee their influence on design and development. Inadequate participation of

users during system development is cited as one of the factor that may contribute to the shortfall between the expectations and reality. User participation effects has been conceptualised in terms of:

- influence and conflicts resolution, and complete assessment of user requirement (Franz and Robey, 1982; Amoako-Gyampah and White, 1993).
- improved system's quality (Edstrom, 1977; Boland, 1978; Robey and Farrow, 1982; McKeen et al., 1994; Damodaran, 1996).
- relative influence regarding user and system developers (Edstrom 1977; Franz and Robey, 1986).
- improving twofold communication (Gibson, 1977; De Brabander and Edstrom, 1977; De Brabander and Thiers, 1984; Doll and Torkzadeh, 1989; King and Lee, 1991).
- user's satisfaction (Nolan and Seward, 1974; King and Rodriguez, 1981; Robey and Farrow, 1982; Baroudi, et al., 1986; Tait and Vessay, 1988; King and Lee, 1991; Lawrence and Low, 1993; McKeen et al., 1993; Amoako-Gyampah and White, 1993; Roth and Bartholome, 1994; Yap et al., 1992; Leonard-Barton and Sinha, 1993; McKeen, et al., 1993; Kappelman, 1995; Srivihok, 1999; Lin et al., 2000).
- system acceptance (Lucas, 1975; Clement and den Besselaar, 1993; McKeen et al., 1994; Ives & Olson, 1984; Damodaran, 1996).
- enhances users perceived control over their work (De Brabander and Thiers, 1984; DeSanctis and Courtney, 1983).
- system success (Cale and Curley, 1987; Pettingell et al., 1988; Yap et al., 1992; Ives and Olson, 1984; Cavaye, 1995; Srivihok, 1999; Hirschheim, 1983; Guimaraes et al. 1996a).

- development/influence towards user expectations to be realistic about system capabilities (Bjorn-Andersen and Hedberg, 1977; McKeen et al., 1994; Ginzberg, 1981; Yap et al., 1992; Szajna and Scamell, 1993).
- development of users understanding and feelings of system's ownership (Robey and Farrow, 1982; Lucas, 1974a; Grover and Teng, 1994).
- decreasing resistance to change (Lucas, 1974a, Checkland, 1981; Mumford, 1983; Hirschheim and Newman, 1988; Amoako-Gyampah and White, 1993; Cavaye, 1995; Grover and Teng, 1994).
- Greater understanding of the system and more effective use (Damodaran, 1996)
- increasing user commitment to the system (Lucas, 1974a; Markus, 1983).

Butler and Fitzgerald (1999) noted in their detailed case study that user participation when well managed might contribute towards higher user satisfaction and system success. The benefits of user participation during system development may only be well acquired if appropriate attention is given to change management issues during system implementation process. They stated that "...participative development ensured that the end product closely matched user requirement and, hence, facilitated a high level of user satisfaction with the developed system" (p. 82).

#### **2.6.4. User Participation and Past Research**

"It is almost an axiom of the MIS literature that user involvement [participation] is a necessary condition for successful development of computer-based information Systems" (Ives and Olson, 1984 p. 586). Surprisingly the previous research evidence may not be able to corroborate all arguments/benefits strongly. User participation has also been criticised in design for its drawbacks (e.g. Hirschheim, 1983). Previous research results regarding (i) user participation and system success, (ii) user participation and user satisfaction, are inconclusive. It may happen that a system is unsuccessful although users participated and

successful without user participation (De Brabander and Edstrom, 1977; Cavaye, 1995). Edstrom (1977 p. 590) also stated "...in certain cases involvement may still lead to failure while in other cases good results can be obtained without the involvement of the user".

Research reviews (Olson and Ives, 1984) of 22 empirical studies (1959 - 1981) and (Cavaye, 1995) of 19 empirical studies (1982 - 1992) showed positive, negative and inconclusive findings regarding user involvement/participation and system success. Only 8 studies among 22 (Olson and Ives, 1984) (i.e. approximately 36%), and 7 studies among 19 (Cavaye, 1995) (i.e. approximately 37%) showed a positive contribution of user participation towards systems success. On the other way meta-analysis carried out by Pettingell et al. (1988), and Hwang and Thorn (1999) show that user participation/involvement is positively correlated with system success. Mixed findings regarding effect of user participation/involvement on user satisfaction and system success could be evidenced in literature (Ives, et al., 1983; Ives and Olson, 1984; Tait and Vessey, 1988; Doll and Torkzadeh, 1989; McKeen et al., 1993). For example, Baroudi, et al. (1986) noted that user participation/involvement leads to user satisfaction. Garrity et al. (1995) found positive correlation between user participation and perceived usefulness of the system. Amoako-Gyampah and White (1993) showed that user involvement has direct and positive effect on user satisfaction. McKeen, et al. (1993) found a positive relationship between user participation and user satisfaction. Roth and Bartholome (1994) pointed out participation insignificant for gaining user satisfaction. Torkzadeh and Doll (1994 cited in Srivihok, 1999) found no relationship between user participation and user satisfaction. Srivihok (1999) said that user participation/involvement does not influence EIS success directly. Leonard-Barton and Sinha (1993) found relationship to be not positive between user involvement and user satisfaction. Yap et al. (1992) found positive relationship between user participation and user information satisfaction. Guimaraes et al. (1996a) also found direct relationship between user involvement and user satisfaction and expert system success. Ewusi-Mensah (1998 p. 33) states " user involvement which is widely recommended as crucial to successful



systems development may be necessary but is not sufficient criterion for system completion or implementation success".

Different studies evidenced in IS literature shows mixed findings regarding the effect of user involvement on system usage, system quality, and user attitudes (see Hirschheim, 1983). It may lead to the question, whether user participation is unimportant towards system development or some other considerations towards contingencies are required. Different researchers have different opinions about such inconclusive findings. For example, DeLone and McLean (1992) states that participation effect on subsequent success of Information Systems using user satisfaction without considering system quality and information quality might vary. Garrity (1994 p. 41) concluded that past research has not accounted for the type of the system investigated, so inconclusive findings regarding user participation and system success may be due to cross system comparisons. Ives and Olson (1984) passed comments that past research has not been strongly based in theory and there is a lack of consistency in how user participation/involvement may be conceptualized. They attributed it to the conceptual, methodological and measurement flaws. Saleem (1996) attributed contradictory findings to non-consideration of contingent factors. Newman and Noble (1990 p. 89) stated that the "precise nature and consequences of user involvement have been insufficiently explored empirically".

Mixed findings concerning to user participation vs user satisfaction, user participation vs system success, lead to the conclusions that existing research has not been able to explore all the benefits of user participation/involvement and to foresee when it likes to be more appropriate (Barki and Hartwick, 1994; Doll and Torkzadeh, 1989; Ives and Olson, 1984; King and Lee, 1991). Consideration of different factors such as user participation, user-developer interaction and communication and formation of user expectations are critical in IS development. User perception of participation [involvement] may be influenced by user-developer interaction and user expectations (Amoako-Gyampah and White, 1993). Others also argued that user participation could reduce unrealistic expectations because users are exposed to the process of system design and

development that might make them receptive to the system being implemented (Yap et al., 1992). Anderson (1997) argued that participation/involvement and communication among all groups affected by IS implementation may provide a means to identify and resolve the potential problems. If such problems remain unresolved then ultimately their adverse effects may appear as users' non acceptance of the system.

Considering the matter of developing realistic expectations and dyadic communication relationship, the effect of user participation is speculated to be positive. Hopefully it seems to be helpful in reducing the gap between what users expect and what they get. User expectations have their deep concern towards user satisfaction. Considering user satisfaction in terms of fulfilment of user expectations, it requires that user expectations need to be managed by bridging the expectation gap. The expectation gap may be the cause of unrealistic expectations being emerged due to various factors. The need to manage/reform user expectations supposed to be an important factor towards achieving user satisfaction.

## **2.7. The Notion of Expectation**

### **2.7.1. Defining Expectations**

Users may develop their desires about system's outcome regarding their jobs, self-interests and organizational objectives. These emerge in the form of their preconceptions and expectations. User expectations are defined as beliefs and desires concerned with how a system will serve various stakeholders interests (Lyytinen and Hirschheim, 1987; de Abreau and Conrath, 1993). Szajna and Scamell (1993) took it as a set of beliefs held by users about eventual system performance and their performance using the system. Hartzel and Flor (1997) argued that expectations emerge due to lack of absolute knowledge about the product [system], which does not exist at that moment. The expectations may be realistic or unrealistic and can have a result of various reasons that have been discussed already. For example 'technology hype/hope' as one of reasons due to

which stakeholders may raise their expectation beyond technology capabilities. There may also be the case that expectations only be formulated to justify the efforts and investments in IS (Lyytinen and Hirschheim, 1987). Users' expressions of what they want or what they are thinking to get from the system appear in the form of their expectations. The expectations can not only restricted and related to users but system developers may also expect from management and users during IS development. Magal et al (1988) considered management of user expectations as one of the critical success factor for Information Center (IC) managers. "No matter what the IS deliverable is -- information, applications, technology, user support -- it is critical that IS determine what it is that its users expect to receive (I/S Analyzer, p. 4)". However, the gap between what users expect and what they get from the system, or what system developers expect from management and what they found in terms of their co-operation always appears to be problematic. The importance of user expectations has been well recognized in IS literature. Different studies (Hayen, et al., 1990; Madigan, et al., 1998) described mismatch between what was expected and gained that shows the expectation gap.

### **2.7.2. The Expectation Gap**

The expectation gap deals with what an individual expects and what he gets eventually. Anderson (1978) considered the emergence of expectation as a function of individual's desires. He attributed 'expectation gap' to the factors such as human's tendency to let his expectations be directed by his desires, technology hype, ignoring IS development importance by top management and system developers role. Similarly, Kim (1990) pointed out that organizational resources and management indifferences might restrict IS not to deliver what users expect. Such factors also cause discrepancy between what is being delivered by the system and what users want. Fowler and Walsh (1999) mentioned user-developer communication gap as one of the causes for unrealistic expectations. Other researchers (Anderson, 1978; Doll and Ahmed, 1983; Lederer and Mendlow, 1990; Kim, 1990) have highlighted the problem of unrealistic expectations, the 'expectation gap' (i.e. what users expect from IT and what they get) still exists.

No doubt rapid development in technology had provided better options as compared to past, but its limitations can not be overlooked. Overblown advertisements may raise individual expectations even beyond reality. Such unrealistic expectations from users appear as critical issue towards organization (Doll and Ahmed, 1983; Lederer and Mendelow, 1990), user satisfaction (Ginzberg, 1981; Rushinek and Rushinek, 1986, 1986a; Kim, 1990; Szajna and Scamell, 1993; Watson et al., 1993a, 1993b) and cause user disappointment (Rushinek and Rushinek, 1986).

The expectation gap influences user satisfaction and system success and usually occurs due to unrealistic expectations being kept by the users. When the expectations of user exceed his perceptions, user feel dissatisfied (Watson et al., 1993a). Lyytinen (1988a, p. 46) described the concept of 'Expectation Failure' as a gap between stakeholder's expectations in some ideal and actual performance. Doll and Ahmed (1983) found projects unable to fulfil user expectations concerning what users are going to get or what they are going to have to do to get it, erode user confidence. The expectations may be unrealistic low or unrealistic high, and both are required to be aligned to narrow the gap between what users expect and what they eventually get. A gap between expected/desired and actual level of system performance may be termed as disconfirmed expectation. Disconfirmation of expectation may be evaluated by comparing the performance of the system with the developed expectations. Disconfirmation may be positive (i.e. performance exceeds expected performance) or negative (performance lags expected performance) (Remenyi and Money, 1991; Szajna and Scamell, 1993; Suh, et al., 1994). A large gap (negative) indicates user dissatisfaction with the system performance. Remenyi and Money (1991) pointed out that large 'positive' gap shows wastage of resources whereas large 'negative' gap indicates that system requires improvement in its performance.

### **2.7.3. User Unrealistic Expectations: A problem**

IS researchers recognized unrealistic expectations as a critical issue that could not be ignored. User unrealistic expectations are one of the reasons affecting system

success and even individual's own performance. Researcher found user unrealistic expectations a significant reason causing IS failures (Faerber and Rattiff, 1980; Lyytinen and Hirschheim, 1987; Lyytinen, 1988a, 1988b). Compeau and Higgins (1995) found that individuals with higher expectations exhibited lower performance. User expectations has been recognized as an important factor relating to user satisfaction (Ginzberg, 1981; Barki, 1988; Kim, 1990; Suh et al., 1994) and IS success (Lederer and Mendelow, 1990; de Abreau and Conrath, 1993). So it could be argued that formation of expectations to be realistic might be a positive step towards achieving user satisfaction with the system that consequently leads to system success.

User expectations realistic/unrealistic have its good/adverse effects on system's outcome, user satisfaction and individual's performance respectively. Users unrealistic expectations could usually cause problems for management and IS departments. Doll and Ahmed (1983) found user unrealistic expectations as a major problem for IS departments and management, and ranked it higher than other problems mentioned in their list. Callaway (1996) said that management of user expectations about 'what IT can and can not do' has been recognized as common problem for IS managers. A survey of 500 IT managers in the United States and UK pointed out changing user requirements, poor planning and unrealistic expectations as the most common reasons for IT projects failures, whereas the unrealistic expectations were ranked second among list of such reasons (Moad, 1998). Similarly in 1988, NCC members' survey showed high cost, IT failure and senior manager's unrealistic expectations as most difficult barriers faced by IT managers (Computer Weekly, 1998).

User expectations about system's impact on the organization are critical. When expectations appear to be unrealistic, user may perceive the system not to be successful. Users with unrealistic expectations hardly satisfied with the system. Previous research results showed that gap between expectations and actual performance of the system might have its profound effect on user satisfaction (Ginzberg, 1981; Remenyi and Money, 1991; Watson et al., 1993a; Suh et al., 1994).

#### **2.7.4. The Influence of User Expectations on User Satisfaction**

User expectations have its deep concern with degree of satisfaction. Bass (1965 p. 35) stated that dissatisfaction depends on the discrepancies between expectations and attainment. Disconfirmation of expectation and level of satisfaction with product [system] performance are also closely related (Oliver, 1980). When the users perceive their expectation are being fulfilled by the system then they feel more satisfied with the system. Conrath and Mignen (1990) ranked user expectations as second in his list of 33 items affecting user satisfaction. Rushinek and Rushinek (1986) also found strong effect of user realistic expectations on user satisfaction. User expectations prior to implementation or current both are deeply concerned with satisfaction of user with the system. Ginzberg (1981) found users having realistic expectations prior to system's implementation more satisfied as compared to those having unrealistic expectations. Lawrence and Low (1993) found current expectations more significant rather than expectations before implementation. It leads to the suggestion that user expectations either prior to implementation or current are crucial for user satisfaction. The formation and management of expectations to a realistic level at early stages during system development could be effective in gaining user satisfaction. Researchers pointed out that users having unrealistic expectations about system outcome may feel it less successful (Ginzberg, 1981, Lyytinen, 1988a) and its consequences appear in term of user dissatisfaction (Ginzberg, 1981; Hirschheim and Newman, 1988).

Expectation formation is an on going activity during system development process. It may go on changing due to organizational learning and awareness with the system (Remenyi and Money, 1991). Expectations may not always be static but might vary. Toubkin and Simis (1980 p. 170) say " ... exceeding aspiration or expectation level does not result in greater satisfaction on the part of the user but rather raises his level of expectation for the future. Conversely, the failure to attain a level of aspiration or expectation results in dissatisfaction and, after continued failure to reach that level, a lowering of expectation levels". Restricting evolving expectations up to certain realistic level may add towards user

satisfaction. Toubkin and Simis (1980) stated that user satisfaction is related to the level of user expectation or aspiration. User satisfaction has been recognised as a surrogate measure of system success (Ginzberg, 1981; Wan and Wah, 1990; Raymond, 1987; Ives et al., 1983) and system effectiveness (de Abreu and Conrath, 1993). The system coping with user expectations could be perceived useful by them to perform their tasks, thus as a result they might use it. DeSanctis and Courtney (1983) found a direct relationship between user expectations and system use. The degree of system use may be influenced by what users expect and what they perceive in terms of services provided by the system (Toubkin and Simis, 1980). Such facts show the importance of user expectations towards user satisfaction, system usage and system success. So it may be argued that user expectations consequently may affect systems success. For a satisfied user, his expectations from the system usually need to be managed properly (Kowal, 1992). User satisfaction may be speculated to be inversely proportional to the expectation gap. The more narrow the gap, the greater the degree of satisfaction.

## **2.8. Effective Communication and IS Development**

### **2.8.1. Importance of Effective Communication**

Communication involves transfer of information among people. It does not exist without people. It has deep concern to relationship among people. People in an organization are interdependent. Their interdependence calls for co-ordination and co-operation that also requires effective communication to carry out needed tasks, so that organization's objectives can be achieved (Ludlow and Pantou, 1992). Communication among people (stakeholders) is a social process. The stakeholders have to deal with each other during development and implementation of IT projects, and it demands collaboration and co-ordination among them. It may be formal or informal but appears to be a necessary element. De Brabander and Edstrom (1977), p. 193) wrote " less risk for problems of coordination of activities in the organization is involved when both parties [user and system developers] come to an agreement on the basis of mutual understanding, and mutual understanding can only be the result of effective

communication”. Communication may be considered as a process of creating a meaning between or among different peoples. “Communication is a human process in the sense that it has consequences for individuals’ self-knowledge” (Murray and Willmott, 1991 p. 83). It may be looked as “an interpersonal process of sending and receiving symbols with meaning attached to them” (Ludlow and Panton, 1992 p. 5). Frequent and effective communication may contribute to conflict resolution, allow members to express their feelings, attitudes, and proposals, improve relationship among the participants, and enable constructive discussions (Borovits et al., 1990). Lack of communication among the stakeholders may result in excluding some important aspects that might be necessary for decision making during system development.

User and system developer relations are very important and critical in the system development phase (Friedman and Cornford, 1989). System developers must have an understanding of users and their information needs as it ultimately affect systems success. Researchers considered user-developer interaction as a key factor towards successful system implementation and its outcome (Ginzberg, 1981; Amoako-Gyampah and White, 1993). According to Kim (1990), as a result of user-developer interaction process the user may modify his expectations. Kaiser and Srinivasan (1982) research showed that both users and developers perceived interaction as one of the necessity during IS development. They noted that both users and system developers perceived user-developer communication and user information needs as important factors in the context of IS development. User and system developer’s skills to communicate during analysis, design and development for determining user requirements, and system objectives are very much required. Communication should be always effective in order to avoid any ambiguities concerning to system requirements and goals. Curtis et al. (1988) pointed out that communication within the project team of software development necessary to resolve misunderstanding about requirements or design decisions. Effective communication may reinforce better understanding, better relationship and also add towards increasing motivation. Positive effect of effective communication in user requirement elicitation has been well recognized in IS literature (Mittermeir et al., 1987; Bostrom, 1989; Valusek and Fryback, 1987).



Srivihok (1999) showed strong correlation of EIS (Executive Information Systems) development team communication skills with information quality, system quality, and service quality. These factors are part of DeLone and McLean's (1992) model and its extension (Pitt et al., 1995). So it may be inferred that system developer's communication skills have their positive effect towards user satisfaction and system success.

Srivihok (1999) said that better the communication skills of development team, the more successful system perceived to be. He also noted that the development teams communication skills have its direct influence on user participation. He argued that user and system developer communication in system development may result in enhancing user participation and involvement, increasing understanding, enhancing positive user attitudes, decreasing user resistance and enhancing the possibility of successful system implementation. (Edstrom, 1977 p. 604) stated that "importance of effective communication is important for the perceived success of the MIS as well as for changing the system design". Doherty et al. (2000) found a strong positive correlation between effective communication and system success. Magal et al. (1988) identified 26 critical success factors for Information Center (IC) managers, and 'communication with users' falls at the 2<sup>nd</sup> top most in their list.

The importance of effective communication among participants particularly users and system developers has also been highlighted and well recognized in IS research (Bostrom and Heinen, 1977; De Brabander and Edstrom, 1977; Cronan and Means, 1984; Kling and Scacci, 1982; Robey and Farrow, 1982; Franz and Robey, 1984; De Brabander and Thiers, 1984; Verrijn-Stuart and Anzenhofer, 1988; Bostrom, 1989; Christensen, 1991; Murray and Willmott, 1991). It can be traced back to an article that discussed the importance of relationship between scientists and managers (Churchman and Schainblatt, 1965). What users desire from IS and how system developers interpret it usually require communication to be effective at early stages of IS development (Doll and Ahmed, 1989; Lawrence and Low, 1993). The importance of effective communication can not be ignored because users should know about the system being developed and system

developers should know what requirements seem to be missing if any. In this context, it may be argued that there is a need for effective communication between stakeholders, particularly between users and system developers to achieve better results of their combined efforts towards system development.

### **2.8.2. Effect of Effective Communications on Participation**

Both users and system developers have their prime role in IS development efforts. Their relationship is always symbiotic and interdependent. Gibson (1977) pointed out that effective communication and user-developer rapport usually affect user participation. IS development is a joint effort and such collaborative effort may be more successful on participation and effective communication from both sides. It seems to be necessary as users have to convey their understanding about the existing system functions completely and accurately to system developers those have to translate it into working computer systems. Effective communication may help system developers in assessment interviews with users and similarly encourage users to have rapport and positive interaction with systems developers (DeSanctis and Courtney, 1983). “Managers [users] have the information and understanding of the dynamics of the environment, analysts have the time and inclination to do the systematic analysis that complex strategic decisions require” (Mintzberg, 1973 P. 163). Kaiser and Srinivasan (1982) advocated the need for user-developer interaction and better communication during IS development process. They reported (p. 640) “both user and system staff do indeed perceive user-analyst communication as an integral part of systems development and implementation”. de Abreu and Conrath (1993) noted user-developer interaction not only related to IS success measures but also affect user expectations. Similarly, Ewusi-Mensah (1998) highlighted the adverse consequences of lack of communication and interaction among user, management and system staff in his recent case study of abandonment of an IS project, although the project was initiated by users and they also participated in the system development process.

User participation and user-developer mutual understanding has also been recognised as an important factor toward development and implementation of successful systems (Ives and Olson, 1984; Keil and Carmel, 1995). Users feel themselves part of the system and it assists user-developer better communication in Information Systems development activities. User participation and effective communication between users and system developer provides ways to become familiar with each others expectations and in gaining enhanced knowledge and understanding of the system (Hartzel and Flor, 1997). Effective communication and better mutual understanding both add towards user participation to be more effective that may enhance systems quality (King and Lee, 1991). So effective communication appears to be fruitful for both of the groups (i.e. such as users and system developers) in IS development in order to maintain good rapport, eliciting user requirements completely and restricting user unrealistic expectations.

Users could convey their expectations to other members of IS development through communication. If users are unable to convey their expectations to management and even to system developers then it supposed to be problematic in long run. Effective communication may positively add towards recognizing what user expects and also leads to intelligent and effective user participation.

### **2.8.3. Other Advantages of Effective Communication**

User and system developer interaction/effective communication may help to achieve solutions to problems that arise due to communication gap. Both may benefit from the close interaction and effective communication by exchanging views, identifying and restoring conflicts, gaining and enhancing knowledge, as well as sharing information (Robey and Farrow, 1982; McKeen et al., 1994; Boland, 1978; Edstrom, 1977). Not only is this, sufficient users and system developers interaction and effective communication may lead to positive expectations formation and even system implementation success (de Abreu and Conrath, 1993). Edstrom (1977) found a significant relationship between effective communication and system success. Some others also reported its positive effects on system's implementation and success (De Brabander and

Edstrom, 1977; de Abreau and Conrath, 1993). Srivihok (1999) found communication skills to have its positive influence in improving user attitudes towards successful implementation of the system and its success. McKeen, et al. (1993) showed positive relationship between user-developer communication and user satisfaction. Keeping in view such evidences it may be speculated that user and system developer interaction and effective communication may enhance and ensure mutual understanding, aid realistic expectations formation, user satisfaction and ultimately successful systems.

The effective communication in design process not only complement methodologies but also help for maintaining good rapport between users and system developers (Bostrom, 1989). Keil and Carmel (1995) also suggested [user] customer-developer links for exchange of information between user and system developer properly during IS development process and emphasized on direct contact (i.e. face to face communication). Some times system developers feel that users have not much knowledge to contribute towards system development i.e. 'knowledge gap' (Cavaye, 1995), so effective communication may not only overcome it, but add towards users knowledge/learning and meaningful participation. Effective communication has its important role in identifying and resolving conflicts that may exist among participants in IS development (Robey and Farrow, 1982). Effective communication may be affected from user-developer semantic gap<sup>1</sup>, the extent to which user involvement is mandatory, and the relative position of participant in organization (De Brabander and Thiers, 1984; Cavaye, 1995). Different factors may cause distortion in messages conveyed to others. Such ineffective communication is usually has adverse effects on systems development and consequently affects systems outcome.

---

<sup>1</sup> Semantic gap means "Different persons have different concepts about reality" (De Brabander and Thiers, 1984 pp. 142).

#### **2.8.4. Drawbacks of Ineffective Communication**

As IS development team participants have diverse background, so effective communication and co-ordination among participants are critical. Unfortunately the system developers are accustomed to communicate with each other in technical terms regarding system development. These technical terms more or less always can be problematic for users to understand and communicate with developers comfortably. Users and system developers being from different background, having personality and inherent differences, speaking different languages (vocabulary), may face communication problems. Such factors cause communication to be ineffective (Faerber and Ratliff, 1980; Franz and Robey, 1984; McKeen, et al. 1994; Lyytinen, 1988a; Verrign-Stuart and Anzenhofer, 1988; Bostrom, 1989 Conrath and Mignen, 1990; Laudon and Laudon, 1996). Lucas (1974a) considered communication obstacles as a source of conflicts in the organization. The consequences of ineffective communication during development process may be negative towards system success. According to Edstrom (1977, p. 600) “ineffective communication is strongly negatively associated with the perceived success of the system ”. It may happen during communication that one might not receive information conveyed by some one other with the same meanings due to owing different background and situational context (Metcalf and Powell, 1995). So the needed information hardly reaches to the receiver with its real meaning if communication is not better. It is not too far that some times system developer and user may view the same things in different ways due to communication gap. The degree of effectiveness of communication depends upon whether the message as intended by the sender, is received with exact meanings by the receiver or not (Tubbs and Moss, 1994, Metcalf and Powell, 1995). However, as long as recipient sense the meaning of the message, the message is supposed to be communicated accurately.

The difficulties in eliciting/understanding system requirements by users and system developers are not only of user inability to identify information needs (DeSanctis and Courtney, 1983), but also result of ineffective communication (DeSanctis and Courtney, 1983; Flynn and Jazi, 1998). Due to such

communication barrier, it may be difficult for system developer to establish system's specifications in accordance to user needs, albeit the specifications must be unequivocal (Verrijn-Stuart and Anzenhofer, 1988). How can one hope that user expectations from the system may be fulfilled even when the user needs have not been fully incorporated within the system. The system specifications in accordance to user needs are critical for IS success (Suh, et al., 1994) whereas the need of users may be determined completely and accurately that may be possible on good relations and effective communication among the participants (i.e. users and system developers). Friedman and Cornford (1989) stressed improving user and system developer relations in IS development. They emphasized on "producing the right system rather than producing the system right" (p. 175).

Lack of effective communication usually affects requirement elicitation process. Due to lack of effective communication, the system developers usually face difficulties in eliciting and developing system specifications in accordance to user needs (DeSanctis and Courtney, 1983; Verrijn-Stuart and Anzenhofer, 1988) and such flaws in system specifications cause users dissatisfied with the system (De Brabander and Their, 1984). The problem regarding user requirement ambiguities may be controlled by effective communication and mutual interaction and understanding. Such considerations may also influence user expectation evolution. The consequence of lack of such considerations has its adverse effects towards system development and implementation. Unsatisfactory interaction and poor communication among stakeholders groups may cause cancellation of IS projects (Ewusi-Mensah, 1997, 1998).

#### **2.8.5. Ineffective Communication and User Expectations**

The expectations may emerge during requirement elicitation. Users learn more during this phase as to what new features may be added to enhance the capabilities of the system and how new system may facilitate them more. They may change their requirements as a result of their learning process, perhaps due to their expectation formation. If the requirement has not been delivered accurately and completely then how the expectations about system's outcome

may be fulfilled. Ineffective communication not only affects system design process but also cause lack of understanding of the system to users (Faerber and Ratliff, 1980). In order to convey requirements accurately, users should communicate their needs properly, and the developers also need to capture those accordingly. Lack of communication may cause users to retain their expectations with them and are never conveyed to system developers and even to management. Users and system developers weak interaction also confines system developers to understand about necessary features required for better quality Information System. It causes discrepancy between user expectations and system features that leave negative effects on user satisfaction (Suh, et al., 1994). Due to lack of interaction and communication during system development process, users may hold unrealistic expectations. Watson et al. (1993a p. 350) stated in connection with raising expectations to be unrealistic, "It is important to note that the user will ordinarily not have had these expectations - they have been created by careless communication, or sometimes, a general lack of communication". They argued that IS personnel those remain in contact with users may learn more about their expectations and possibly encourage communication among them. The unrealistic expectations causes users to be dissatisfied with the system (Ginzberg, 1981).

User participation and effective communication may provide an opportunity for users to learn more and also for system developers to educate the users. Both users and system developers not only learn but they may understand each other's culture. Users participation and their interaction with system developers result in formation of user expectations to be more realistic (Bjorn-Anderson and Hedberg, 1977; Ginzberg, 1981; Doll and Ahmed, 1983) whereas poor interaction usually causes emergence of unrealistic expectations on users' side (Ginzberg, 1981). The expectations may be more realistic if both groups understand each other's culture, thought process, environment and limitations of either technology or of individuals. The inability of the system to fulfil user realistic expectations may cause user dissatisfied with the system, so the system may lead to failure (Lyytinen and Hirschheim, 1987; Ginzberg, 1981).

The problems that are faced by users and system developers during system development always need to be rectified. However, above discussion leads to questions that up to what extent participation and effective communication is influential towards managing mutual interaction between users and system developers and eventually user satisfaction.

## **2.9. User's Satisfaction**

### **2.9.1. Defining User Satisfaction**

In general, satisfaction is defined as the extent to which something is rewarding to us relative to how much better we might do elsewhere and what aspirations we have (Bass, 1965 p. 36; Nolan and Seward, 1974, p. 255). Satisfaction has been considered as some ones internal feeling (Nolan and Seward, 1974), and attitude (Pearson and Bailey, 1979). Keeping in view user satisfaction with IS, Pearson and Bailey (1979, p.1) defined satisfaction as "the sum of feelings or affective responses to distinguishable factors of the computer based information products and services that are provided within the organization". Bailey and Pearson (1983, p. 531) also described satisfaction as "in a given situation is the sum of one's feeling or attitudes toward a variety of factors affecting that situation". User satisfaction has also been defined as "the extent to which users believe the information system available to them meet their information requirements" (Ives et al., 1983 p. 785). Kappelman and McLean (1991 p. 342) defined user satisfaction as "the degree to which users have positive affective orientation toward an information system; i.e., the extent to which they feel good about it". Ishman (1998 p. 64) considered user satisfaction as the positive affective orientation that an individual has towards an Information System or how good the users feel about it. Seddon and Kiew (1996 p. 94) perceived user satisfaction as the net feeling of pleasure or displeasure with the aggregate benefits that a person hopes or receives from the interaction of an Information Systems. The above mentioned definitions lead to the argument that up to what extent users expected needs/requirements and benefits from the system are met, may enforce satisfaction. The fulfilment of user needs usually enhances user satisfaction.



User satisfaction has also been conceptualized in terms of effective attitudes towards the activities related to user interaction with the system (Doll and Torkzadeh, 1988; Melone, 1990; Galletta and Lederer, 1989; Harrison and Rainer, 1996). How users perceive the system irrespective of its technical quality shows user satisfaction and is related to fulfilment of what users want. During requirement elicitation, the users convey their requirements/needs for the candidate system. To what extent user needs are to be incorporated in design, may be a determinant of user satisfaction (Lawrence and Low, 1993). It may include users' opinion, how system may enhance their job performance and meet organisational objectives/goals. System may only be able to reinforce satisfaction when it fulfils users needs (Ives et al., 1983) and it also leads to system usage (Baroudi et al., 1986).

Nicholas and O'Connor, (1990) also stated that user satisfaction toward IS may be determined by comparing the user information needs of their job with those provided by the system. User needs deal with the objective of the system and might be viewed as what users expect from the system eventually. User satisfaction might be explained as a gap between what users perceive being important to them in term of their expectations and what an IS delivered as they believe regarding its effectiveness and the level of performance. The positive gap always shows the satisfaction of users with the system. User requirements/needs from the system appear in terms of their expectations. The discrepancy between user's expectations and perceived performance of the system have its deep concern to user satisfaction with the system (Ginzberg, 1981; Remenyi and Money, 1991; Szajna and Scamell, 1993; Suh et al., 1994). It leads to speculation that if the expectations of user exceed his perceptions then he might feel dissatisfied. Satisfaction is a measure of user beliefs about how a system may meet user requirements and user expectations (Shirani et al., 1994).

User satisfaction may be influenced by different factors related to system outcome, task characteristics, and user characteristics. Satisfaction as one's belief or attitude may vary from user to user with position or status. According to Cheney and Dickson (1982) the level of satisfaction varies across level of

management. Others also stated that administrative users appear to be more satisfied than technical users (Nicholas and O'Connor, 1990). According to Franz and Robey (1986) the lower level users feel that a system is more useful as compared to high level users. Similarly, Wrigley et al. (1997) found a difference between managers and non IS managers' satisfaction in evaluating the system. It leads to the argument that satisfaction usually varies among users. It might be a novice user feel more satisfied with the same system as compared to an experienced user.

### **2.9.2. User Satisfaction as a System Success Measure**

The logical appeal to determine systems success stems from the belief that successful systems can improve the performance of organizations, and the desire to improve the process by which the systems come into existence (Wrigley et al., 1997). The direct measures of system success are considered to be very difficult if not possible. Several measures such as system effectiveness, value of benefits, systems usage, user satisfaction, cost-benefit analysis, information attributes, system effectiveness, organizational impact etc. (see Ives and Olson, 1984, DeLone and McLean, 1992, Nicholas and O'Connor 1990; Kaiser and Srinivasan, 1980) have been proposed in IS literature. User satisfaction is generally accepted as a better surrogate measure of system success (Swanson, 1974; Bailey and Pearson, 1983; Ives et al., 1983; Raymond, 1985; Barki and Huff, 1990; Igarria, 1990; DeLone and McLean, 1992; Kim, 1990; Guimaraes et al., 1995; Conrath and Sharma, 1993, Harris, 2000) although criticized (Galletta and Lederer, 1989, Melone, 1990). The basis for considering user satisfaction as a success measure concerns that Information Systems those fulfils user needs and objectives may reinforce satisfaction. Barki and Huff (1990 p.90) say "user satisfaction may be affected by factors tangential to the true value of the system". There are various terms for example "MIS appreciation" (Swanson, 1974), "felt need" (Guthrie, 1974); "perceived usefulness" (Larcker and Lessig, 1980); "feeling about system usefulness" (Maish, 1979); "perceived system worth" (King and Rodriguez, 1981; Conrath and Sharma, 1993); "user appreciation" (Gallagher, 1974); "system acceptance" (Igersheim, 1976); "user information satisfaction (UIS)" (Ives at al.,

1983; Baroudi and Orilowski, 1988); "user satisfaction" (Pearson and Bailey, 1979; 1980; Bailey and Pearson, 1983); "end-user satisfaction" (Doll and Torkzadeh, 1988; Montezami, 1988; Igbaria, 1990) have been used in IS literature and to be speculated as to describe the same concept of user satisfaction with the system.

A plethora of studies since 70's has been carried out for the development of user satisfaction instrument, measuring user satisfaction with the systems and how different factors in different domains affect user satisfaction. Keeping in view such aspects the user satisfaction related research may be considered in two streams such as 1) studies those concentrated on the development of user satisfaction measurement instrument or its validity (Nolan and Seward, 1974; Pearson and Bailey, 1979; 1980; Bailey and Pearson, 1983; Treacy, 1985; Doll and Torkzadeh, 1988; Jenkins and Ricketts, 1985; Ives et al., 1983; Baroudi and Orlikowski, 1988; Galletta and Lederer, 1989; Etezadi-Amoli and Farhoomand, 1996; Hawk and Raju, 1991; White and Cronan, 1993), 2) studies that attempted to explore the effects of different factors relating user characteristics (Igbaria, 1990; Baronas and Louis, 1988; Ives and Olson, 1984; Ginzberg, 1981; Ang and Soh, 1997; Yaverbaum and Nosek, 1992), organizational characteristics (Rivard and Huff, 1988, Amoroso and Cheney, 1991; Grover and Teng, 1994; Thong et al., 1993) and systems characteristics (Doll and Torkzadeh, 1988; Udo and Guimaraes, 1994; DeLone and McLean, 1992; Srinivasan, 1985; Loh and Ong, 1998; Torkzadeh and Doll, 1999) on user satisfaction.

The items included in different instruments to measure user satisfaction with the system vary in their number and some how in their contents. For example, Bailey and Pearson (1983) based on voluminous literature identified 39 items for user satisfaction instrument. It encompasses different dimensions such as: organizational characteristics, features of EDP staff, systems characteristics, user characteristics, information characteristics, system policies, vendor characteristics and output features (Davis, 1985). Jenkins and Ricketts (1985) mentioned 20 items whereas 18 of them represent problem finding, problem solving, input procedures, computer processing and report form as important dimensions for

user satisfaction. The rest two describe overall user satisfaction with the system. Ives et al. (1983) further studied Bailey and Pearson's instrument and developed shorter version by dropping some items. They identified three major dimensions such as EDP staff and services, knowledge and involvement, and quality of information product. Doll and Torkzadeh (1988) mentioned 12 items consisting dimensions such as: contents, accuracy, format, ease of use and timeliness in their instrument for measuring end-user satisfaction. Powers's (1971 cited in McKeen, 1983) instrument to measure user satisfaction with the system, and Sanders and Courtney's (1985) instrument to measure user satisfaction with Decision Support Systems (DSS) are also examples about how researcher measured user satisfaction. Miller (1989) also identified how the contents of user satisfaction instruments vary in emphasis. More studies related to user satisfaction construct may be found elsewhere (see Harrison and Rainer, 1996; Miller, 1989; Klenke, 1992). Some argue that a single measure construct to evaluate overall user satisfaction may be better (Galletta and Lederer, 1989; Kappelman and McLean, 1991). Research studies such as Ginzberg (1981), and Rushinek and Rushinek (1986) used single item to measure user satisfaction. Lane et al. (1994) attempted both single and composite measures for user satisfaction in their study. Galletta and Lederer (1989) stated that single item measure of user information satisfaction might provide summative and formative evaluation for the practitioners. White and Cronan (1993) found a strong positive correlation between the instrument measuring overall user satisfaction and instrument consisting more than one items related to user satisfaction.

### **2.9.3. How User's Satisfaction Effects and Being Effectuated**

User satisfaction has been well recognized and generally accepted as a surrogate measure of system success and its effectiveness. As a surrogate measure of success it has been used to assess the success of Information Systems, Decision Support Systems, Office Automation systems etc. (for example, see Raymond, 1987; Doll and Torkzadeh, 1988; Barki and Huff, 1985; Tan & low, 1990; Mahmood and Sniezek, 1989).

A plethora of factors such as relating to users (i.e. user participation; user expectations, user previous experience), organizational (i.e. top management involvement/support), systems characteristics (systems quality, information quality, user interface, ease of use), problem/task characteristics (i.e. task uncertainty, task complexity) have been pointed out in past research that may influence user satisfaction. Similarly, (Bailey and Pearson, 1983 p. 536) stated that factors such as the time required for new development, processing of change request, flexibility, integration of system, degree of training and top management involvement are those aspects that may affect user satisfaction. Others stated that user expectations, ineffective communication, top management role, task complexity (Lawrence and Low, 1993; Ginzberg, 1981; McKeen et al., 1993; 1994; Edstrom, 1977; Szajna and Scamell, 1993) may also affect. Summing up such facts one can argue that users may show their dissatisfaction with systems that are not going to meet their requirements/needs. User dissatisfaction is always problematic towards system success. It has been evidenced in literature that dissatisfied users discontinue system usage, use it partially or seek alternatives (Ginzberg, 1981; Sauer, 1993; Szajna and Scamell, 1993) and consequently user dissatisfaction may lead system to failure (Ginzberg, 1981; Sauer, 1993).

Past research showed mixed results that are confusing regarding user satisfaction and system usage, user participation and user satisfaction relationships. Research (Lucas, 1975; Robey, 1979) shows that heavily used systems are positively correlated with user satisfaction, whereas Srinivasan (1985) pointed out that the relationship is not always positive. Cheney and Dickson (1982) argue that systems usage does not mean that users are satisfied with the system. It may be the case that users have no alternatives and the system may be all they have, thus it is better than nothing. A positive correlation between system usage and user satisfaction have been found in different studies (for example, Conrath and Mignen, 1990; Guimaraes et al., 1996a; Khalil and Elkordy, 1997). Khalil and Elkordy (1997) also stated that user satisfaction, which is an attitude, might influence systems usage. These results match with the earlier findings of Baroudi et al. (1986). Baroudi et al. (1986) pointed out that user satisfaction might lead to system usage, whereas Lawrence and Low (1993) showed that the relationship is

non-significant. Cheney and Dickson (1982) also stated this relationship non-significant. Schewe (1976) found no correlation between user attitudes and system usage. Melone (1990, p.79 ) said “It is possible to have an ‘effective IS’ without satisfaction on the part of users”. On the other hand Conrath and Mignen (1990) stated that an effective system might be under-utilised if users perceived that un-satisfactory towards fulfilling their needs and accomplishing tasks. Such findings show that the research concerning user satisfaction and system usage is mixed and inconclusive. Some argue that “The lack of convergence of such findings may be due to over-simplified assumptions ... ” (King and Lee, 1991 p. 327); variability of satisfaction measure might be due to differing quality of systems (DeLone and McLean, 1992).

## **2.10. Literature Critique**

Different factors were explored by IS researcher to tackle the problems causing IS failures. This research was confined to only those that more or less related to users. Although both constructs such as user satisfaction and user participation have been widely researched and have generated considerable empirical research but many studies have yielded inconsistent results. For user participation to be effective, user co-operation is expected. However, whether the users are making their best efforts to contribute towards system development is questionable. Despite the axiom that user participation may play a positive role in IS development and implementation (for example, may gain user commitment and system acceptance, avoid resistance, ensure user requirements, contribute towards user satisfaction and systems success), previous research about its effects on user satisfaction and systems success shows mixed and inconclusive results.

Different approaches that are adopted to measure systems success are system usage, user satisfaction, and system performances. IS researchers have developed surrogate measures such as user satisfaction (for example, Bailey and Pearson, 1983; Ives et al., 1983; Doll and Torkzedah, 1988; Amoroso and Cheney, 1992; Jenkins and Ricketts, 1985, see also Miller 1989), system usage (see Srinivasan, 1985; Trice and Treacy, 1986) to evaluate IS because direct measure may be

difficult, if not possible (Galletta and Lederer, 1989). The success measures such as user satisfaction and system usage are mostly used in evaluating the system success (DeLone and McLean, 1992; Amoroso and Cheney, 1992; Mawhinney, 1990; Igbaria, 1990; Raymond, 1987; Khalil and Elkordy, 1997), and both are criticized in literature regarding difficulties associated with their application and measurements. For example, there is no agreement on a conceptual definition of user satisfaction and no theory clearly explains the relation of user satisfaction and system success (Melone, 1990; Klenke, 1992). Keenke (1992) argued such reasons to be the cause of inconsistent findings among IS researchers. Iivari and Ervasti (1994 p.206) say that the concept of user satisfaction is plagued with problems such as: the concept of user satisfaction, its measurement and its role in the web of variables describing IS phenomena in spite of almost twenty years of active research. System usage is also advocated as surrogate measure of success but applicable only if it is voluntary (see Lucas, 1975, Barki and Huff, 1990; Baroudi et al., 1986; DeLone and McLean, 1992). The construct of system usage has also been criticized in IS literature. There are plenty of factors (see Dutton and Kraemer, 1978; Igbaria et al., 1989; Jarvenpa and Ives, 1991 ) that might affect use of the system. Might be the use of a system is enforced by organization or users have no other alternatives. There exist an axiom that how a system can benefit towards achieving organizational objectives until it is used. It implies that if the system is used then it must be useful, attain the organizational goals and therefore successful. Seddon and Kiew (1994) stated that non-use does not necessarily mean that system is not useful. It may be that other alternatives may do the required. So, they advocated to use "usefulness" instead of "use" as objective measure of success. There are certain complexities that are observed in literature in applying system usage as a surrogate measure of success. In such cases the system usage seem to be no longer always be applicable in measuring systems success. Trice and Treacy (1988) say that despite wide research on system usage, this construct is still not well understood and measured.

There are certain problems associated with these measuring instruments (see Melone, 1990; Galletta and Lederer, 1989; Wilkin et al., 1999). The measuring instruments used for system use and user satisfaction in different studies vary in

their constructs. Mawhinney (1990) says that the major problem with user satisfaction measurement is the lack of a generally accepted theoretical construct. Etezadi-Amoli and Farhoomand (1996) stated that user satisfaction instrument mostly considered user beliefs about system characteristics, attitude towards using a system but hardly performance related dimensions. Some others also criticized existing user satisfaction measures for lack of theoretical foundations (Srinivasan, 1985; Jenkins and Ricketts, 1985; Melone, 1990). For example, Treacy (1985 p.13) criticized the user satisfaction model specified by Ives et al. (1983) and says that the labels such as 'EDP Staff and Services', 'Information Product', and 'Knowledge or Involvement' attributed to factors relating with user satisfaction as a definition of a theoretical construct is imprecise and ambiguous. Bailey and Pearson's instrument has also been criticized for its lack of construct validity (Treacy, 1985) and being outdated (Doll and Torkzadeh, 1988). Doll and Torkzadeh (1991) stated that the user satisfaction instrument suggested by Bailey and Pearson not only consists of factors that measure satisfaction but also contains factors that cause satisfaction. Galletta and Lederer (1989) mentioned that the user information satisfaction instrument (developed by Ives et al., 1983) accepted as reliable is, in fact, not reliable. (Melone (1990 p. 85) says that measuring user attitudes [user satisfaction] based on system attributes might "offer a limited, if not only distorted picture". Galletta and Lederer (1989) criticized the elimination of factors from Bailey and Pearson's instrument (1983) to evaluate user satisfaction to get short instrument (i.e. 13 item instrument of Ives et al., 1983), item heterogeneity and scale units. They stated that their "study provides evidence that an instrument previously accepted as reliable is, in fact, unreliable" (p 433). Straub and Carlson (1989) say that 17 percentage of the studies use previously developed instruments in research. The researchers alter the original instrument significantly but hardly validate. In fact, if an original validated instrument is changed (i.e. wording, order, format etc.), the greater the likelihood that changed/derived instrument will lack validation qualities of original instrument. All instruments used in IS research are unlikely not to be validated (see Straub and Carlson, 1989; Klenke, 1992), that might cause variation in IS research findings. Thong and Yap (1996 p. 601) noted criticisms



on user satisfaction and it includes: "(1) questionable operationalization of the user satisfaction construct; (2) poor theoretical understanding of the user satisfaction construct; (3) misapplication of user satisfaction instruments". Consequently, that causes mixed findings in the IS research utilizing this variable.

There also have been varying definitions of the same concepts and might be problematic when users evaluate their systems. These may cause variations in findings about the relationships among different constructs within studies. Klenke (1992 p. 341) says "The growth of satisfaction related concepts such as MIS appreciation, user satisfaction, user information satisfaction, and end user computing satisfaction has not been accompanied by a careful segmentation of the theoretical domains to which these constructs belong nor by a clarification of the relationship among these concepts". Miller (1989 p. 277) comments after reviewing research on the measurement of user satisfaction that " ....it appears that there is as yet no single accepted measure of UIS [User Information Satisfaction] and indeed it remains a question whether available instruments tap underlying user attitude or other psychological processes". Hufnagel (1990 p. 444) argues that user performance outcomes may lead to his feeling of satisfaction or dissatisfaction with the system. User may blame systems when things go poorly and discount system contribution when things go well, so "user satisfaction may be a less than adequate surrogate for system effectiveness when the actual contribution of the system is ambiguous or difficult to quantify from the user's perspective".

It has been argued that satisfaction might be correlated with systems usage because of the potential benefits and user satisfaction to be derived from system usage (Davis and Srinivasan, 1988). The past research findings about the relationship between user satisfaction and system usage is also mixed and inconclusive (for example see Schewe, 1976; Srinivasan, 1987; Mawhinney, 1990; Lawrence and low, 1993). Such inconsistent results need further investigation (Kim, et al., 1998). The reasons for mixed findings are attributed to inconsistent theoretical definitions, measurement issues and poor

operationalization constructs (Goodhue, 1986; Treacy, 1985; Trice and Treacy, 1986; Kim, 1989; Kim et al., 1998).

Although user participation has been widely recognized that it can improve system design process and to be useful in achieving user acceptance to systems, user satisfaction and systems success, but previous research hardly provided clear evidences. Saarinen and Sääksjärvi (1990) criticized the research framework, and the measurement of the key concepts of user participation and success for shortcomings and the cause for contradictory research findings. Various studies in past have been conducted to explain the construct of user participation/involvement and for its measurement (Kappelman and McLean, 1991; Barki and Hartwick, 1994; Ishman, 1998; see Klenke, 1992), its effects towards user satisfaction and systems success (see Zmud, 1977; Ives and Olson, 1984; Cayvaye, 1995; Hwang and Thorn, 1999). Participation of users may be interpreted differently among people and be evidenced in different ways. For example, as representation of users in meeting, interviewing selected user, getting users sign off system specifications, participation in systems testing, and in prototyping etc.. Users are essential part of organizations and their participation in IS development might be influenced by organizational issues (see Axtell et al., 1995).

Various questions may arise such as who participated, at what stage in system development they participated, how much time they spent with developers, what type of users (i.e. such as novice or experienced), whether distant users participated sufficiently or not, how much influence users have, users' technical background and knowledge, their interests and motivation towards system implementation, their relations and interaction with system developers, and management, whether feedback from user was constructive or not, and many others. Most of the previous studies used surveys to explore user participation effects. Might be studies were conducted after implementation of the system and users response about their participation may vary with success of failure of the system. Barki and Harwick (1989) mentioned that when a system is perceived to be high quality, the involved users might form very positive attitude concerning

the system whereas for low quality systems involved users might have negative attitude. During surveys different participants may be part of different types of systems installed there. The need for participation may vary from system to system. Some argue that different systems may face user resistance due to different reasons (Jiang et al., 2000). Therefore, a plenty of aspects need to be considered on studying the effects of user participation in system development. Ewusi-Mensah (1998) argues that although user involvement is widely recommended as crucial during systems development but it is not a sufficient criterion for system completion/implementation success. Roth (1994) noted that although user participation was not significant during systems development but users were satisfied with the system. Such aspects have been widely discussed earlier in this chapter and show controversies among researchers. It might be speculated that research findings about whether user participation is useful or not towards achieving user satisfaction and eventually systems success may vary under such circumstances. The full potential benefits of user participation have hardly been explored. Klenke (1992) stated that a need for systematic approaches to develop more encompassing and valid theories of user involvement and user satisfaction, and also the relationships between and among system related variables seems apparent to provide accurate and specific theories useful to the practitioners.

Although previous traditional reviews (see Zmud, 1979; Ives and Olson, 1984; Cavaye, 1995) regarding effect of user participation on systems success provide a summary about how many studies favour/not favour the axiom that user participation leads to user satisfaction and consequently systems success, but unable to provide the strength of the relationship between user participation and systems success. A research synthesis (i.e. meta-analysis) of previous studies encompassing various systems developed in various environments with user participation at different stages of IS development might be useful in evaluating user participation relationship with user satisfaction and systems success.

## 2.11. Summary

The chapter concerns itself with an exploration of the causes of disappointments from Information Systems and how user related aspects may influence the system development process. In spite of a growing trend to invest more and more on IT applications, the success rate of Information Systems is not encouraging. Mostly IS may face failure in one or another way. Among multiple reasons, most were attributed to human/social, and organizational problems. These may exist at any stage in the systems development life cycle or after implementation. One of the causes relating to stakeholders is their dissatisfaction with system performance. Various factors might be the cause of users' dissatisfaction with systems. For example, the expectation gap that appears as the discrepancy between what users want and what they get eventually. User participation during systems development is supposed to be one of the steps towards achieving successful systems, but past research findings regarding user participation effects on user satisfaction and system success are mixed and inconclusive. The reasons for mixed findings may be attributed to organizational, political, and user related factors, the degree of user participation, and use of different instruments for the evaluation.

IS research has been argued to be fragmented, and lacking theoretical grounding. According to Thong and Yap (1996 p. 601) "IS research has often been criticized for lack of theoretical grounding resulting in the inconsistent use of IS theoretical constructs, noncomparability across studies and an inability to build on a common theoretical base". The IS literature is also filled with controversial findings regarding relationships between user participation and user satisfaction, user participation and systems usage, system usage and user satisfaction. The effects of user expectations and of user effective communication also vary among studies. Such aspects relating to users and IS development would benefit from further research to conclude how such factors influence user satisfaction, whereas past research fails to explore the effect of such factors on user satisfaction.

User related aspects such as unrealistic user expectations that emerge due to various factors (Bokhari and Paul, 2001) need to be restricted in order to achieve user satisfaction and systems success. Previous research shows that user expectation has been considered as a surrogate measure of user satisfaction and system success (Ginzberg, 1981; Marcolin, 1994; Szajna and Scamell, 1993). The disconfirmation of user expectations after implementation of a system has been evidenced in the IS literature to be used to evaluate the system in terms of its success but less efforts have been made for exploring, mitigating and controlling the reasons causing unrealistic expectations during the development process. It may be speculated that restricting/confining/managing user expectations to a realistic level during the design/development phase may lead users to be satisfied with the system. Senn (1978) says that system requirement, user expectations, and system usage may change over time, "hence what might be considered a total system today most likely will be only a partial system tomorrow".

The role of effective communication among the stakeholders, specifically between users and developers has its own importance. Without interaction and effective communication the requirement elicitation process might be less successful and consequently have its adverse effects on systems performance and consequently user satisfaction.

This chapter discussed different aspects related to user and their concern with IS development and user satisfaction. It may lead the author to define a research framework/model and to develop research questions keeping in view research objectives mentioned in chapter-1. A proposed research framework and related research questions are mentioned in next chapter.

## 3. Development of Research Questions

### 3.1. Introduction

Current chapter discusses the proposed research framework/model that explains determinants/dimensions of user satisfaction. It also shows user related factors that may affect user satisfaction. This model may lead to develop research questions. Chapter-2 covered a detailed review of IS literature related to research intentions mentioned in chapter-1. It is evident from the literature review that user satisfaction and system usage are mostly agreed and used as surrogate measures of system success. It was also found in literature review that past research findings about the relationship between user participation and user satisfaction are mixed and inconclusive. There is no compromise among IS researchers whether user participation in IS development is essential or not to achieve user satisfaction/systems success. The proposed model shows user participation/involvement, user expectations and user-developer effective communication as independent variables that may affect user satisfaction.

It is natural that a person attempts to explain the events under his observations. Such explanations may depend upon common sense or some sort of scientific reasoning. For detailed explanation of events, theories and models may be devised that may further elaborate causal relationships among actions and/or events (Black, 1999). To achieve better understanding of a situation one may construct a model about how events might occur and which factors are supposed to be influential towards the occurrence or change of such situation. Black (1999 p. 6) considered a model as “ ....an explanation of events employing abstract and intangible concepts”. Kaplan (1964 p. 258) defined the term *model* as "something eminently worthy of imitation, an exemplar or ideal". He further added that models are said to provide "meaningful contexts within which specific findings can be located as significant details" (p. 268). Mandell (1987) considered a model in terms of a mathematical representation of an actual system that shows influence of independent variables on the value of dependent variables.

A “framework” may be considered as a conceptual model that helps to understand, organize thoughts, discuss and communicate about Information Systems (Lucas, 1982). The role of frameworks in the development of a body of research literature on IS is well explained (see Cushing, 1990). Different research endeavours on the same subject may add to the body of knowledge depending upon their findings. An independent researcher may repeat the same research in order to validate the previous findings and his point of view may vary or not, based on his judgement. Although the theories may rely on key assumptions made by researchers but it is not unusual that theories may be altered or discarded as knowledge grows due to further continuous research efforts. It is common that one usually puts a question about 'what is the evidence that supports your assumption?', and demands solid findings before he accepts some knowledge. Might be, it is not possible without 'research'.

To proceed with research one should need to understand deeply the existing problems in a particular domain and then define clearly the attributes that might be explored. The conceptual model may serve as a basis to proceed with the research. The demand for Information Systems is fuelled by the belief that these may increase the performance of organizations. Despite the advanced technology and growing trend to adopt Information Systems, the success of systems usually remains a significant issue. A number of systems are not able to meet their objectives, under utilized, cost overruns or fail to be used at all leaving users disappointed and dissatisfied. Lucas (1982) argue that IS failures not only costly to organizations but also may lead to conflict within individuals and adversely effect organization's human resources. Research on IS failure/success seeks to find out the major causes for failure and to understand how a system may be successful.

A plethora of factors that falls in different domains such as organizational, behavioral, political, technical, technological may affect the success of the systems. Various factors that may influence IS success in different contexts have been mentioned in IS literature (for example Cerullo, 1980; Lees, 1987; Rademacher, 1989; DeLone and McLean, 1992; Odedra-Straub, 1993; Pit et al.,

1995; McGolpin and Ward, 1997; Li, 1997; Bonner, 1995). With the increasing trends to invest on IS development, the evaluation of systems in terms of its effectiveness is an important issue. A system's success can only be conceptualized after its evaluation. To evaluate means to determine what something is worth to somebody. Evaluation is a common phenomenon that might help someone to understand and assess a particular object in terms of its advantages or drawbacks and how much it is productive to achieve its purpose. According to Seward (1975), evaluation may provide a direction for allocating efforts for redesigning the weaker elements of an Information System, in monitoring its ability to meet the changing needs of organization, and judging its effectiveness. He stated that evaluation of an Information System may be accomplished by assessing the "satisfaction" of a user with the system (p. 134). Different measures to evaluate the systems have been suggested and used in IS research (Kumar, 1990).

Measurement/evaluation is a complex endeavour but the only way to understand how things have been improved, one needs to measure their performance in terms of certain specified criteria. Poor measures are worse as they provide incorrect data for evaluation and prediction (Benbasat and Zmud, 1999). To measure or evaluate some thing, it needs to be defined clearly and require decision about 'what' to measure and 'why'? Both social and technical needs are important and need to be considered in order to evaluate the system in terms of its success (Hirschheim and Smithson, 1987). The success of a system is multidimensional construct that can be measured at multiple levels. Garrity and Sanders (1998 p. 2) say that IS success can be measured at organizational (i.e. how a systems contributes towards organizational performance and profitability), process (i.e. in terms of efficient use of resources and reduction of process cycle time), and individual (i.e. user's perception of systems use and user satisfaction) levels. Kumar (1990 p. 207) noted that the most frequently used system evaluation criteria seem to be information quality, user satisfaction and user attitudes towards the system, internal controls, and project schedule compliance. Different measures such as system usage, user satisfaction, users' favourable attitudes towards the system, degree to which the system accomplishes its objectives and



pay off to organizations are commonly adopted as measures of IS success (Lucas et al., 1990; Kumar, 1990).

### 3.2. IS Success Determinants

DeLone and McLean (1992) developed an IS success model after a comprehensive literature review. They say that, it is unlikely that a single measure may be sufficient for IS success, but multiple measures (p. 83). Their study not only pointed out six dimensions of IS success but their interdependencies also. The DeLone and McLean's model of IS success is showed in Fig-3.1. This model describes the interaction and interdependencies among the proposed success factors.

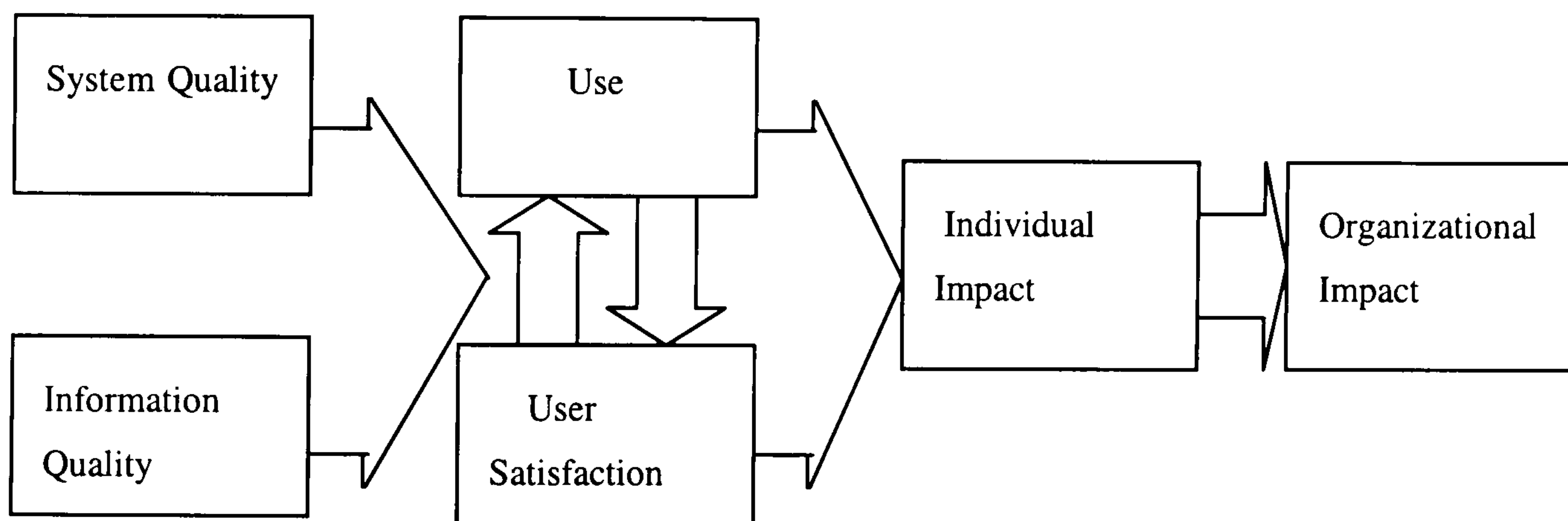


Fig. 3.1. IS Success Model (Source: DeLone & McLean, 1992 p.87)

IS success construct involves a variety of dimensions. However it is apparent from the model that specified dimensions seem to encompass system related factors that affects user satisfaction. Different studies (Seddon and Skiew, 1996; Bonner, 1995; Seddon and Yip, 1992; Hwang and Thorn, 1999) validate this model in terms of how its dimensions are interrelated and how it interprets system success. Past research mostly considered system usage (i.e. for what purpose systems are used) and user satisfaction (encompasses system quality, user acceptance etc.) as surrogate measures of system success. Ives and Olson (1984) adopted two outcome variables such as system quality and system acceptance where system acceptance includes information satisfaction, system

usage and system impact on users behaviour in terms of systems success. They report that among the factors those are more frequently used as measures of system success, the “system usage” and “user satisfaction” received more attention of researchers. Their findings support the early research results regarding success factors such as quality of decision or performance, user satisfaction and system usage (Power and Dickson, 1973; Lucas, 1975, 1975a; Ein-Dor and Segev, 1978). Zmud (1979 p. 969) considered system usage, user satisfaction and user performance as predictors of system’s success. Ives et al. (1983) quoted profitability, quality of decisions or performance, user satisfaction and system usage as IS success criteria. Raymond (1987) quoted user satisfaction, system usage, user decision performance and organizational performance as surrogate measures of IS success. Gelderman (1998) say that user satisfaction is the most appropriate measure for IS success. DeLone and McLean (1992 p. 69) also mentioned user satisfaction or user information satisfaction as the most widely used single measure of IS success. Seddon and Kiew’s study (1994 p. 100) further confirmed this argument as they found user satisfaction as the most perceptual measure of IS success. They suggested modifications in DeLone and McLean’s model by replacing “use” with “usefulness” arguing that in case system usage is mandatory the use might be good proxy for usefulness. Their considerations are based on what DeLone and McLean (1992) say that system usage, either perceived or actual, be only be pertinent when usage is voluntary (p. 68). Other researchers also suggested more factors such as service quality (Pitt et al., 1995), information awareness (Bonner, 1995), and group impact (Ishman, 1998) that might be considered as enhancement to DeLone and McLean’s model.

The concept of user satisfaction remained subject of research interest since 1970’s (Gallagher, 1974; Swanson, 1974). User satisfaction is mostly used as a measure of system success because it is potentially measurable and almost generally acceptable (Ives et al. 1983; Iivari, 1995). Bailey and Pearson (1983) described 39 factors to measure user satisfaction. This instrument mostly includes all aspects mentioned in DeLone and McLean’s model except organizational impact. DeLone and Mclean (1992) believe that information quality, systems quality singularly and jointly affect systems use and user satisfaction. The use of

a system can affect user satisfaction positively or negatively and the reverse relationship may also be true. Further, user satisfaction and use are direct antecedent of individual impact and lastly organizational impact. The past research shows user satisfaction as the most considered dependent variable to evaluate the system in terms of its success.

No matter how complete a model or theory is, the probability always exists that it can be extended or improved (Black, 1999). DeLone and Mclean (1992 p.88) suggested further development and validation of the success model before it could serve as a basis for the selection of appropriate IS measure. It leads to conclusion that IS success model can be improved. Different researchers proposed other factors that might influence IS success and are suggested as modifications/extensions to this model (for example, Pit et al., 1995; Seddon and Kiew, 1994; Myers et al., 1998). Iivari (1995) also suggested extension to the original model of DeLone and Mclean (1992) and included external variables that might affect dimensions of IS success. He says “The purpose of this extension is to remind us the definition of UIS [User Information Satisfaction], if it is not interpreted to be a purely user-defined concept, should take into consideration the potential role of UIS in a larger web of its antecedents and consequents” (p.355). Iivari’s model, an extension of DeLone and McLeans’ model is shown in Fig-3.2.

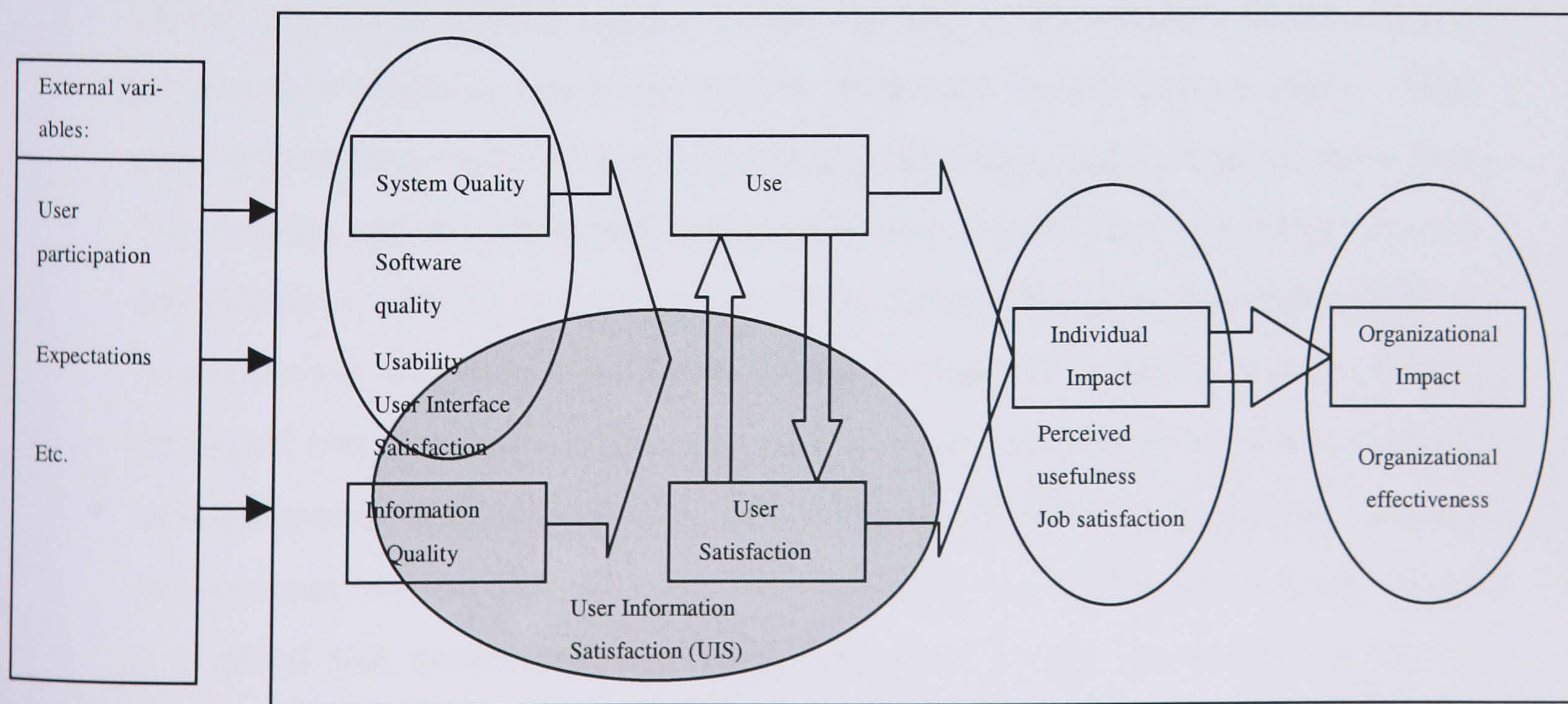


Fig-3.2. A framework for UIS as a measure of IS quality. (Source: Iivari, 1995)

This model suggested to study the effect of external variables that are proposed as an extension to the existing DeLone and McLeans's model. The effect of such external variables requires to be explored. Garrity and Sanders (1998) stated that the IS success/failure is very related to the way the users perceive their system. Variables such as user participation/involvement, user expectations and user-developer communication have been considered as independent variables in this research and a research framework is proposed to explore their effects on user satisfaction. How user participation, effective communication, and user expectations may affect user satisfaction has already been discussed in the light of past research (see chapter 2).

### **3.3. Independent Variables**

The dimensions of IS success mentioned by DeLone and McLean (1992) might be affected by independent variables that relate to technical, organizational and individual aspects. The technical quality of the system may not be a guarantee that a system will always be successful, but socio-technical aspects are also important. Ignoring any of the aspects either technical or social may cause trouble towards achieving a successful system. It has already been mentioned that organizational and behavioral issues are found to be more problematic and cause IS failures. Lucas (1982) argues that introducing an Information System in any organization requires major changes in behaviour on the part of users. User participation/involvement in system development was suggested about more than two decades ago as a prescription to acquire user appreciation and greater system use (Swanson, 1974), and to cope with the behavioral issues/problems (Bjørn-Anderson and Hedberg, 1977; Bostrom and Heinen, 1977, McCosh et al., 1981). Mumford and Henshall (1979) suggested participative design approach to cope with the change that may occur on introducing a new Information System, to gain and increase user satisfaction, and also to increase the efficiency of work. There is a belief that participation of those who have to use the system at last is necessary to develop successful systems. System's success is very related to the users' satisfaction with the system. Broadly, the following factors in past research

have been commonly considered by researchers to explore and evaluate their effects on user satisfaction.

1. User participation/involvement
2. User expectations
3. User characteristics (Age, Experience etc.)
4. Systems characteristics
5. Organizational/Management characteristics
6. Training
7. Documentation
8. EDP support
9. Vendor support
10. Equity

In the 1970's Jenkins and Ricketts (1979) proposed input procedures, report format/contents and computer systems stability as dimensions of user satisfaction with MIS. Jenkins and Ricketts (1985) focused more on system quality while evaluating user satisfaction with decision support system. Ives et al. (1983) considered user satisfaction in terms of EDP staff and services, user knowledge and involvement and quality of information product. IS research included measures of user attitudes towards IS function and process, how services are provided by the IS department to users, and system quality in terms of user satisfaction (Joshi, 1992). Bailey and Pearson (1983 p. 536) stated that factors such as time required for a new development, processing of change request, flexibility, integration of system, degree of training and top management involvement may affect user satisfaction. Remenyi and Money (1993) discussed what users expect from IS department and what they get, appears as expectations gap that may also affect user satisfaction. User satisfaction might be gained if users get what they want. Users may also show their dissatisfaction with systems that are unable to meet their job requirements/needs. As mentioned earlier that user satisfaction is a multidimensional construct, so it might be affected by a number of factors/variables. Different factors/variables with their nature and source (i.e. research study) that may affect user satisfaction directly/indirectly are categorised in Table-3.1 on next page.

Table-3.1<sup>2</sup>: List of factors/variables that may affect users' satisfaction

<b>Factors/Variables</b>	<b>Authors</b>	<b>Factors/Variables</b>	<b>Authors</b>	
<b>User Characteristics</b>		<b>Systems Characteristics</b>		
<i>Age</i>	Igarria (1990), Igarria and Iivari (1995b), Ang and Soh (1997), Igarria and Nachman (1990) , Gatian (1994), Amoroso and Cheney (1991), Udo and Davis (1992), Yaverbaum and Nosek (1992), Ramamurthy et al. (1992), Lane et al. (1994)	<i>Systems Quality</i>	DeLone and McLean (1992), Lucas, 1978a), Doll and Torkzadeh (1988), Udo and Guimaraes, (1994)	
<i>Qualifications/ Education</i>		<i>Information Quality</i>		
<i>Training</i>		<i>System Effectiveness</i>		Conrath and Sharma (1993)
<i>Experience</i>		<i>Ease of Use</i>		
<i>Skills</i>		Saarinen (1996), Lawrence and Low (1993)		Udo and Davis (1992), Davis (1989); Hoplin and Suresh (1989); Ramamurthy et al. (1992)
<i>Individual Impact</i>		Igarria and Tan (1997), DeLone and McLean (1992),		
<i>Self efficacy</i>		Joshi (1992), Igarria and Iivari (1995), Deborah et al. (1999)		
<i>Participation /Involvement</i>	Hartwick and Barki (1994), McKeen et al. (1994), Lees (1987), Ives and Olson (1984), Cavaye (1995), Baronas and Louis (1988), Hawk (1993)	<i>System Perceived Usefulness</i>	Yoon and Guimaraes (1995), Loh and Ong (1998), Igarria et al. (1995, 1995a)	
<i>Expectations</i>	Ginzberg (1981), Rushinek and Rushinek (1986, 1986b), Ryker et al. (1997), Szajna and	<i>System worth</i>	Loh and Ong (1998), King and Rodriguez (1981); Pettingell, et al. (1988)	

<sup>2</sup> List of factors/variables and references are not exhaustive.

<i>User/Developer Communication Skills</i>	Scamell (1993)  Edstrom, (1977), McKeen, et al. (1993, 1994), Kim et al. (1998), Srivihok (1999)	System usage	Igarria(1990), Kivijarvi and Zmud (1993), Barki and Huff (1985), Choe (1998), Baroudi et al. (1986)
<i>Influence</i>	McKeen, et al. (1993), Edstrom (1977), Robey and Farrow (1982), Roth, (1994)	<b>Organizational Characteristics</b>	Thong et al. (1993), Amoroso and Cheney (1991), Grover and Teng (1994), Garrity (1994), Guimaraes et al. (1992, 1996)
<i>Attitudes</i>	Robey (1979), Maish (1979), Lucas (1973), Melone (1990), Igarria and Nachman (1990), Ein-Dor and Segev (1986), Hartwick and Barki (1989)	<i>Organizational/ Management Support</i>	Sanders and Courtney (1985), Bajwa and Rai (1994)
<i>Users' Level</i>	Hawk and Dos Santos (1991), Allingham and O'Connor (1992)	<i>Management Involvement</i>	Franz and Robey (1986), Montazemi (1988), DeLone (1988), Jarvenpaa and Ives (1991)
<b>Task Characteristics</b>	Udo and Guimaraes (1994), Igarria (1990), Igarria and Iivari (1995b)	<b>Others</b>	Bailey and Pearson (1983), Thong et al. (1993), Bajawa et al. (1998), Bajwa and Rai (1994)
<i>Task Variety</i>		<i>Vendor support</i>	
<i>Task Difficulty</i>			
<i>Task Uncertainty</i>			
<i>Task complexity</i>	Harris (1999), McKeen et al. (1993), Blili et al. (1998)	Service Quality	Watson et al. (1993), Martinsons and Chong (1999)
<b>Problem Domain</b>		<i>Consultants or Specialist' Role</i>	Harris (1999), Igarria (1990), Bajwa and Rai (1994)
<i>Complexity, Difficulty, Importance, Criticality, Diversity</i>	Kivijarvi and Zmud (1992), Guimaraes et al. (1996), Khalil and Elkordy (1996)	<i>Computer anxiety</i>	Deborah et al. (1999)

Although a plethora of factors may influence user satisfaction and are related to organizational, management, political, technological issues, but this study considers only those that are related to users, particularly user participation/involvement, user expectations and user-developer effective communication. How these factors may affect IS development, and consequently user satisfaction and systems success have been described in chapter-2.

The past empirical research has been filled with variations in research findings about the affect of different independent variables on IS success, for example, user participation/involvement. User participation/involvement has received consistent attention of researchers but have not been in full agreement about how and to what extent user participation contributes towards user satisfaction leading to systems success. This study considered a subset of independent variables such as user participation/involvement, user expectations and user-developer effective communication to evaluate their relationship with user satisfaction. Such factors are very concerned with users and how they affect user satisfaction is the main objective of this research. Keeping in view the multi-dimensional construct of user satisfaction, a number of factors that contribute towards users' satisfaction with the system are included in a proposed research framework.

### **3.4. Dependent Variables**

An Information System may be viewed in many ways in terms of its success. The perception of the system is very dependent on how the IS has its impact towards fulfilling users requirements from the system, the quality of decision making and in achieving organizational goals. Researchers focused on different facets as mentioned in DeLone and McLean's model. DeLone and McLean (1992) pointed out that without a well-defined dependent variable of measure, the researcher may hardly be confident with his findings and the research seems to be speculative. Garrity and Sanders (1992 p. 14) asserted that "definition and conceptual refinement of a dependent variable for IS and the ensuring refinement, and validation of a dependent measure(s) is central to the development of the IS field". User satisfaction as a dependent variable in DeLone and McLean's model



is critical as the widely used measure of system success. It does not mean that other dimensions are of less importance and might be ignored. User satisfaction has been taken as dependent variable to proceed with this research. The proposed determinants of user satisfaction are discussed here for further deep understanding.

### **3.4.1. Determinants/Antecedents of User Satisfaction**

#### ***(a) Information Quality***

Information can be used to find the problems and also to solve the problems. The quality of information has its prime concern to information value. There is a general notion that good information may lead to good decision making. Users always require necessary and updated information from the system in a situation that needs some decision on users part. The attributes such as timeliness, accuracy, relevance, reliability and format of information are required to be essential for information to be valuable. According to Cyert and March (1963), an Information System that provides needed information to its users may reinforce user satisfaction. The importance of information quality might be due to the fact that system objectives stated in terms of user requirements specify the needed information that IS likely to provide in a useful and accurate manner (Hamilton and Chervany, 1981; Saunders and Jones, 1992). How users perceive the information (useful or not) have its deep concern to the success/failure of the system (Larker and Lessig, 1980).

In the past IS researchers considered information quality in terms of information attributes and reliability, and timeliness of reports (see Gallagher, 1974, Bailey and Pearson, 1983; Larcker and Lessig, 1980, O'Reilly, 1982, Doll and Torkzadeh, 1988). About decades ago Barrett et al. (1968) found that user satisfaction with the system is positively related to the degree to which user information needs are perceived. It highlights the importance and relevance of information in achieving user satisfaction with the system. Bergeron and Raymond (1992) mentioned that users were more satisfied with information quality as compared to benefits of an Executive Information System under study.

Saunders and Jones (1992) found information quality as the third most popular dimension for measuring performance of IS function. It has been suggested in literature that information quality may lead to perceived usefulness (Franz and Robey, 1986; Kraemer et al., 1993), and positively correlated with user satisfaction (Christiaanse, 1994). Any IS that omits important functions required by user, or provides irrelevant information/services can not satisfy his users. The 'information quality' is an important determinant of user satisfaction (Doll and Torkzadeh, 1988, 1989; Bailey and Pearson, 1983; Ives et al., 1983; Jenkins and Ricketts, 1985; Baroudi and Orlikowski, 1988; Joshi, 1990; Seddon and Yip, 1994). Swanson (1974) took system appreciation in terms of reports to be timely, informative, easy to understand, relevant and adequate. Such attributes represent the quality of information that measures system appreciation by their users. System appreciation may be considered as user satisfaction with the system. Larcker and Lessig (1980) took perceived useableness and importance as attributes of information quality. The common attributes of information quality such as accuracy, currency, relevance, timeliness, specificity, precision, reliability, format, accessibility and sufficiency are considered in IS literature (Bailey and Pearson, 1983; Ives et al., 1983; Srinivasan, 1985; Raymond, 1987; O'Reilly, 1982; Epstein and King, 1982; Doll and Torkzadeh, 1988, 1989). Joshi (1990) found a strong positive correlation of information quality with user information satisfaction. Similarly, McGill et al. (2000) found a positive impact of information quality on user satisfaction.

### ***(b) System Quality***

System quality concerns with whether the system is bugs free, easy to use, easy to learn, flexible, reliable, contains better user interface, better response rate, good documentation and consequently how the system supports the users to accomplish their work. Up to what extent the system facilitates the user to accomplish his tasks easily and conveniently concerns to its quality. The system's effect on user performance not only contributes to organizational effectiveness but also to user satisfaction. There are multiple factors that contribute towards system quality. The factors that are mentioned in previous research such as

system functionality, equipment performance, interaction and quality of user interface are determinants of system quality (Igarria et al., 1995 p.97). DeLone and McLean (1992) mentioned twelve studies that measured system quality. Their measures attempted to explore the above mentioned attributes of the system in terms of its quality. Miller and Doyle (1987) suggested system quality as an important factor towards achieving system success. Lucas (1978a) found a positive relationship between quality of the system, its use and success whereas a poor quality system discourage users and may lead to unfavourable attitudes. He suggested to consider quality of the system on user oriented criteria and not on the technical elegance alone. User satisfaction with the system quality has also been identified as a relevant factor in achieving system success (Igarria et al., 1989). User satisfaction measuring instruments include system quality as its essential dimension (for example Bailey and Pearson, 1983; Ives et al., 1983; Srinivasan, 1985; Raymond, 1987; Miller and Doyle, 1987; Doll and Torkzadeh, 1988, 1989). The results of path analysis in Igarria et al.'s (1995) study showed that system quality has strong effect on perceived ease of use and perceived usefulness. McGill et al. (2000) mentioned that perceived system quality has a positive influence on user satisfaction and both are positively correlated. The better the system fulfil user information needs and of better quality in terms of its functionality, the more it may contribute towards user satisfaction. Information quality and system quality found to be positively correlated with user satisfaction (Udo and Guimaraes, 1994). Similarly, Seddon and Yip (1992) results supported the links from information quality to user satisfaction as mentioned in DeLone and McLean 's model.

### *(c) Systems Usage*

The argument to consider system usage as one of the factors that may contribute towards user satisfaction might be that if users almost use the system although its use is not mandatory, then it might be speculated that system is useful. Some argue that without considering "system usage" how one can observe that the system is successful and beneficial towards an organization (Lucas, 1978a; 1982; Fuerst and Cheney, 1982). Jenkins and Ricketts (1985 p. 1) say "MIS has no

effect on decision making unless it is used ...". Davis and Srinivasan (1988) argue that the degree of system usage is highly correlated with the extent to which the system has been found useful. It can be easily monitored and provides an objective measure of utility of a system. Trice and Treacy (1988) noted system usage as a necessary condition through which IT might affect performance. They considered three aspects to system usage such as users are dependent upon the system, users feel ownership for the system and use of system is routinized. Dutton and Kraemer (1978) found management use of a system positively correlated with decision making, operational performance, and administrative control respectively. It has also been argued that the choice of system use as a measure rests on the notion that the more the system is being used, the more it is successful (Ein-Dor and Segev, 1978; Hirschheim and Smithson, 1988). The more the system accomplishes user needs and provides services, the more users are likely to use it. The quality of a system might be one of the factors that users perceive to be encouraging to use the system. Barrett, et al. (1968) noted in their study that if users are not well versed in the use of a system then their dissatisfaction with the system might be due to this fact. Igarria et al. (1995) say that the system quality has its strong effect on usage of the system. Lucas (1982) argue that high quality systems may lead to favourable user perceptions and attitude as it is easy for users to interact with the system. According to Lucas (1978a), system use is a good indicator of IS success when use is voluntary. Choosing system usage as a measure of success supposed to be reasonable when use is voluntary, otherwise its validity as dependent variable is questionable (Szajna, 1993). However, it has also been argued that system usage is not always voluntary whereas mandatory use of any system can hardly explain user satisfaction, usage status and system effectiveness. Secondly, Information Systems literature shows that different researchers used different criteria to measure system usage such as frequency of use, perceived usage level, daily hours of use, no of application used, no of tasks supported etc. (Igarria et al., 1989; Lee, 1986; Lucas, 1975; Davis et al., 1989; Igarria, 1993; Igarria and Guimaraes, 1994; Adams et al. 1992; Thompson et al., 1991). Szajna (1993)

warned that one should be cautious in choosing a relevant measure of IS usage in order to measure system success, effectiveness or acceptance.

Many studies tried to correlate system usage to user satisfaction. IS researchers have different opinions regarding relationship between system usage and user satisfaction. Further, different claims appear in past research such as user satisfaction leads to system usage, relation is reciprocal and relation is not significant. Some argue that an Information System can not be utilized effectively unless users feel satisfied. For example, Baroudi et al. (1986 p.236-237) noted that user satisfaction leads to system usage. On the other hand Al-Gahtani and King (1999 p. 290) mentioned that their study did not support user satisfaction as a determinant of system usage. Torkzadeh and Dwyer (1994) argued that this issue is still unresolved among IS researchers and require more investigation about the causal direction between these two constructs. The relationship between system usage and user satisfaction is inconclusive, and no compromise among researchers about the causality direction between system usage and user satisfaction has been found in past research. Such aspects have also been discussed in chapter-2.

Further research is needed to explain and reach some conclusion about the relationship between system usage and user satisfaction, as there exist controversies within the past research about the nature of this relationship.

#### *(d) Perceived usefulness*

Perceived usefulness concerns how the users perceive that a system contributes towards their job performance. Davis (1989 p. 320) defined perceived usefulness as “the degree to which a person believes that using a particular system would enhance his or her job performance”. He found perceived usefulness significantly positively correlated to current system usage and also predicted future use. Igarria et al. (1997) also found a positive correlation between system usage and perceived usefulness. They also mentioned that total effect of perceived ease of use is greater than perceived usefulness on system usage. Perceived usefulness is found to be determinant of user intention and system usage (Davis, 1989, 1993;

Igbaria et al. 1995, 1994; Venkatesh and Davis, 2000). Seddon and Kiew (1996) showed a positive correlation between usefulness and user satisfaction. Wilkins (1996) considered two factors such as ease of use and productiveness to measure perceived usefulness. Usefulness means the degree to which user believes that on using the system his job performance will be increased (Davis, 1989). Loh and Ong (1998) considered perceived usefulness as system usefulness in terms of its technicality and functionality. He found a positive correlation between perceived usefulness and user satisfaction. The perceived usefulness when considered as an attribute of information, it means the extent to which information facilitates the decision making process (Larcker and Lessig, 1980).

Robey (1979) found a positive correlation between user performance and perceived system worth where system worth was considered in term of probability that other will use the system, system success, system accuracy and system overall worth. Miller and Doyle (1987) found perceived performance as good measure of system success. It might be speculated that perceived system worth might be treated as determinant of or user satisfaction. Davis (1989; 1993) termed user performance as perceived usefulness and shows a positive relationship between perceived usefulness and system usage. Igbaria et al. (1995, 1995a; 1997) found a positive relationship between perceived usefulness and system usage, ease of use and system usage. The relationship of perceived usefulness with other organizational and user characteristics are also discussed (Igbaria, 1993).

As discussed above that perceived usefulness and the system usage are positively correlated. In case the system usage is positively correlated with user satisfaction then perceived usefulness supposed to be determinant of user satisfaction. The argument might be supported in the light of findings (Mawhinney and Lederer, 1990; Igbaria and Guimaraes, 1994; Yoon and Guimaraes, 1995; Guimaraes et al., 1992; Igbaria et al., 1997) that system's contribution/impact towards user's job or perceived usefulness is positively correlated with user satisfaction. Doll and Torkzadeh (1988) found a positive correlation between usefulness and user satisfaction. Similarly, Torkzadeh and Doll (1999) found a positive relationship

between user satisfaction and task productivity, task innovation (i.e. perceived usefulness). Mahmood et al. (2000) mentioned strong correlation between perceived usefulness and user satisfaction in their meta-analytical findings. Such findings provide evidence how perceived usefulness is important towards user satisfaction. Szajna (1996) found a positive correlation between ease of use and perceived usefulness in a study of electronic mail system. Further, IS researchers specified that the perceived usefulness and ease of use both have their effects on user attitude towards change due to IS implementation (Jiang et al., 2000).

#### *(e) Ease of Use*

This aspect deals with how a system is easy to understand and use. How users perceive the system is an important factor in achieving user satisfaction. Obviously, the system might be used by heterogeneous mix of users such as novice and experienced. It may be argued that more the system is easy to use, the users may feel more comfortable and satisfied. A system that is "easy to use", usually means that an individual should be able to interact effectively and efficiently with the system after small instructions (Nickerson, et al., 1968). In past research, how to evaluate an IS, user satisfaction was considered as major determinant and ease of use as one of dimensions of user satisfaction (see Barrett et al. 1968). They found ease of use related to user satisfaction in their study. Hoplin and Suresh (1989) found ease of use as one of the important factors towards measuring user satisfaction with the system. Ease of use not only contributes towards user satisfaction, but also consequently increases user performance. Etezadi-Amoli and Farhoomand (1996) mentioned a positive correlation between ease of use and user performance. Adams et al. (1992) found that ease of use has a direct effect on system usage through user perceived usefulness. Ives et al. (1983) stated that "A 'good' information system perceived by its users as a 'poor' system is a poor system".

Perceived ease of use is defined as the degree to which a person believes that using a system would be free of efforts (Davis, 1989; Venkatesh and Davis, 2000). It relates to individual's assessment about how much effort involved in

using a system. Igarria et al. (1995) say that the degree to which users feel to use and understand computer system and to be free of effort may be referred as ease of use. They found positive correlation between perceived ease of use and perceived usefulness and also between ease of use and system usage. Similarly, Gelderman (1998) found a significant positive relationship of ease of use, and information timeliness with system usage. Adams et al. (1992) found that ease of use directly and indirectly affect system usage through perceived usefulness. Other studies also mentioned a significant positive correlation between ease of use and system usage (see Igarria et al., 1997; Bajaj and Nidumolu, 1998). Bajaj and Nidumolu (1998) stated that past system usage experience does affect current ease of use. A positive significant correlation between ease of use and perceived usefulness has also been mentioned in IS literature (for example Davis, 1989; Igarria et al., 1997).

There exist some controversies among research findings. Young and Watson (1995) found EIS' characteristics such as ease of use is not significantly associated with system acceptance. Barrett et al. (1968) found high correlation between ease of use and system importance whereas correlation between ease of use and user satisfaction, and also between system importance and user satisfaction was found negative. Ramamurthy et al. (1992) also found a negative correlation between user's ease with computer and user satisfaction. They also mentioned that high system usage was not associated with ease of use. Bajaj and Nidumolu (1998) found a negative correlation between ease of use and perceived usefulness. Adams et al. (1992) found positive correlation between ease of use and usefulness and ease of use and system usage respectively. They also mentioned that it is not possible to assert a simple unidirectional relationship from ease of use to usage. The variation in findings between studies regarding relationship between ease of use and system usage may be speculated as cause of other factors that might affect this relationship. Igarria et al. (1995) noted that system quality strongly affect user perception of system's ease of use. Meta-analysis about the relationship between perceived ease of use and user satisfaction explains that they are moderately correlated (Mahmood et al., 2000).



The effect of perceived ease of use on perceived usefulness and intention of use is well explained (Davis et al., 1989; Adam, 1992; Venkatesh and Davis, 2000). Although there exists controversies among researchers about the effect of ease of use and users satisfaction but ease of use has been considered as an independent factor to evaluate usefulness, systems usage, user satisfaction and the acceptance of the technology.

*(f) Systems acceptance*

IS research discloses that a number of systems are not successful because human factors are not given too much attention. One of the problems towards successful Information System is whether users accept the system or not. Lack of user acceptance of an Information System is one of the impediments to the success of the systems. User acceptance of the system indicates their satisfaction with the system. Davis (1993) says that user acceptance is an important factor that determines the success or failure of an information System.

One of the objectives of the system is to improve user job performance. If the system is easy to understand and use, fulfil user needs and helpful toward his job then it might be acceptable to him. Bennett (1978 cited in Goodwin, 1987) argues that system's functionality (i.e. how the function is invoked and what functions the system contains) affects user acceptance. So the perceived usefulness and perceived ease of use have been suggested as an important criteria for user acceptance of the system (Goodwin, 1987; Davis, 1993). Forcht et al. (1994) suggested user participation during IS development as a base for user acceptance of IS. Igersheim (1976) pointed out that more satisfied a person with his job performance, the more likely he/she is to accept the system. He found a positive relationship between user involvement in IS implementation and system acceptance, and between system acceptance and job satisfaction. Lucas et al. (1990) found little evidence regarding relationship between user job characteristics and user acceptance of the system. They proposed four variables relating to system implementation success from a causal chain. The relationship among these variables is showed on next page (see Fig. 3.3.)

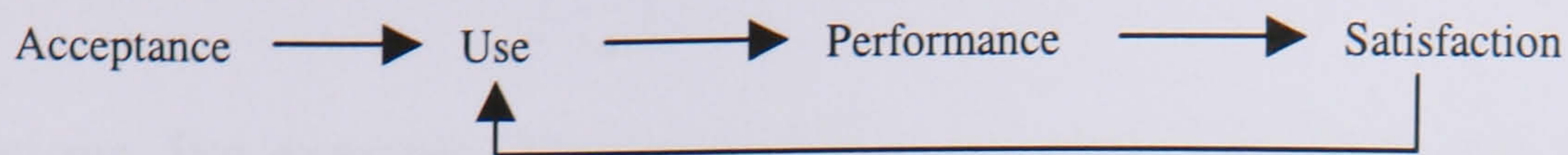


Fig. 3.3. **Measures of Implementation Success** (Source: Lucas et al., 1990 p. 26)

The above model shows that use influences acceptance, and both performance and satisfaction influence use whereas use also has a direct influence on satisfaction. Satisfaction affects performance through use only. User acceptance of the system is one of the important factors of system's successful implementation. The model mentioned its relationship with the rest of factors. Lucas et al. (1990) considered system implementation in terms of "change plus improvement" whereas both system use and system acceptance are related to change. They argue that "Acceptance is a predisposition to use a particular system" (p. 25). Their study showed some support for the relationship between system acceptance and use.

The above mentioned determinants of user satisfaction are interrelated. Although there may be other factors that can influence user satisfaction but this study is restricted to only those factors that are mentioned above.

**(g) User Information Satisfaction/User Satisfaction**

How user satisfaction is related to independent variables is the main objective to this research. User satisfaction is more preferred surrogate measure of system success when system usage is mandatory (Fowler and Walsh, 1999). IS researchers either measured user satisfaction with the system or made their efforts to prepare some instrument to measure user satisfaction. User satisfaction measures are categorized in terms of three perspectives such as: 1) user attitudes towards IS, 2) user satisfaction in terms of information quality, and 3) user satisfaction in terms of perceived IS effectiveness (see Kim, 1989 for details). Users' satisfaction is usually measured by instruments that are based on a single item measure (i.e. overall satisfaction with the system) (Kappelman and McLean, 1991; Ishman, 1998) or multiple items measure (i.e. relating to system quality, information quality, EDP services, knowledge and involvement, vendor support, user equity) (Bailey and Pearson, 1983; Ives et al., 1983; Jenkins and Ricketts, 1985; Doll and Torkzadeh, 1988, Joshi, 1990). Both instruments have their own

limitations. For example, Melone (1990 p. 85) says that measuring user attitudes [user satisfaction] based on system attributes might “offer a limited, if not only distorted picture”. On the other hand, measuring overall satisfaction is limited to summative evaluation and does not provide any idea of reasons for the potential dissatisfaction of user about the system (Iivari, 1997). Myres et al. (1998) suggested for further study for reliable measurement of user satisfaction.

### 3.5. Research Framework

A number of factors have been mentioned that contribute towards achieving user satisfaction. User satisfaction is multi-dimensional, so these factors are considered in conceptualizing a user satisfaction construct, and are included in the proposed research framework (Fig. 3.4) as dependent variables.

The major focus is to explore the effect of user participation on user satisfaction. This research also explored the effect of user expectations, and user-developer effective communication on user satisfaction. It might be speculated that this study might provide a better understanding about the effect or relationship of independent variables such as user participation/involvement, user expectations and effective communication between users and developers with user satisfaction. The proposed framework for this research is shown in Fig-3.4.

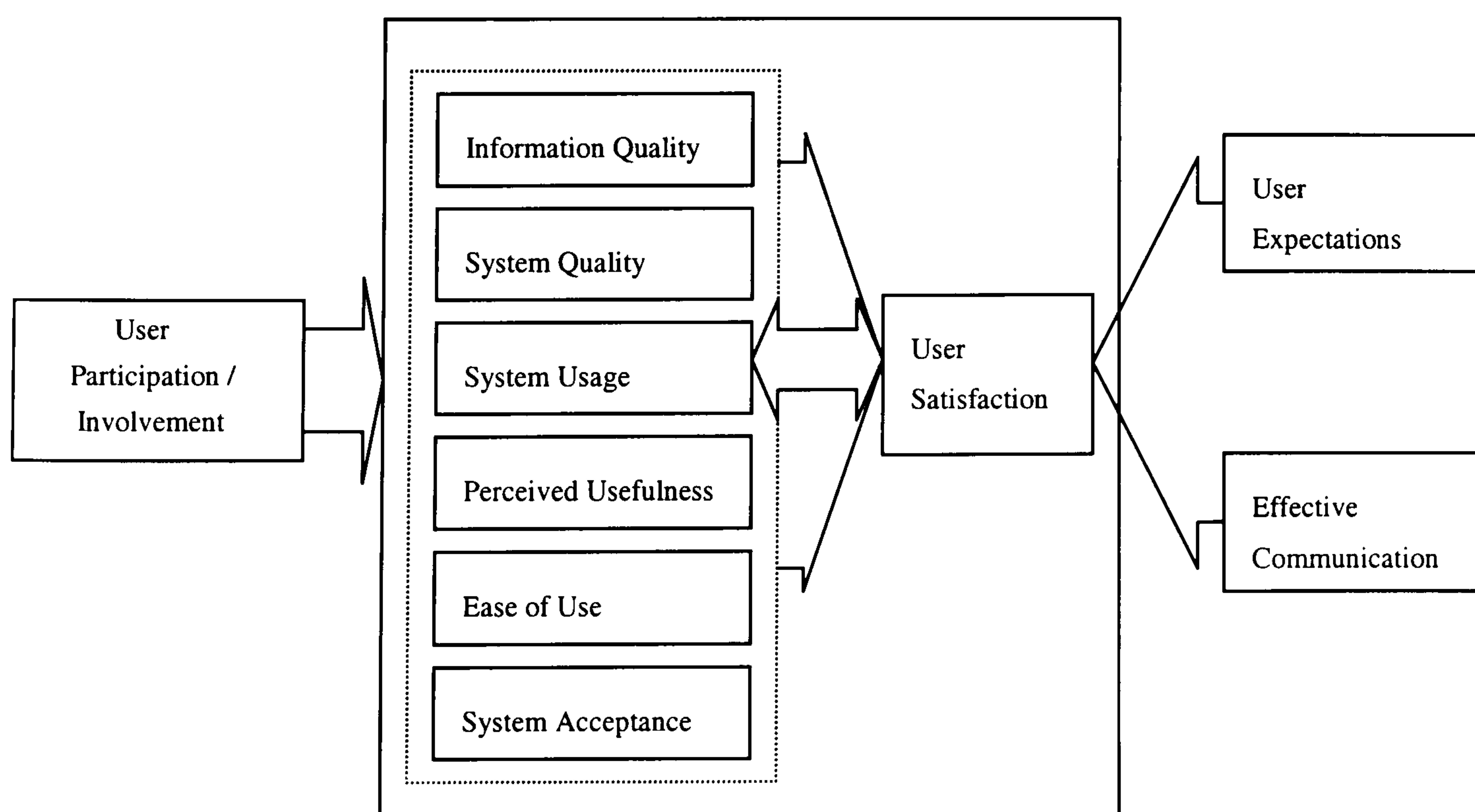


Fig-3.4. Proposed Research Framework

The proposed model investigates how user participation/involvement affects user satisfaction and its determinants, the relation between system usage and user satisfaction, and the effect of the other two factors such as user expectations and effective communication on user satisfaction. The effect of user-developer communication, and user expectations was discussed in chapter-2. The purpose of IS is to enable the functioning of an organization to be run smoothly, and to provide sufficient information for decision making to its user. The system that does not meet the expectations of users may leave them dissatisfied. User satisfaction is inextricably linked to personal expectations as well as the actual benefits that may be achieved for the IS (Naylor and Williams, 1994). The importance of user/management participation/involvement during IS development has been realized and advocated to achieve system's success (Cerullo, 1980; Rademacher, 1989; Odedra-Straub, 1993; McGolpin and Ward, 1997). To evaluate a system in terms of its success, the user satisfaction with the system is well recognized and accepted as one of the criteria (DeLone and McLean, 1992). Therefore the study of effect of user participation on user satisfaction usually remains a topic of interest in the IS research.

Past research findings about the effect of user participation/involvement on user satisfaction are mixed and inconclusive. Further, the relationship between system usage and user satisfaction is also inconclusive whereas both of these factors are supposed to be indicators of systems success. This research aims to investigate and reach some conclusions about the relationships between user participation/involvement and user satisfaction, and also about the nature of relationship between system usage and user satisfaction. The influence of other factors such as user expectations, and user-developer effective communication on user satisfaction is also differentiated. In the proposed model, the relationships are suggested as something to be subjected to a test. These can be termed as:

- Does there exist any relationship between user participation/involvement during IS development and user satisfaction?

- Does there exist any relationship between user participation/involvement during IS development and system usage?
- Does there exist any relationship between system usage and user satisfaction?
- Does there exist any relationship between user expectations and user satisfaction?
- Does there exist any relationship between user-developer effective communication and user satisfaction?
- Do user expectations have more effect towards user satisfaction as compared to user-developer effective communication?

### **3.6. Summary**

This chapter concerns itself with developing a conceptual framework that might be helpful in understanding the problems under study and to seek some alternative solutions to cope with the situation. Any discrepancies or inconsistencies that might occur in past research can only be explored after a detailed literature search. A detailed review of the IS literature particularly about how user participation can play its role in IS development and implementation was conducted. Although the claim that user participation in IS development may lead to user satisfaction and system success appears reasonable, past research findings are found to be mixed and inconclusive.

Both user satisfaction and systems success are multi-dimensional constructs and may be influenced by various factors. Such factors can be organizational, political, technical, technological, or of individual's concern. These factors have been partially discussed in the current chapter. A number of factors specifically concerning individual (i.e. users) such as user participation, user expectations and user-developer effective communication are included in the research model to study their effects on user satisfaction. User satisfaction has been considered as a dependent variable. Different determinants of user satisfaction particularly

concerned with user's perception and system attributes are also proposed. The proposed model describes certain relationships about how the independent variables (i.e. user participation/involvement, user expectations and user-developer effective communication) may affect user satisfaction. It may be speculated that the proposed model may help to explain the effect of independent variables on user satisfaction (i.e. dependent variable) and consequently to reach some conclusion about whether user participation is needed or not to achieve user satisfaction and ultimately systems success.

There is a need to adopt a suitable research approach to proceed further. The choice of a suitable research methodology is an important step in a research process. The next chapter describes various research approaches/methodologies that are common and usually adopted by IS researchers. It also explains why 'Meta-Analysis' supposed to be more suitable method for my research.

## 4. Research Methodology

### 4.1. Introduction

This chapter develops an argument for choosing an appropriate research methodology suitable for this research. In previous chapter a research model was proposed after detailed review of past research concerning the area under study. Both independent and dependent variables are suggested as part of that model and were explained with the justification for their consideration and inclusion in the research model. Keeping in view the controversies that exist in past research about the relationships between variables under study, a research method 'Meta-Analysis' is argued to be more suitable for this research. A brief history of 'meta-analysis' along with necessary steps that a researcher (i.e. meta-analyst) must have to carry out to apply this method in his research are explained. Further, the limitations of this method are also described.

Kaplan (1964 p. 18) considered methodology as "the study - the description, the explanation, and the justification - of methods, and not the methods themselves". The primary purpose of research is to acquire and add knowledge that further may be used as solutions or in finding solutions to the problems. Research is a procedure by which one may attempt to find answers to the questions or solutions of problems systematically. It contributes towards filling the gap that exists in existing knowledge. It always originates with a question in the mind of a researcher (Leedy, 1989). Howard and Sharp (1983 p.6, 20) defined research as seeking through methodical processes to add to or extends one's own and hopefully others' existing body of knowledge by discovering of non-trivial facts. Dane (1990) considered research as a critical process for asking and attempting to answer questions about the world. During the research process we may enhance our knowledge and attain a comprehensive view of the nature of the issues/problems in a particular area of study. There might be alternative solutions for the problem and the research attempts to seek a better solution. Research is a gradual and continuous process that helps the researcher to reach some solution

that is practically applicable to cope with the situation. Klein et al. (1991, p. 1) says that “how do we know what we know” and “how do we acquire knowledge” usually appears as a problem.

Broadly, the research might be related to 1) reviewing the existing knowledge, 2) describing some situation/problem, 3) construction of something novel, and 4) explanation (Howard and Sharp, 1983). The research either may be “primary research” or a “research synthesis”. The main purpose is to seek and provide better solutions to the problems under study. In the field of social sciences the data for primary research is collected from people by using questionnaires or by observing their behaviour, whereas data for a research synthesis is collected from past studies relevant to the topic of research. The choice of a problem in primary research is very much influenced by the interest of the researcher and the social conditions that surround him, but a research synthesis must study the topics that have already been appeared in literature. A research synthesis also concerns the same problems/issues as within primary research. It is not supposed to be less creative than primary research (Cooper, 1998).

The subject of Information Systems (IS) is multidisciplinary (Keen, 1980; Cornford and Smithson, 1996; Avison, 1997). It encompasses different disciplines in social sciences, business, and only occasionally in natural sciences (Galliers and Land, 1987). Fitzgerald and Avison wrote in foreword (Mingers and Stowell, 1997 pp. xvi) that “Information Systems indeed ‘an emerging discipline’ (if it is a discipline at all!)”. Others also have stated that the IS field is emerging (Culnan and Swanson, 1986; Mingers and Stowell, 1997; Jones, 1997) or even fragmented (Banville and Landry, 1989). Being a multi-disciplinary field it addresses a range of strategic, managerial and operational activities that are involved in collecting, processing, distributing and using information in organizations. Most of the issues of IS are multidisciplinary in their nature, therefore IS research may be concerned with both social and technical aspects. IS research is argued to be heterogeneous in that it focuses on managerial, technical, and/or behavioural issues concerned with development, and the use and operation of Information Systems (Cooper, 1988). It is concerned with studying or



improving the effectiveness of systems design, implementation, system use and other systems environment related factors affecting IS development, and the IS impact on individuals and organizations (Galliers and Land, 1987). IS research has been criticized as lacking in theory (Keen, 1980; Banville and Landry, 1989), practical relevance (Benbasat and Zmud, 1999), and cumulative research (Keen, 1980; Benbasat and Zmud, 1999). Without cumulative research, it is difficult to develop and assess strong theoretical models (Benbasat and Zmud, 1999). They suggested for cumulative and theory based research.

Different models are suggested to carry out research task. For example, Cox et al. (1981) proposed a model for systems implementation success. Ives et al. (1980) discussed different IS research models and provided a comprehensive research framework after reviewing past research. They suggested the need for further research on the process variables such as user participation, user satisfaction and systems utilization. Similarly, Benbasat and Zmud (1999) argued regarding 'IS research lacks relevance and practice', and suggested that the IS researchers may contribute to practice in the area of measurement (for example, assessing users' satisfaction with the quality of IS).

## **4.2. IS Discipline and IS Research Issues**

The field of IS is relatively new, young and multi-disciplined. It addresses issues of how Information Technology (IT) can be utilized efficiently and effectively within organizations. Therefore the IS field not only encompasses the technical/technological aspects but organizational, and social also. Its theoretical foundations, methodologies, and research often draw on other more established disciplines (Cornford and Smithson, 1996; Benbasat and Weber, 1996; Ridley and Keen, 1998). Keen (1980) says that IS is fusion of technical, managerial and behavioral issues. Although with the passage of time the IS field is gradually emerging and becoming established (Culnan and Swanson, 1986) but diversity in IS research is viewed to be problematic and a threat (Benbasat and Weber, 1996; Robey, 1996). Researchers have made their efforts to study how such potential issues are affecting IS development and implementation. Visala (1991) argues

that social aspects of IS are widely acknowledged and these led to the importation of generally unresolved conceptual issues of social sciences into IS research. Concerning the IS research problems, Keen (1980) pointed out that IS field lacks theoretical based and cumulative research. Lyytinen (1986 p. 71 cited in Visala, 1991) says that “IS research is fragmented and mostly un-coordinated. Cumulative research traditions are rare ...”. Grover and Sabherwal (1989 p. 243) studied IS issues, and changing trends in IS research. They found a gap between “what IS executive consider as important and what is actually researched”. For example, when the practitioners and IS executives considered IS role and contribution, and managerial issues as important ones, the research on them was slackening. They also pointed out journals’ preferences to ‘publish or not’ a specific research as a drawback towards IS research. There is a long running debate on the merits/demerits of positivists versus interpretivists approaches, and also about quantitative versus qualitative methods in IS research. The IS research methodologies are so addressed in literature that it has become a research area in itself. Robey (1996) criticized unnecessary debate/conflicts between positivists and interpretivists, and also between qualitative and quantitative researchers. He suggests an ideal collaboration for the sake of IS to flourish. Benbasat and Zmud (1999 p.4) stated that business community questioned the practical relevance of IS research published in the leading journals of the field. They pointed the lack of cumulative research tradition as one of its cause. It also has been mentioned that IS research is more depending on IS researchers priorities but the needs of practitioners. Trauth et al. (1993) discussed the expectation gap between industry needs and academic preparation. Avison et al. (1999) argue that research should be relevant to practice.

There is a tremendous increase in the quantity of journals that are related to MIS field. Lending and Wetherbe (1992) mentioned that amount of IS research between 1984 to 1990 has almost doubled as compared to research conducted during 1977 to 1983. Hardgrave and Walstron (1997) mentioned about 233 journal and 54 conferences that may be of value to MIS field. The other way some argue that journal and magazines focus on different themes and there is hardly increase in the richness of themes being addressed in IS research but a

conflicting contemporaneous trends in research and practice (Lee et al., 1999). Banville and Landry (1989) mentioned IS as a fragmented adhocracy. A long before, Farhoomand (1987 p. 48) stated that “MIS has not made very significant progress as a scientific discipline”. IS researchers are argued to be less successful in developing cumulative research traditions and consequently it adds more difficulties towards developing strong theoretical models such that perspective action can confidently be suggested for practice (Benbasat and Zmud, 1999). Such comments represent IS research as fragmented, non-cumulative and may be lacking development research.

### **4.3. Research Approaches and Research Methods: A Definition**

Usually two terms “research approaches” and “research methods” are being used interchangeably. These terms have been distinguished however as:

“A research approach or strategy is a way of going about one’s research, embodying a particular style and employing different research methods with which to collect data.” (Galliers, 1992, p. 147).

A research method is defined as “Methods are simply ways to systematize observations.” (Weick, 1984, p. 121). By ‘systematize observations’, Weick means “sustained, explicit methodical observing and paraphrasing of social situations in their naturally occurring contexts”. Benbasat (1984) differentiates the methods in terms of “settings” in which the phenomena under research might be studied. These are like as:

- 1) Natural Settings (Case studies, Field studies, and Field experiments)
- 2) Contrived and constructed settings (Lab experiments)
- 3) Setting independent studies (Survey).

#### **4.4. Common Research Approaches**

A number of research styles, or so called research approaches and their taxonomies relating to Information Systems research have been classified (Galliers, 1991; Galliers and Land, 1987; Orlikowski and Baroudi, 1991). Galliers (1991) termed these research approaches as “Scientific (Empirical)” and “Interpretivist”. Checkland (1981) identified repeatability, reductionism and refutability as the characteristics of a scientific approach. “Empirical” indicates that the information, knowledge, and understanding may be gathered through the experience and direct data collection (Black, 1999). Orlikowski and Baroudi (1991) say that in a positivist research approach (Scientific/Empirical) the researcher sets out to discover the objective physical and social reality by crafting precise measures that will detect and gauge those dimensions of reality that interest the researcher. Positivists believe that knowledge is obtained through observation and experience on real phenomena in an objective and real world. Tashakkori and Teddlie (1998) say that positivism bases knowledge solely on observable facts whereas it rejects speculation about “ultimate origins”. Some argue that positivist research approach is commonly adopted because of a technical view of Information Systems (Avison, 1997).

A positivist research approach considers that knowledge is acquired through scientific endeavour of reductionism whereas interpretivists are more concerned that knowledge is available in the context of the understanding of social actions and meanings. According to the interpretative approach reality is assumed to be produced and reproduced by human beings through their actions and interactions (Jönsson, 1991). He says that the interpretive researchers construct interpretation or explanations of how subjective constructs are created and maintained. Lee (1999) summarized interpretative research in terms of four concepts: 1) it includes humanly created meanings either individually held or shared by a group, 2) researchers serves as an instrument of observation, 3) interpretation is iterative and 4) the assessment of validity or goodness of interpretation.

Both of the above mentioned research strategies are in evidence in current IS research. Jeffery and Lawrence (1986) mentioned that almost 50% of the articles in MIS Quarterly based their conclusions on empirically derived evidences. Orlikowski and Baroudi (1991) noted that 96.8 percent of the IS research published in leading IS journals follow the positivist approach whereas the rest interpretative. Shanks et al. (1993 cited in Falconer and Mackay, 2000) also showed predominance of positivism in their study. There is a range of research methods that are associated with both of the research approaches. Both positivist and interpretivist approaches as a research philosophy are well discussed in the literature (see Orlikowski and Baroudi, 1991). Within IS literature there is a long and ongoing debate about merits of both approaches and also on adopting combined research methodologies in IS research (see Tashakkori and Teddlie, 1998; Falconer and Mackay, 2000). There is a range of research methods such as conceptual study, mathematical modelling, laboratory experiment, field experiment, survey, case study, field study, phenomenology, hermeneutics, participant observation, grounded theory, longitudinal study and action research that are adopted in IS research (see Van Horn, 1973; Howard and Sharp, 1983; Benbasat, 1984; Jenkins, 1985; Galliers, 1985, 1991; 1997; Avison, 1997).

Galliers (1991) identifies the IS research approaches in the context of scientific and interpretivist philosophies more or less adopted by researchers as shown in Table-4.1.

<b>Scientific</b>	<b>Interpretivist</b>
Laboratory Experiments	Subjective/ Argumentative
Field Experiments	Reviews
Surveys	Action Research
Case Studies	Descriptive/Interpretive
Theorem Proof	-----
Forecasting	Future Research
Simulation	Role/Game Playing

**Table-4.1. Information Systems Research Approaches in the Context of Scientific and Interpretivist Philosophies. (Source: Galliers, 1991, p. 332)**

He also proposed a framework for the choice of a research method in a particular context.

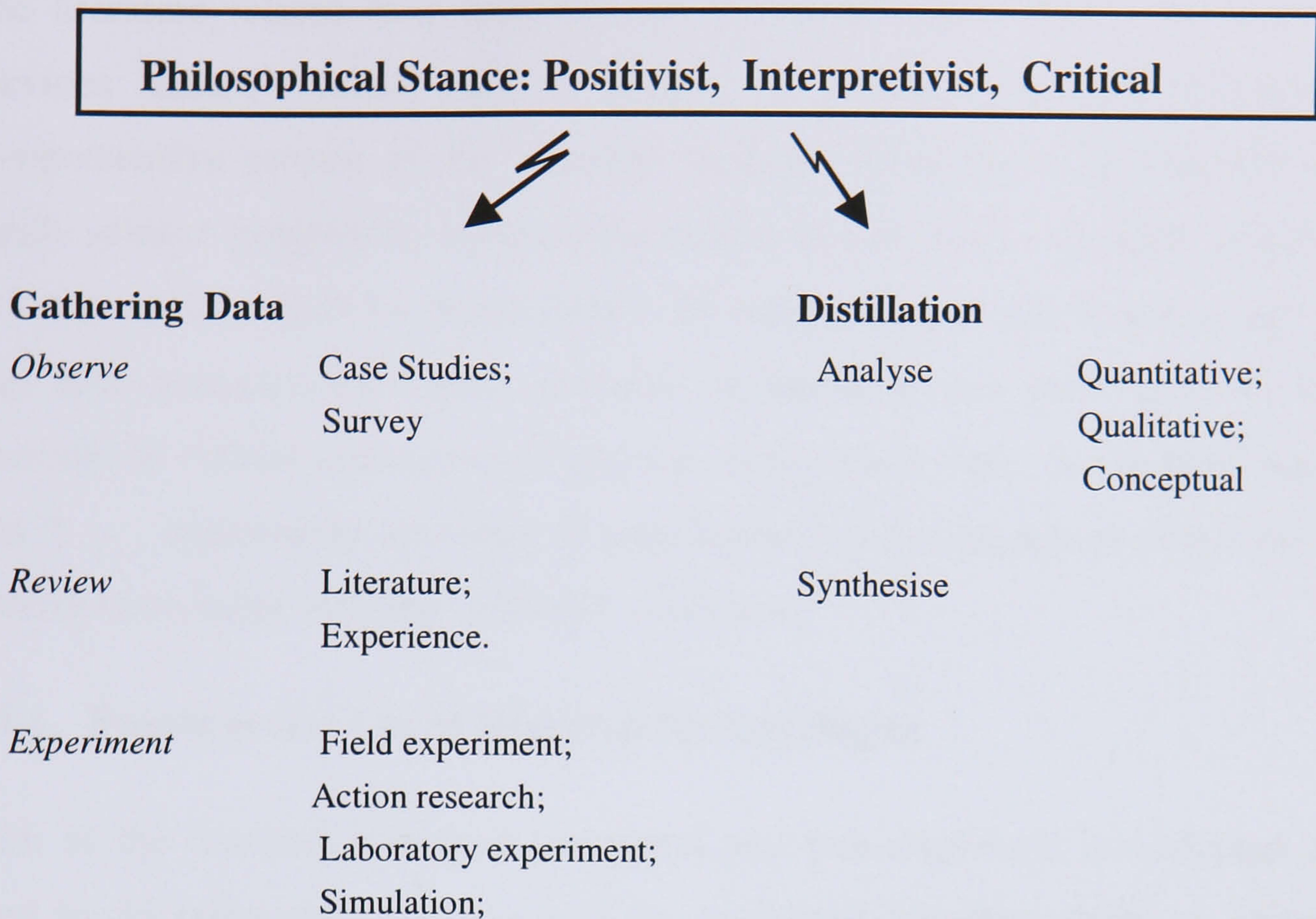


Fig-4.1. Towards a revised framework of IS research philosophies, approaches and methods. (Source: Galliers, 1997, p. 154)

All approaches mentioned in the Table-4.1 have their advantages and disadvantages. For example, in a laboratory experiment the major strength is the ability of a researcher to isolate and control a number of variables for intensive study, but its weakness is the limited extent. Similarly, a case study approach may provide the opportunity to capture reality in great detail but is restricted to a single organization. "A single study is never definitive no matter how memorable and newsworthy it may be" (Green & Hall, 1984 p. 38). Similarly, Hunter et al. (1982 p. 10) stated that "Scientists have known for centuries that a single study will not resolve a major issue. Indeed, a small sample study will not even resolve a minor issue". More details, advantages and limitations of such approaches are mentioned in IS literature (see Benbasat, 1984; Galliers, 1985; Cooper, 1988; Galliers, 1991).

In addition to primary research, the research synthesis may also play a vital role in building some generalised understanding of the problems and their solutions. The literature related to a specific topic of interest that appears as output of previous research efforts may be helpful in understanding and obtaining a comprehensive picture of the previous findings. Researchers in isolation may hardly achieve progress by ignoring the earlier efforts made and might repeat the mistakes already made by predecessors. By integrating the previous findings one may seek guidance for further research on the areas that have received little attention or contain controversial findings on the same topic. It has been argued that “..... trustworthy accounts of past research are a necessary condition for orderly knowledge building” (Cooper, 1998 p. 1).

#### **4.4.1. Trends in the Use of Research Methodologies**

Both of the research strategies (empirical and non-empirical) are adopted and used by IS researchers. Analysis of the published literature shows a growing trend to adopt empirical research methods. Cooper (1988) noted the tendency to adopt more empirical research such as case studies, field studies, surveys and laboratory experiments in the 1980's as compared to non-empirical. He also identified IS research areas that were more focused as compared to others. Some others argued that the area of “Decision Support Systems” took more attention of researchers (Grover and Sabherwal, 1989; Teng and Galletta, 1991). Conceptual (i.e. non-empirical) methods were more common in the 1970's Hamilton and Ives (1982). Regarding research methodologies, both Cooper (1988) and Teng and Galletta (1991) found case studies and surveys as commonly used methods in IS research. The former ranked “case study” as top whereas the latter ranked “surveys”. Other research methodologies are also in use but less frequent. The findings of different researchers showing the trend to adopt different research methodologies are given next.

Hamilton and Ives (1982) reviewed published articles in 15 journals between 1970-1979. The type of research conducted is shown in Table-4.2.

Research Strategy (Research Method)	Overall data		Trend data	
	1970-1979		1970-1974	1975-1979
	Count	%	%	%
<i>Empirical</i>				
Case Studies	63	11.8	11.8	11.9
Field Studies	42	7.9	10.8	6.2
Field Tests	26	4.9	2.6	6.2
Laboratory Studies	27	5.3	4.6	5.6
<b>Subtotal</b>	159	29.9	29.7	30.0
			(58)	(101)
<i>Non-Empirical</i>				
Conceptual	326	61.3	63.1	60.0
Tutorial, Review, Other	47	8.8	7.2	10.0
<b>Subtotal</b>	372	70.1	70.3	69.9
<b>Total</b>	532	100.0	(137)	(236)

Table-4.2. Research methodologies in use: 1970-1979. (Source: Hamilton and Ives, 1982, p. 342), numbers in parenthesis are counts.

It is apparent that even some time ago trends in research changed a bit. The use of field tests and laboratory studies has increased and reliance on field studies has decreased.

Cooper's (1988) statistics about IS research methodologies trend that he reviewed from 5 high ranked journals is shown in Table-4.3.

Research Method	1970-1980	1981-1985
<i>Empirical</i>		
Case Study	13%	25%
Field Study (Survey)	9%	32%
Field Test	5%	2%
Laboratory experiment	6%	13%
<i>Conceptual [Non-Empirical]</i>		
(Subjective-argumentative Theorem proof engineering)	67%	28%

Table-4.3: Comparison of research methods: 1970's vs. 1980's. (Source: Cooper, 1988, p. 93)

The data show a decrease in the use of non-empirical methodologies. Further, except for "field test" the use of other empirical methodologies increased in the 1980's as compared to the 1970's.



Farhoomand (1987) also analysed 536 articles published during 1977-1985 in six journals. The results (Table-4) showed a shift in research strategies from non-empirical to empirical. The tendency to adopt and use “case studies” and “survey” is most common as compared to others.

Research Method	1977 - 1985
<i>Empirical</i>	
Case Study	25.4%
Survey	25.4%
Field Experiment	1.7%
Laboratory Experiment	4.1%
<i>Non-Empirical</i>	43.5%

Table-4.4. Research Methodologies in use: 1977-1985. (Source: Farhoomand, 1987, p. 52, Amended in tabular form)

Orlikowski and Baroudi (1991) also examined 155 published articles from January, 1983 to May, 1988 in three journals and in a conference keeping in view what research strategy was adopted by the researchers. The findings match earlier studies as discussed above. Empirical research approaches are more common as compared to non-empirical. Positivist approaches appear to be dominating in their results. (see Table-4.5)

Research Design	Frequency	Percent [%]
Survey	76	49.1
Laboratory Experiment	42	27.1
Case Study	21	13.5
Mixed Method	5	3.2
Field Experiment	4	2.6
Instrument Development	4	2.6
Protocol Analysis	2	1.3
Action Research	1	0.6
	155	100%

Table-4.5. Articles Classified by Research Design, 1983-1988, (Source: Orlikowski and Baroudi, 1991, p. 4)

In the survey by Teng and Galletta (1991) researchers were directly involved, and were asked about their research activities in terms of the research methodologies used by them. This study differs from previous ones as the sources of information in the above are mostly journals whereas this study depends upon the data gathered direct from researchers. This survey contains the opinions of 397 researchers on 1503 IS projects. The findings of this study are tabulated in terms of projects under research with research methodology adopted by researcher for a specific project. The results are in Table-4.6.

[Research] Method	Percent of all	
	Projects	Researchers
Surveys	23%	54%
Cases	22%	47%
Subj/argumentative	16%	41%
Lab Experiments	14%	31%
Field Experiments	12%	33%
Engineering	8%	18%
Theorem Proof	4%	10%
	N=1503	N=397

Table-4.6 Research Methods and Endorsements (Source: Teng and Dennis, 1991, p.56).

A review of IS research was carried out by Alavi and Carlson (1992) that included MIS articles published in eight reputable journal within a period of 1968 to 1988. They specified 471 non-empirical (on page 53) and 437 empirical (on page 54) articles that were published between 1968 and 1988. Empirical articles are to be calculated as 48.127 percent (but mentioned in the paper as 48.8 on page 52) as compared to non-empirical that are calculated as 51.872 percent. These finding match the previous studies discussed above (Cooper, 1988; Hamilton and Ives, 1982). However, Farhoomand (1987) shows a shifting trend from non-empirical to empirical studies within his research that covers a period between 1977-1985. Alavi and Carlson's (1992) findings about distribution of empirical

articles with reference to methodology in use may be tabulated as mentioned below. (see Table 4.7)

Research Methodology	No. of articles	Percentage % of Sample
<i>Empirical</i>		
Field Studies	146	33.40%
Lab. Experiments	66	15.10%
Case Studies	40	9.15%
Survey	32	7.32
Field Experiments	18	4.11%
<i>Other Empirical Type</i>		
Description	98	22.43%
Ex-post Description	18	4.11%
Development of Tools	12	2.75%
Secondary Data	7	1.60%
Total	437	

Table-4.7. Empirical Articles by type (1968-88) [%age calculated]. (Source: Alavi and Carlson, 1992, p. 54).

They also mentioned rising trends of empirical research articles involving case studies, field studies, and laboratory experiments for the last two decades.

Summing up the results in a tabular form from different studies carried out within a certain period leads to the information summarized in Table-4.8 on next page. This table provides the details of previous research methodologies in use with their adoption trend in IS research since 1970.

Research Strategy	Hamilton & Ives (1982) 1970-1979 %	Cooper (1980)		Farhoomand (1987) 1977-1985 %	Alavi & Carlson (1992) 1968-1988 %	Orlikowski & Baroudi (1991) 1983-1988 %	Teng & Dennis (1991) %
		1970-1980 %	1981-1985 %				
<b>Empirical</b>					<b>14.18(others)</b>		
Case Study	<b>11.8</b>	<b>13</b>	<b>25</b>	<b>25.4</b>	<b>4.40</b>	<b>13.5</b>	<b>22</b>
Field Study	<b>7.9</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>16.27</b>	<b>-</b>	<b>-</b>
Survey	<b>-</b>	<b>9</b>	<b>32</b>	<b>25.4</b>	<b>3.52</b>	<b>49.1</b>	<b>23</b>
Field Test/Exp.	<b>4.9</b>	<b>5</b>	<b>2</b>	<b>1.7</b>	<b>1.98</b>	<b>2.6</b>	<b>12</b>
Lab. Experiment	<b>5.3</b>	<b>6</b>	<b>13</b>	<b>4.1</b>	<b>7.27</b>	<b>27.1</b>	<b>14</b>
<b>Sub-Total</b>	<b>29.9</b>	<b>33</b>	<b>72</b>	<b>56.6</b>	<b>48.12</b>	<b>92.3</b>	<b>71</b>
<i>Non-Empirical/ Others (Overall)</i>							
Sub-Total	<b>70.1</b>	<b>67</b>	<b>28</b>	<b>43.5</b>	<b>51.87</b>	<b>7.7</b>	<b>28</b>

Table-4.8. Trends in use of empirical and non-empirical research methodologies: A Comparison.

The review of six independent studies shows the tendency to use more field studies, surveys and case studies as research methodologies in past research. The increasing trend to use empirical methods in IS research as compared to non-empirical ones is apparent. Alavi and Carlson (1992) show a little bit more percentage rate of non-empirical methodologies as compared to empirical ones in their study, but the research trend reveals a swing from theoretical to empirical. Although the results of different studies within the same time period show variations, but the overall trend of empirical and non-empirical research methods is apparent. The trend in the use of non-empirical research methods looks to be declining with the passage of time. A long time ago, Van horn (1973) said that real progress in developing a body of knowledge for MIS might depend on empirical research and he considered it necessary to the development of MIS as a significant area of study. Orlikowski and Baroudi (1991) noted that much of the information systems research conducted is concerned with exploring the relationship among IT, individuals and organizations and reflects a positivistic

orientation. Similarly, Ridley and Keen (1998) found positivism as the overwhelming major approach used in IS research in Australia after studying 173 papers published in ten reputable journal and conferences. No paper with interpretive approach appeared in publications before 1992. Their findings are as under:

Epistemology	Frequency	Percent [%]
Positivist	153	88.4
Positivist (theoretical)	80	(46.2)
Positivist (descriptive)	73	(42.2)
Interpretive	15	8.7
Critical studies	5	2.9
<b>Total</b>	<b>173</b>	<b>100%</b>

Table-4.9. Epistemologies Used in Research IS Empirical Papers by Australian Authors, 1980-1996. (Source: Ridley and Keen, 1998).

Lai and Mahaparta (1997) also found that empirical research methods are preferred to non-empirical methods in IT implementation research. Their findings are based on analysis of 71 articles of IT implementation research published during 1976-1995 in nine most reputable IS journals. Their findings are tabulated as under: (see Table 4.10)

Research Methodology	No. of articles	Total %age
<b><i>Empirical</i></b>		
Case Study	24	33.8%
Field Study	26	36.6%
Field Experiment	5	7.0%
Laboratory. Experiment	2	2.8%
<b>Sub-Total</b>		<b>81.2%</b>
<b><i>Non-Empirical</i></b>		
Conceptual Study	14	19.7%
Review/Tutorial	0	0%
<b>Sub-Total</b>		<b>19.7%</b>

Table-4.10. Articles classified according to Research Methodology. (Source: Lai and Mahaparta, 1997, [Tabulated from page 195]).

The analysis of above table shows that empirical approaches are preferred to non-empirical in IT implementation research. The published studies during the period 1990-1995 shows that 53% of these studies used field study approach as compared to 21.4% that used case study approach (Lai and Mahapartra, 1997). They also described common topics of research during that period. Further, their study revealed growing trend in IT implementation research.

A recent study by Claver et al. (2000) regarding IS research shows more trends towards empirical studies as compared to theoretical. Their research based on publications in two reputable IS journals within a period 1981-1997. Their findings are summarized in Table-4.11.

<b>Research Methodology</b>	<b>Total %age (1981-1997)</b>
<b><i>Empirical Studies</i></b>	
Case Studies	21.2%
Field Study	39.0%
Field Experiment	1.0%
Laboratory Experiment	7.5%
<b><i>Sub-Total</i></b>	<b>68.7%</b>
<b><i>Theoretical Studies</i></b>	
Conceptual	11.8%
Illustrative	16.0%
Applied Concepts	3.5%
<b><i>Sub-Total</i></b>	<b>31.3%</b>

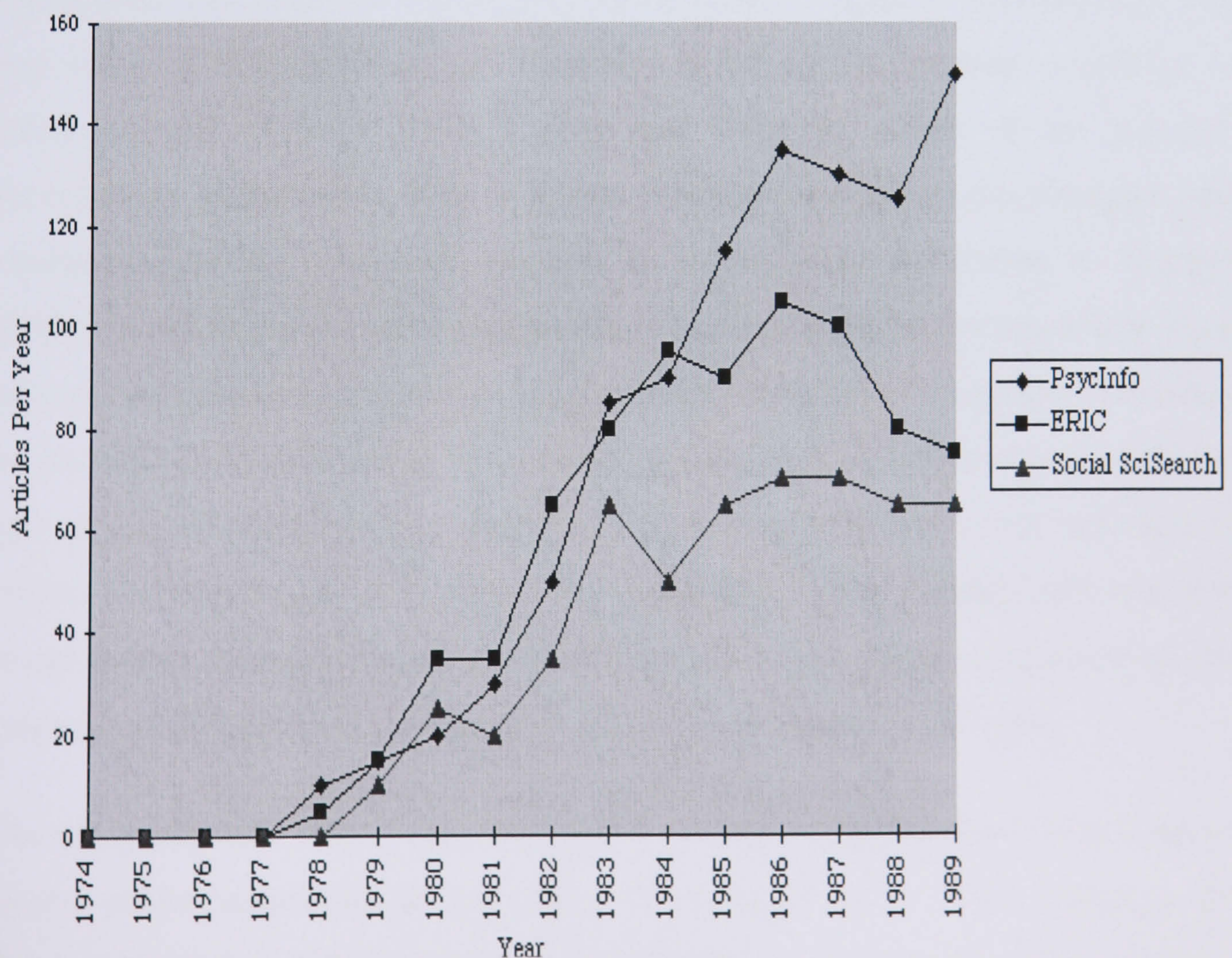
Table-4.11. Articles classified according to Research Methodology. (Source: Claver et al., 2000, p. 187 [Only Summary], for yearly details see paper).

The analysis of the above table shows that most of the studies are empirical as compared to theoretical ones. The findings of this study also match the previous studies' findings. The priority of research topics and how it varies with the passage of time may also be observed in the above mentioned studies.

All the research methods mentioned in the studies discussed above deal with primary research. However research methods such as "research reviews" that may integrate and evaluate past research have hardly been paid any attention.

This approach to research synthesis is gaining acceptance due to the availability of on-line literature search facilities and improvements in synthesis techniques (Cooper, 1998). A research synthesis may appear as detailed independent work that can attempt to integrate, criticize and identify different issues within past research. The term “Meta-analysis” (a quantitative research method for integrating past research) is being used as a synonym for research synthesis/research review. Meta-analysis was not discussed in any of the above mentioned studies on IS research. It might be that meta-analysis, being a new research methodology (introduced in 1976 by Glass) did not get any attention from IS researchers. In other fields of the social sciences it looks to be a common research method. The growing trend in the use of meta-analysis in social research is showed in Figure-4.2. It shows the number of meta-analysis references published from 1975 to 1990. The growing trend in the use of meta-analysis in different disciplines for the last 15 years is apparent. (see Fig-4.2)

**Meta-Analysis: The First 15 Years**



**Fig-4.2.** (Source: White, H. D. (1994); Lyons, L. C. (1998), [on line] available

<http://www.monumental.com/solomon/ MetaAnalysis.html>)

Similarly, Hunt (1997 p. 161) also mentioned the growing trend in use of meta-analysis and says that “The best evidence is the remarkable growth of meta-analysis in scientific journal (none in 1977, nearly 400 in 1994) and in data banks (none in 1977, nearly 3,500 in 1994).

When researcher has his clear view about research objectives, the next step may be the selection of an appropriate research strategy and methodology in a research process. Checkland (1981 p. 161) considered research methodology as “a set of *principles of method* which in any particular situation have to be reduced to a method uniquely suitable to that particular situation”.

#### **4.5. Adopting a Research Strategy**

Research in any area may begin with specifying a particular domain to be addressed, the problems that exist in that area, and supposed objectives. These objectives may evolve or be altered whilst undergoing the research. Choosing an appropriate methodology for research in IS has been debated among IS researchers. The decision about using some specific research methodology that may suit and best facilitate the researcher to attain his research objectives is always crucial. It is very much concerned with the nature of the research questions in researcher’s mind and his understanding about the strengths and weaknesses of the available research methodologies. According to Cooper (1988), the choice of research methodology may be based on the theoretical view imposed on the problem that is being examined. Yin (1994) suggested a criterion for choosing a suitable research approach. It comprises of an identification of the type of research question, the extent of control a researcher has over behavioural events, and the degree of focus on contemporary events. Further, the research design guides the researcher in collecting, analysing and interpreting observations keeping in view the initial set of questions to be answered (Yin, 1989).

It is rarely expected that a single study may provide comprehensive knowledge to resolve major issues. So to generalize the findings or to build a theory, the researchers need to repeat the experiments/studies. It is also rare that researchers



with the same research question may reach absolutely the same conclusions. That might be due to a different research set up or other external factors that might affect the results. A single study occurs at a single time and there is no guarantee that the same results would occur at another date (Cook et al., 1994). They say that a single study might fail to provide comprehensive and widely generalized knowledge. Similarly, Hunter et al. (1982) argue a single study may not resolve major issues. The foundation of science is the cumulation of knowledge from the results of many studies. Research synthesis or research integration attempts to discover the consistencies and also account for the variability in similar-appearing studies. It might help in extending our knowledge through the combination and comparison of previously conducted primary studies.

Some argue that Meta-analysis can provide preliminary tests for generalising the findings that are not derivable from individual studies that it merges (Hunt, 1997). It may provide impartial, precise, and quantitative description of the findings in a population of studies conducted on a particular topic under study. The above discussion shows that a synthesis of previous researchers' contradictory/disagreed findings on a specific topic may be fruitful in reaching some conclusions.

As discussed in earlier chapters, the mixed empirical results of the effect of user participation on user satisfaction and systems success, and about the relationship between systems usage and user satisfaction, are creating confusion rather than helping to reach any conclusion. Such contradictory findings do not lead to some acceptable answers to generalise or to build a theory but instead yield unending calls for further research. It may cause an enormous wastage of scholarly efforts. Keeping in view the existing situation the choice of meta-analysis as a research method seems to be appropriate. Although this method was not widely used previously in IS research but its use is more frequent in the fields of psychology, education and medicine (Hunt, 1997). IS researchers (Straub and Trower, 1988; Pettingell et al., 1988; Alavi and Joachimsthaler, 1992; Pervan, 1994; Shaw, 1998; Gelderman, 1997; Hwang and Thorn, 1999; Mahmood et al., 2000) also attempted this method for a research synthesis whereas previously

traditional/qualitative research reviews were in use (for example Zmud, 1979; Ives and Olson, 1984; DeLone and McLean, 1992; Cavaye, 1995).

Literature reviews might play a central role in research development. It is defined as "an information analysis and synthesis, focusing on findings and not simply bibliographic citations, summarising the substance of literature and drawing conclusion from it" (ERIC [Educational Resources Information Centre] Processing Manual cited in Cooper and Hedges, 1994). These may provide an opportunity to the reviewer to look at differences in findings/sayings and to analyse why such differences occur. The accumulation of research findings in a specific domain and its gradual convergence towards higher quality information is the key factor for progress in any science. It is common that researchers/scientists base their research on existing information, add more data to it and do their best to find more complete and accurate solutions/explanations of existing problems. Cook and Leviton (1980, p. 449) say, "Science is a cumulative endeavour". Light and Pillemer (1984) say that reviews may help to interpret other's findings, resolve controversies and conflicts in research, and examine a large number of variables that might be important for future research.

Bangert-Drowns (1986) specified four types of reviews. The first type identifies and discusses new developments, the second uses empirical findings to highlight, illustrate, or access a particular theory or tentatively propose new frameworks, whereas in the third type a reviewer may organize knowledge from divergent research. The fourth type, "meta-analysis", is an integrative review. Meta-analysis is a quantitative review as compared to a qualitative review (i.e. a traditional review). It focuses on empirical studies to summarize past research in order to draw overall conclusions relating to the research question in a particular research domain.

Traditional reviews have their own limitations and drawbacks. These usually contain descriptions of critical experiments already conducted where the reviewer discusses the theories concerned with a particular phenomenon (Cooper, 1998). They seldom quantify the strength of the relationships among study variables but

give an interpretation. Traditional reviews are not only subjective, and scientifically unsound, but may be an inefficient way to extract useful information (Light and Pillemer, 1984 pp. 3-4). They suggested use of statistical procedures for combining studies. Traditional reviews have also been criticized (Glass et al., 1981) for their weaknesses regarding a firm understanding of a research tradition. On the other hand the quantitative review is a more objective and efficient way to summarize the literature. It discusses not only whether there is support for the hypothesis but also whether such support varies with the attributes of the study (Green and Hall, 1984).

#### **4.6. Vote-Counting: A Step Towards Quantification**

The most common form of quantification is “box score” or “vote counting” (Light and Smith, 1971; Green and Hall, 1984). Vote-counting procedures were in use by reviewers to quantify summary statistics before the advanced meta-analysis methodology was introduced. Feldman (1971 p.89) considered it as a simple procedure to count explicitly the studies that support a certain hypothesis and others that did not.

In the vote-counting method the available studies are sorted as yielding significant positive, significant negative and non-significant findings (Feldman, 1971; Hedges and Olkin, 1982; Cooper, 1998). The more studies supporting or rejecting the hypothesis about the relationship between variables was considered to determine the winner. These techniques are easy to use but have drawbacks. This method assumes that the sample sizes for all studies included are the same. When sample sizes of studies are not the same then analysis requires better procedures for research syntheses. Other limitations, for example, the strength of a relationship between variables is seldom considered. Hedges and Olkin (1980) found this procedure has low statistical power. They say that the power of this method decreases as the number of studies reviewed increases. Cooper (1998) also described this problem by arguing that the number of expected non-significant findings are usually greater than the expected number of either positive or negative significant findings even when the null hypothesis is true.

This approach ignores many non-significant findings so may be low in statistical power. Green and Hall (1984) criticized “vote-counting” because it ignores the magnitude of effects across available studies. Light and Smith (1971) also pointed out that vote-counting method of research integration disregards the sample size. Cooper (1998) argues that vote-counting strategy requires at least 34 percentage of findings to be positive and statistically significant before the result is considered as winner. Vote-counting might be considered as an attempt at quantification but not adequate as a high quality review. Light and Pillemer (1984) also criticized the ‘vote-counting method’ for its limitations such as 1) it tells little about the size of an effect, and 2) it often fails to identify a significant overall effect in case ‘effect sizes’ and ‘sample sizes’ are small. In case the studies under consideration do not provide test statistics, the meta-analyst has no choice except vote-counting.

The lack of effectiveness or failure of traditional reviews to provide definitive answers to the research questions was the motivating factor for the development of meta-analysis. Quantitative review such as meta-analysis may be more useful in analyzing the data with better statistical methods. Rosenthal (1991) says that meta-analytic reviews are more systematic, explicit, exhaustive, and quantitative with respect to traditional reviews. The importance of meta-analysis over traditional reviews has also been discussed (see Hwang, 1996). Lipsey and Wilson (2001) mentioned strengths/advantages of Meta-analysis on conventional/traditional reviews. Although meta-analysis is more time consuming, and laborious but it represents key study findings and effects of relationships among study variables in a more sophisticated way as compared to traditional reviews. Meta-analysis has become an accepted research technique that has rapidly developed in conceptual, methodological, and statistical sophistication (Lipsey and Wilson, 1993).

## 4.7. Meta-Analysis: A Quantitative Research Method

### 4.7.1. Defining Meta-Analysis

Research synthesis or research integration attempts to discover the consistencies and also account for the variability in similar-appearing studies. It might help in extending our knowledge through the combination and comparison of previously conducted primary studies. Glass (1976) first coined the term “Meta-Analysis”. This approach is different from research integration practices that preceded it. Meta-analysis focuses on the aggregation and comparison of the findings from different studies conducted on the same topic. Meta-analysis comprises of a set of techniques for reviewing research in which results from different studies are statistically combined. Glass et al. (1981 p.21) say that “ ‘Meta-analysis’ is nothing more than the attitude of data analysis applied to quantitative summaries of individual experiments ... it is not a technique; rather it is a perspective that uses many techniques of measurement and statistical analysis”. Lipsey and Wilson (1993) stated that in meta-analysis the results and characteristics of individual study are abstracted, quantified, coded, and assembled in to a database that is statistically analyzed.

Meta-Analysis refers to “the analysis of analysis” (Glass, 1976 p. 3). Glass (1976) also distinguished it from primary and secondary analysis. Primary analysis is the analysis of the original data collected for a research study, and usually carried out under the direction of those who have designed that study. Secondary analysis is the re-analysis of the same data from different perspectives, or to answer the original or new research questions with better statistical techniques. According to Bryman (1989) the one of the reasons for secondary analysis might be that secondary analyst wish to consider an alternative interpretation of a set of data from the original researcher. Secondary information consists of source of data and information collected by others in some form. Secondary data sources may be archival documents. By investigating secondary resources one may get the opportunity to learn about what is already known and what remains to be learned, limitations of previous research, and short comings

of methodologies applied (Stewart, 1984). Some argue that secondary data research may improve the research quality as more of the resources are utilized on analysing the data than collecting it (Jarvenpaa, 1991).

However, meta-analysis uses statistical procedures to integrate existing research findings and draws upon the summary statistics of a number of studies without accessing the original data. It is the quantitative treatment of a review of the results.

Hunt (1997, p. 1) explained the term meta-analysis as “.. it is a means of combining the numerical results of studies with disparate, even conflicting, research methods and findings; it enables researchers to discover the consistencies in a set of seemingly inconsistent findings and to arrive at conclusions more accurate and credible than those presented in any one of the primary studies”. It attempts to identify the central tendency in the outcome of a group of studies, helps to find out causes of variation among studies. Meta-analysis may also be termed as research synthesis, evaluation synthesis, systematic review, overview and structured review, research integration, quantitative reviews (Green and Hall, 1984; Hunt, 1997; Kulik and Kulik, 1989). Meta-analysis applies statistics to the treatment of quantitative representations of the study findings, and thus makes it distinct from traditional reviews. Light and Smith (1971) argued that meta-analysis provides somewhat more objective information as compared to narrative/traditional views. It provides ways to compare and understand the results across studies that look at the same phenomena but with different researchers, using different methods, involving different subjects. If the results differ or absolutely contradict then one may search, what are the factors that cause variation in results. Understanding such aspects may lead to conclusion about either there exist methodological flaws or some sampling errors causing such variations.

#### **4.7.2. A Brief History of Meta-Analysis**

The application of research reviews was rare until mid 1970's. Feldman (1971 p. 86) says “systematically reviewing and integrating what is nominally called the

'literature' of a field may be considered a type of research in its own right – one using the characteristic set of research techniques and methods". He suggested that the findings of others either published or not, might be viewed as the raw "data" for a reviewer.

Quantitative reviewing has a long past, as in the early 1930's researchers used statistical tools for combining results from a series of experiments (Kulik and Kulik, 1989; Cook et al., 1994). According to Glass (1976) a good review is the intellectual equivalent of original research. The process of either primary or review research always starts with formulation of some research questions in the researcher's mind. The reviewer begins work after developing a clear understanding of the issues of existing research. After specifying a particular topic within defined boundaries the reviewer collects information relating to the research questions. That might be a "sample" for his study.

Although the term "meta-analysis" was introduced in 1976, combining results from different studies or experiments is not new. Other researchers have adopted the strategy of combining results from divergent studies in the past (see Cook et al., 1994 p. 6; Bangert-Drowns; 1986 p. 389; Cooper, 1988, p. 107). For example, Pearson (1904 p.1244) computed the mean of correlations from separate sets of data to summarize the relationship between immunity from infection and inoculation for enteric fever. Thorndike (1933) cumulated the results calculated in terms of correlation 'r' from various studies. The meta-analytic process does not only explore cumulative knowledge but also provide future research directions clearly. Meta-analysis as a research method is commonly used in the social sciences. Hunter and Schmidt (1990) argue that researchers who did meta-analysis as compared to those who did primary research make most of the advances in cumulative knowledge. No single study may ever been able to resolve an issue. Meta-analyses might explore the most important findings that otherwise can not be gained from the individual studies for generalizability. Applications of meta-analytic procedures may be of three types. The first type summarizes for a set of studies the average correlation between variables investigated in each study. The second type determines the

factors responsible for variations in magnitude of relationship between variables whereas the third does not investigate any relationship but provides aggregate data for the variables under study (Rosenthal, 1984). In summary, meta-analysis is an effort to review the findings from a research domain in quantitative terms with the intent to identify what significant relationships exist between the variables under study.

#### **4.7.3. Stages in the Meta-Analysis Process**

The meta-analysis process comprises of five main stages. These are 1) Problem Formulation, 2) Data Collection, 3) Data Evaluation, 4) Synthesizing the data/Analysis, and 5) Presentation of findings (Hunt, 1997; Cook et al., 1994; Cooper, 1998; Forza and Nuzzo, 1998). The detail description of these stages and how these are adopted in my research is discussed.

##### ***(a) Problem Formulation***

Any research attempt always begins with the formulation of a research problem that may be simple or complex. In this phase the meta-analyst decides what question to answer and what kind of evidences to examine. Primary research on the topic must exist before a synthesis can be started. In general it is not too different from that in primary research. Primary researchers are limited by the researcher's imagination and interests but a meta-analyst must study the literature already on the topic under research (Cooper, 1989). The primary research on the topic may have replications and might produce similar or different findings/conclusions, so what may be the net results is the goal in carrying out meta-analysis. In the case where the problem is not well defined or investigated then the results produced by meta-analysis may be of little use. Whatever nature of the problem, either it is simple or complex, its definition and investigations both mean a lot in doing meta-analysis. During this phase the meta-analyst decides what distinguishes between relevant and irrelevant material. The variables under inquiry need to be defined properly and also to be provided explanations (Cooper, 1998).



This stage relates to review of past research, and in finding existing problems if any. Both of these aspects are covered in chapter-1 and chapter-2. In Chapter-1, I attempted to provide evidences about controversies among IS researchers about the effect of user participation on user satisfaction and also mentioned my research intentions. Past research findings on the subject under research are problematic and may leave the reader confused whether user participation during IS development is necessary or not to achieve user satisfaction and ultimately system success. Keeping in mind the existing problems in past research, a research model along with research questions was described in chapter-3. Meta-analysis was suggested as a suitable method for this research. This stage concerns formulating research questions after finding problems in existing research so deals with Chapter-1, Chapter-2 and Chapter3.

#### ***(b) Literature Search and Data Collection***

This stage is very much concerned with the process of data collection keeping in view the research questions raised. As meta-analysis is an observational study so the data collection must be carried out with care. Attempts to search the maximum studies available on the topic irrespective of those are published or unpublished, poorly conducted or well managed would be preferable. In meta-analysis data may be collected by conducting a search for reports on studies carried out in the past and are very relevant to the research topic.

In primary research data are collected by asking people or by observing their behaviour but in meta-analysis data are collected in terms of effect size (i.e. the magnitude of difference and relationship strength between variables generally) from studies. Studies with no quantitative data can not be included in meta-analysis. It might be true that the effect sizes with published studies may be higher than dissertations (Smith, 1980; Bangert-Downs, 1986; Cooper, 1988). By including unpublished studies, or dissertations, the “file-drawer problem” may be reduced. Rosenthal (1979) identified the file-drawer problem as a situation in which studies with no significant results are most likely buried away in file drawers. The file-drawer problem is also criticized because it solely based on the

null hypothesis as it assumes an average zero significance for unknown studies (Hunt, 1997). Meta-analysis is also criticized for its outcome that is very dependent on the number of studies included. To avoid such criticism, maximum efforts were made to collect related unpublished studies on personal requests from IS researchers.

Different techniques such as: use of computer databases, 2) use of the list of references at the end of reports/papers (i.e. reference databases; bibliographies), 3) to contact colleagues and fellow scholars, and 4) web sites are commonly suggested (Green and Hall, 1984; Cook et al., 1994; Durlak, 1995; Cooper, 1998; Lipsey and Wilson, 2001). The use of these techniques is discussed in the literature (see White, 1994; Cooper, 1998; Lipsey and Wilson, 2001). Such techniques might be used to find and collect related studies. The main purpose of all such suggestions presented above is to carry out a comprehensive search for related studies. It requires maximum efforts to seek published or unpublished studies to avoid any publication bias. The common problems that may occur during data collection are concerned with incomplete data reported by primary researcher, data might be not in statistical outcome, inability of libraries to ensure all relevant literature because of unpublished literature seldom available, and low rate of response on personal contact. Additional efforts are to be made by contacting the authors by telephone call, or by sending letters/email with a request for the data missing in their studies suitable for meta-analysis. Although the response might not be so encouraging as either the authors of the studies are unavailable or if available then they hardly keep original data with them for the past studies.

The problems that exist in gathering studies are not specifically with meta-analysis but traditional research reviews. The availability bias may affect the traditional reviews and all other methods of reviewing literature such as meta-analysis (Hunter and Schmidt, 1994). They proposed some methods to test and control for an availability bias.

This stage is covered in Chapter-5 that describes the process of data collection using different techniques mentioned above.

### *(c) Data Evaluation*

This phase involves determining the studies that are relevant. It also determines whether the data gathered are valid and usable. The studies that do not meet the criteria related to the research questions are always eliminated. Further, the studies that discuss the topic under research but have their findings that are not mentioned quantitatively, can not be included in analysis.

The meta-analyst should define clearly at the outset the objectives of the research and which studies might be very related and suitable. After specifying such criteria he may be able to exclude the studies that do not meet the criteria. Meta-analysis is not a mechanical exercise, so prior to including research findings it needs judgement about their technical adequacy of information (Cook et al., 1994). It is very difficult to decide some criteria for studies to be technically adequate. Some analysts argue that all studies should be included but others argue that methodologically inferior studies should be avoided (Glass et al., 1981; Slavin, 1986). There is no absolute standard that may be followed, but keeping in mind some constrained questions about research domain one might filter the studies. The meta-analyst must set up some explicit criteria for including or excluding the studies.

At the outset of data collection it was decided to include only those studies in meta-analysis that are relevant to research questions. During data collection the studies for their suitability (i.e. related to subject under study and with empirical findings in terms of effect sizes) to be included in meta-analysis are evaluated and filtered. Studies such as 1) non-empirical either published or unpublished, 2) studies with repeatedly published results, and 3) studies those have not clearly mentioned their results quantitatively were excluded. Such precautionary measures were followed to avoid biasing and to keep data clean. This stage was covered in Chapter-5.

#### *(d) Synthesizing the data*

Meta-analysis offers a set of quantitative techniques that are helpful to synthesize the findings from different research such as surveys, correlational studies, experiments etc.. These studies may have diverse research designs. Some studies may report results in the form of difference between groups whereas others may report association among variables, the reason that data about the relationships among variables under consideration may be found in different statistics. So in order to obtain an aggregate there should be at least some common metric about the relationships between variables under investigation for each study. It may help to integrate the findings and to reach some conclusion.

The conversion of various statistics into some common metric is required to proceed further. The meta-analysis are usually conducted using one of the effect size statistics such as standard mean difference, the correlation coefficient, and odds-ratios and their statistical procedures have already been developed (Lipsey and Wilson (2001). The “effect size” means “the degree to which the phenomenon is present in the population,” or “the degree to which the null hypothesis is false” (Wolf, 1986, p. 24). The effect size statistics that is attempted for a specific meta-analysis must remain the same across studies. Which effect size statistics is appropriate for the study depends upon the nature of research findings, and the nature of the hypothesis being tested. The effect size embodies the information about the magnitude or direction of the quantitative findings of the study. There after the aggregation of effect magnitudes, and test of significance might help to search evidences regarding hypothesis under research. Further from a statistical perspective that studies with larger sample size are assumed to be providing more precise effect size values than those based on smaller samples, the studies with larger samples might be considered as having more weightage. The main objective of analysis in the research synthesis is to find the information and pattern of results. This stage was covered in Chapter-5 (i.e. data collection, effect size conversion techniques) and also in Chapter-6 that deals with data manipulation and aggregation leading to findings.

### *(e) Presentation of Findings*

The last step in the meta-analysis process is presentation of the details of results. The objective and main task of the research is to contribute to the completion and enlargement of the state of the existing knowledge on a particular research topic. The research review enables one to learn about past efforts being made to explore the phenomenon under study, the inconsistencies and also methodological strengths or weaknesses if any. The contribution of the research efforts should be well documented and presented clearly. The dissemination of the results should allow a reader to assess the rigour of the research and research method used, and to observe a detailed analysis of the results regarding the research questions. Research synthesis report is also just like a primary research report that consists of an introduction, objectives of study, methods used and finally the results and discussion. Meta-analysis not only shows the relationships among variables under study but also explains why the variations among studies might occur. These findings may also confirm that the reasons for such difference are either by chance or due to other artifacts. “Data analysis is an aid to thought, not a substitute” (Green and Hall, 1984 p. 52).

In order to do meta-analysis the collection of information across various studies need not only to be summarized but their conversion into some common metric (i.e. effect size) is also required for further analysis. The accumulation of findings of hundreds of studies is a complex and laborious task. Meta-analysis being an observational study requires to be conducted with considerable care. Further, the explanation and presentation of findings require full understanding of the reviewer about how and why something happened. Any mistake, for example, inappropriate data, misinterpretation of findings may threaten the validity of the review. Cook et al. (1994) say that meta-analyses are ideal at identifying research holes and explaining the variations among studies.

Cooper (1998) elaborated the steps that are involved in doing meta-analysis in detail in his book and also provided some guidelines to cope with certain difficulties that meta-analyst may face. The sequence of the stages mentioned

above is not fixed and a meta-analyst sometimes may move backward as well as forward as required. Meta-analysis findings regarding research questions are described and discussed in Chapter-6, so it covers the last stage of meta-analysis. A summary of the steps of meta-analysis is described below. (see Table-4.12).

<b>Stage of Research</b>					
<b>Stage</b>	<b>Problem</b>			<b>Analysis and</b>	<b>Public</b>
<b>Characteristics</b>	<b>Formulation</b>	<b>Data Collection</b>	<b>Data Evaluation</b>	<b>Interpretation</b>	<b>Presentation</b>
Research question asked	What evidence should be included in the review?	What procedures should be used to find relevant evidence?	What retrieved evidence should be included in the review?	What procedures should be used to make inferences about the literature as a whole?	What information should be included in the review report?
Primary function in review	Constructing definition that distinguish relevant from irrelevant studies	Determining which source of potentially relevant studies to examine	Applying criteria separate "valid" from "invalid" studies	Synthesizing valid retrieved studies	Applying editorial criteria to separate important from unimportant information
Procedural differences that create variation in review conclusions	1. Differences in included operational definitions 2. Differences in operational details	Differences in the research contained in sources of information	1. Differences in quality criteria 2. Differences in the influence of nonquality criteria	Differences in rules of inference	Differences in guidelines for editorial judgement
Source of potential invalidity in review conclusions	1. Narrow concepts might make review conclusions less definitive and robust 2. Superficial operational detail might obscure interacting variables	1. Accessed studies might be qualitatively different from the target population studies 2. People sampled in accessible studies might be different from target population of people	1. Nonquality factors might cause improper weighting of study information 2. Omission in study report might make conclusions unreliable	1. Rules for distinguishing patterns from noise might be inappropriate 2. Synthesis-based evidence might be used to infer causality	1. Omission of review procedures might make conclusions irreproducible 2. Omission of review findings and study might make conclusions obsolete

**Table-4.12 Research Synthesis Conceptualized as a Research Project. (Source: Cooper, 1998 p.6; Cook et al., 1994 p. 8-9)**

Overall, the first stage of meta-analysis process such as problem formulation was covered in Chapter-1, Chapter-2 and in Chapter-3 that leads to research questions. The second and third stage such as data collection and data evaluation was covered in Chapter-5 respectively, whereas Chapter-6 describes data-analysis and its presentation and it covers the last stage (i.e. Analysis and presentation of findings) in meta-analysis process.

#### **4.7.4. Criticism of Meta-Analysis**

Meta-Analysis has also been criticised since its introduction by Glass (1976). The criticism concerns:

- giving too much attention to low quality and poor studies
- studies included in meta-analysis do not reflect the presence of all studies conducted on the topic under research
- overemphasis on single values (i.e. summarize the research domain by a single value such as mean effect size)
- mixes apples and oranges
- camouflaging ‘garbage in garbage out’
- covers/includes multiple results from the same study
- as the number of studies included in meta-analysis increases, the probability of rejecting the null hypothesis is more
- published results are mostly included in meta-analysis (sampling bias).

The usual argument is that studies with non-significant findings are hardly ever published but do contain significant results. The published studies have a tendency to be biased towards positive findings and show higher effect sizes as compared to the unpublished (Kraemer and Andrews, 1982 p. 405; Bangert-Drowns, 1986 p. 397). Glass et al. (1981) also supported this argument. Other

researchers also pointed out that published research is biased toward statistically significant findings whereas non-significant results are hardly submitted to be published or published (see Cooper, 1998 p.54-55; Green and Hall, 1984 p. 46-47). Smith (1980) described that results published in journals on the average are one-third standard deviation more favourable towards the hypothesis as compared to unpublished results in dissertations. Straub et al. (1994) mentioned manuscript rejection rates in the top IS academic journals as very high (i.e. average 85-90%), so researchers respond to journal rejections by putting their work in file drawer rather than rework it. Rosenthal (1979) referred to it as the file-drawer problem. Meta-analysis may provide misleading results on skipping unpublished studies to be included.

A number of suggestions/comments has been made to cope with such criticisms (Rosenthal, 1984; Glass et al., 1981). Glass et al. (1981) say that there is no need to compare the studies that have the same findings in all respects while replying to the criticism “meta-analysis mixes apples and oranges”. Mostly those studies require integration which contain fragmented findings on the subject concerned and the reader is unable to reach some conclusion. Rosenthal (1984) says that criticism such as “meta-analysis summarize a research domain by a single value (i.e. mean effect size)” may be removed when meta-analysis not only combines effect sizes but also compares and expresses the variation within different studies either due to sample size or of moderating variables. Exploring the variables that explain the difference in results among the studies and the ability to generate the notions that explain these relations is the most creative and challenging aspect of the research synthesis process (Cooper, 1998).

The criticism of including only a set of studies representing the population of all studies conducted on the topic can be compensated for by calculating fail-safe N. Fail-safe N means the number of additional studies that would be necessary to reverse the conclusion (Cooper, 1979 p. 134). Fail-safe N can point out the file-drawer problem but may not solve the problem absolutely. The meta-analyst should consider as many unpublished studies as possible to cope with such an imbalance of studies caused by the published ones included in analysis. The



criticism about meta-analysis is not so serious as to reject it as a research methodology. The major strength of the research synthesis may be referred to its usefulness for studying the generality of the effects. Some argue that knowledge is usually sought by research synthesis (Hunt, 1997).

#### **4.8. Summary**

The basic objective is to select a suitable research approach for my research. Keeping in mind the nature of the problem to be investigated, past research findings and their controversies in such concerns, and further calls for needed research in that domain, meta-analysis as a research method is proposed. Although it is of growing interest in the IS field, its usage in other research areas such as education, medicine, and psychology is well recognized. Meta-analysis is widely accepted as a method of summarizing the findings of empirical studies within the behavioural, and social sciences (Hunter and Schmidt, 1990; Lipsey and Wilson, 2001) and its use as a research strategy is growing (Hunt, 1997 p.161; Cook et al., p. 13). As far as the IS field is concerned, surveys, and case studies are the mostly widely adopted research methods in the past. The analysis of previous studies that discussed the matter of IS research methodologies adoption trends led to the conclusion that empirical research is more preferred and growing as compared to non-empirical. The appropriateness of any research method is argued to be concerned with the research question being addressed and also might be situation dependent.

Quantitative research reviews might play a vital role in exploring the causes of differences among researchers in their findings on the same topic. One of the advantages of such reviews is their ability to not only explore whether there is support for a certain hypothesis but why such support varies among different studies. It also helps in investigating other intervening factors that may cause variations among studies. Although meta-analysis (i.e. quantitative research method) has been criticised for certain problems that may occur during its process, those might be countered with the careful selection of data and its analysis. The statistical procedures being used in meta-analysis may help to

analyse the past findings to reach some conclusion that a single study merely can not provide.

Keeping in view the mixed and inconclusive past research findings about whether user participation contributes or not towards user satisfaction and consequently systems success, the inconclusive relationship between system usage and user satisfaction, and the desire to explore the ultimate effects of user expectation and effective communication on user satisfaction, meta-analysis as a research method appeals suitable. It may provide confident conclusions as it not only investigates the main relationships among study variables but also explores reasons that might cause variations in findings among researchers on the same topic. Despite the limitations of meta-analysis, if meta-analysis findings are interpreted cautiously then it can go further than any traditional literature review or individual study to establish the generalizability about the phenomena under research.

Data collection is an essential part of any research endeavour. In order to avoid 'garbage in garbage out', data should always be error free. In doing meta-analysis, data need to be collected from previous studies (published or unpublished). The next chapter explains source of data and different data collection techniques that are adopted for this research.

## **5. Data Collection and Manipulation**

### **5.1. Introduction**

This chapter discusses available sources of data and different data collection techniques that might be applied in doing meta-analysis. It might be true that different authors may show the relationship between dependent and independent variables in different statistic. Such findings need conversion into some common metric for further comparison. Therefore different conversion formulae are described for further use. In the previous chapter the trends in adopting different research methodologies in IS research were described. Further, the reasons for choosing meta-analysis as a research method for this research along with its necessary steps that should be carried out to do meta-analysis were explained.

In any research endeavour, data are needed to be collected, analysed and then results are presented. Data collection is an essential part of those activities that are involved in every research work. What type of data is required and in what format, the possible source, and how it should be collected (i.e. more suitable technique), are the basic questions that need researcher's attention. The methods of data collection are almost related to the research methodology adopted for a particular research. Different methods can be used for data collection. Generally, by asking/enquiring opinions/experiences of people, observing them and making inferences, conducting experiments, and by previous available documentation. The successful data collection might have a substantial impact on the undergoing research in a particular domain. The nature of the data may be primary or secondary (Howard and Sharp, 1983). The primary data are collected by the researcher himself through observations, experiments, questionnaire, and so on whereas the secondary data is basically collected by others (Howard and Sharp, 1983; Bryman, 1989) that might be used and analysed by a researcher from different angle. The source of secondary data is commonly published or unpublished literature. The libraries, on-line services, linked references may be useful sources. The Internet might be a common source that can be utilized to

search and collect needed data/information, if available. The secondary data may exist in numerical form, opinions, statements, and theories that are usually collected and produced by other researchers.

Gaining access to, recording and arranging data of any of the category mentioned above always require efforts and knowledge of a particular data collection method. Irrespective of whether the researcher is concerned with primary or secondary data, the more important task is to manage the data in some suitable form for further intended analysis. Data should always be free of errors. Any ambiguity in recording the data can cause an inverse impact on derived results, so the trustworthiness of the research conclusions may be suspect.

Possible sources that might be helpful in collecting the data either of primary or secondary nature are well described in the literature (see Howard and Sharp, 1983; Cornford and Smithson, 1996; Cooper 1998; Tashakkori and Teddlie, 1998; Lipsey and Wilson, 2001). After data collection, the next step required is to process, analyse and present it in a proper way. Choosing a suitable method, collecting and then formatting the data means a lot of further analysis to achieve meaningful results.

To carry out Meta-analysis, the researcher needs to collect the information that other studies found on a specific issue and manipulate those into some common metric for further processing. The key to meta-analysis is an 'effect size' statistic that explains the quantitative findings of a set of research studies in some standardized form that permits further meaningful comparison/analysis across the studies (Lipsey and Wilson, 2001).

## **5.2. The Effect Size: A Metric of Relationship**

The phenomenon in the population under statistical test is considered to be either present (i.e. null hypothesis false) or absent (i.e. null hypothesis true) (Cohen, 1969). In meta-analysis various studies on the topic require to be aggregated. It is not unusual that different studies might use different statistics to measure and describe the relationships between study variables. The 'effect size' provides a

statistical standardization of study findings (i.e. a numerical value) that show relationship between variables and might be interpretable in a consistent fashion across all studies included in the meta-analysis. The relationships between variables might appear in 'd', 'r', 'F', ' $\chi^2$ ', and 't' statistics. In order to compare or aggregate the findings (i.e. data) along different studies the relationship between variables are required to be in the same statistics. There are various effect size statistics that might be workable for research synthesis but commonly a few such as 'd', or 'r' statistics are preferred and used to conduct meta-analysis. Different procedures to conduct meta-analysis such as combining probability ('p') values or Z-scores, correlations ('r'), standard differences between means ('d') and odd-ratio are discussed (see Glass, 1976; Wolf, 1986; Rosenthal, 1991; Hunter and Schmidt, 1990; Lipsey and Wilson, 2001). Correlation coefficient measures the degree of association. If there is no correlation between two variables then its value is zero, otherwise the value falls within plus or minus 1.

A common metric usually used as a measure of relationship between variables is called "effect size". It indicates the strength of relationships between the variables under study. Cohen (1969 p. 9) defined effect size as "the degree to which the phenomenon is present in the population," or "the degree to which the null hypothesis is false". The effect size may take a value zero when null hypothesis is true otherwise a non-zero when null hypothesis is false. Near about dozens of effect size metrics exist (see Cohen, 1969). Pearson's product moment 'r', Cohen's 'd' and Glass's  $\Delta$  are common effect size estimators that are used by researchers. Hunter and Schmidt (1990) introduced a method that uses either 'r' or 'd' as a combinatorial statistics and does not rely on combination of 'p' values or Z-scores. Some others also criticize 'p' value as not a very good effect size statistics (Lipsey and Wilson, 2001). The 'r' index is used to express a relationship between two continuous variables where as 'd' relates one dichotomous variable to a continuous (Hunt, 1997). Rosenthal (1991) mentioned a number of reasons why to prefer effect size 'r' on 'd'. These are flexibility, simplicity of interpretation of 'r', and difficulty in computing 'd' from primary studies. The effect size (Pearson's 'r') is preferred and used by the author because of well-known, more familiar statistics and is more suitable for this study.

### 5.2.1. The Interpretation of Effect Sizes

The effect size is "...a pure (dimensionless) number, one not dependent on the units of the measurement scale(s)" (Cohen, 1969 p. 74). The correlation coefficient 'r' might serve this purpose. Its values fall within the range of -1.0 to +1.0 that represent the degree of relationship with direction between two different variables. Generally, the 'measurement' deals with the process of assigning labels or values to different levels, magnitudes, or qualitative aspects of an event or attribute (Tashakkori and Teddlie, 1998). In 1969, first time Cohen (1969) attempted to quantify the strength of relationship (i.e. in term of effect size 'r', and 'd'). The 'relationship' refers to linear correlation indexed by Pearson's 'r' in this study. According to him the range of values within 0 to 1.0 (i.e. effect size) may be considered as "small", "medium", and "large". These conventions are as under: (see Table-5.1)

<b>Effect Size</b>	<b>Cohen's 'd'</b>	<b>Pearson's 'r'</b>
<i>Small</i>	0.20	0.10
<i>Medium</i>	0.50	0.30
<i>Large</i>	0.80	0.50

Table-5.1. **Conventions: The 'Strength of Relationship' between two variables.**  
(Source: Cohen, 1969 page 79)

The value of 'r' may be either obtained from the publications directly, or converted from other reported statistics such as F, t, d, or  $\chi^2$  to 'r' using standard formulae discussed in the next section.

### 5.2.2. Combining Effect Sizes

Meta-analysis is a method of data analysis and not a data collection strategy. Meta-analysis aggregate multiple studies conducted separately and all are supposed to be empirical. The unit of analysis is the individual research study. Different studies might have different sample sizes. Some argue that studies with large sample size may yield better estimates, so should contribute more to the combined results (Hunt, 1997; Lipsey and Wilson, 2001). An effect size based on

large sample size may contain less sampling error than an effect size based on small sample size. It implies that effect sizes should not be considered as if they were equal in statistical analysis. So before calculating average across studies it is suggested to weight each effect size by its sample size. The weighted average of effect sizes may be the best estimate showing the strength of relationship between study variables. The average estimate may give the most likely population value of the effect size based in the known studies (Hunt, 1997). Hunter and Schmidt (1990) noted that it would be a very rare case that an unweighted analysis would be better. A caution for how to deal with outliers (i.e. large effect sizes that may not be believed to be representatives of study findings and may be observed by examining the distribution of effect sizes included in meta-analysis (Hedges and Olkin, 1985), some suggests to remove those or record them as moderate ones called Winsorizing (Lipsey and Wilson, 2001). The purpose of meta-analysis is to arrive at reasonable summary of the quantitative findings in the previous research and not simply to average the findings. In case, the effect sizes are found to be non-homogenous then search for moderate variables is suggested (Lipsey and Wilson, 2001). A moderator variable is defined as "one which systematically modifies either the form and/or strength of the relationship between the predictor and a criterion variable" (Sharma et al., 1981 p. 291).

### **5.2.3. Causes of Variations Across Studies**

It is almost difficult to say that the study is conducted very perfectly. Variations among studies may occur due to different causes. Hunter and Schmidt (1990) mentioned different dimensions along which studies may fail to be perfect. So any errors in a study eventually affect the results. They denoted study imperfections as "artifacts". The variation in study findings on the same subject may stem from different aspects related to individual studies or may be due to artifacts. A population effect size may be reliably interpreted if the data set is homogenous. 'Homogenous' means that the variance across studies is due to only sampling error. Conflicting findings within studies can some times be explained by sampling error. If the number of studies is large then the impact of sampling error supposed to be smaller depending on the sample size. On the other hand

sampling error of an effect size is high if studies are small in number. Other various sources of artifactual variance may be quality of measure, data entry errors, different definitions or precision variables, and mistakes in analysis (Trotman and Wood, 1991; Forza and Nuzzo, 1998). How to evaluate that variability is either only due to sampling error or also due to other moderators is mentioned under data manipulation.

#### **5.2.4. How to Deal with Replications and Methodological Weaknesses**

The meta-analyst may face some complications with primary data. For example, some studies may provide more than one effect sizes for the same relation. Either to include or not more than one effect size in analysis is controversial among researcher (see Wolf, 1986 p. 46). Some prefer to include whereas some avoid. Wolf (1986 p. 54) says that “how to deal with multiple results within a single study remains a difficult issue that each meta-analyst must confront”. Some argue that including multiple results from a single study may inflate the sample size of statistical tests, violate the assumption of independent data points and may introduce substantial error into statistical inference (Kulik, 1983 cited in Wolf, 1986 p. 46; Wolf, 1986 p. 54; Lipsey and Wilson, 2001 p. 105), whereas Hunter and Schmidt (1986 p. 453) say that “It should be noted that while violations of the assumption of independence do affect (inflate) the observed variation of effect sizes across such studies, such violations have no systematic effect on the mean  $d$  or mean  $r$  values in meta-analysis”. The author included more than one effect sizes from a single study in analysis if available and treated total sample size as 'No of effect sizes' rather than 'No of studies'. Its common practice in meta-analysis (see Hwang and Thorn, 1999).

##### **(a) Replications**

It is common example that multiple items may represent a single variable. For example, let  $x$ ,  $y$ , and  $z$  variables indicate user participation in IS development and are correlated with system's performance ( $s$ ). Within primary data three correlation values (i.e. correlation between  $x$  and  $s$ , correlation between  $y$  and  $s$ , and correlation  $z$  with  $s$ ) are available independently. Three correlation values can



be averaged and average may be considered as one value to represent the study (Hunter and Schmidt, 1990). So in case the author faced such situation, the above technique is adopted. Three kinds of replications such as fully replicated design, conceptual replication, and analysis of subgroups (for detail see Hunter and Schmidt, 1990). The above example relates to conceptual replication. They mentioned that replication within a study may be used in either of the two ways such as: (1) each conceptual replication may be represented by different outcome value that can either be cumulated within the study or may contribute as a set to a larger cumulation, or (2) measurements can be combined resulting a single value.

### **(b) Methodological Weaknesses**

Although some reviewers wish to exclude the studies which they perceive as having methodological inadequacies (Slavin, 1986), but is not reasonable as it seems to be (Hunter and Schmidt, 1990). It all depends upon theoretical assumptions and may be false or true whereas those who believe the assumptions hardly feel to test them. Hunter and Schmidt (1990 p. 495) say that no study can be “without methodological inadequacy”. They further added that “methodological inadequacies do not always cause biased findings, and, prior to the analyses of the full set of studies on the topic, it is difficult to determine reliably when methodological inadequacies have caused biased findings and when they have not” (p. 495). They suggested for testing the moderator variables if one observes substantial variations across studies and are solely not due to artifacts. The factors that might cause variation in magnitude of the relationship between two variables are known as moderator variables (Rosenthal, 1991).

According to Glass et al. (1981), there is no strong relationship between quality of study and mean effect size in typical meta-analysis. Similarly, Rosenthal (1991) also pointed out that quality of study has no great effect on mean effect size. On the other hand, the consequence of excluding studies on a specific topic from meta-analysis may affect the inferences drawn from the review and might be serious. Any available study on the topic with comprehensive details must not be excluded. Rosenthal (1991) suggested for locating the maximum studies

irrespective of their nature in terms of poor or good. Hunter and Schmidt (1990) posit that methodological hypotheses are less likely to be true as they are based on a much weaker data base.

### **5.2.5. Study Statistics Conversions to Effect Size**

It is not unusual that separate studies may examine the same relationship between same variables but report that in different metrics. The data collected from such studies that appear in different statistics require to be converted in to a common metric 'effect size' ('d', 'r' or any other) for later accumulation. It has already been mentioned that Pearson's 'r' is opted as 'effect size' for this research, so it should be preferred to convert other effect sizes into 'r'. It may also happen that data available within a study is suitable to calculate 'd', and then might be converted into 'r'. So to calculate 'd', formulae are mentioned in Table-5.2. A software on Meta-Analysis (Schwarzer, 1998) was also found useful. Further the statistics tables that might be helpful are also used.

Meta-analyst may face a problem that some studies do not provide necessary statistics that might be used to calculate the effect size. The problem seem to be more frustrating when a primay researcher reports that the relation between study variables is 'not significant' and gives no statistic whatsoever. So the meta-analyst realy stuck. A bias in estimating average effect size may occur if one assume such missing values by himself. The better way is to approach the author if possible. Cook et al. (1994) mentioned some methods (i.e. Multiple Imputation (Rubin 1987), Model-based estimation (Little and Rubin 1987) that might be helpful to deal with the problems of missing data. These are not used in this research. The studies that report results in terms of regression analysis also restrict the meta-analyst to find the effect size for an individul independent variable that can not be derived, so such studies are excluded. Further, the studies that did not provide quantitative measurements at all, can not be included in meta-analysis. Standard procedures and formulae showed in Table-5.2 can be used to convert study statistics in to required metric (i.e. Effect Size) (see Wolf, 1986 p. 35; Rosenthal, 1991 p. 18-19, 25; Lyons, 1998).

Table-5.2. Formula for Transformation to 'r'

Statistic to be Converted	Formula for Transformation to 'r'	Brief Notes
t	$r = \sqrt{\frac{t^2}{t^2 + df}}$	Can use with paired or unpaired tests
F	$r = \sqrt{\frac{F}{F + df \text{ (error)}}}$	Use only with one-way ANOVA
$\chi^2$	$r = \sqrt{\frac{\chi^2}{N}}$	N = Sample Size Use only when df = 1
d	$r = \frac{d}{\sqrt{d^2 + \frac{4(N-2)}{N}}}$	d = Cohen's d N = Combind Sample Size
p	$r = \frac{Z}{\sqrt{N}}$	N = sample Size Convert 2 tailed p value in to one tailed p (i.e. p/2). Then look up the value of Z in probability table. Can use either exact p or an approximate p reported by author (e.g. p < 0.5)
<b>Formulas for Transformation to 'd'</b>		
t	$d = \frac{2t}{\sqrt{df}}$	can be used with either paired or unpaired t tests
F	$d = \frac{2\sqrt{F}}{\sqrt{df \text{ (error)}}}$	Use only with one way ANOVA
r	$d = \frac{2r}{\sqrt{1 - r^2}}$	
<b>Calculation of 'd'</b>		
Means and Standard Deviations	$d = \frac{X_e - X_c}{S_p}$	X <sub>e</sub> Experimental Group Mean X <sub>c</sub> Contro Group Mean S <sub>p</sub> pooled (within Subjects) Standard Deviation
Pooled within Subjects Variance	$S^2_p = \frac{(N_e - 1)S_e^2 + (N_c - 1) S_c^2}{(N_e + N_c - 2)}$	N <sub>e</sub> Experimental Group N N <sub>c</sub> Control Group N S <sub>e</sub> <sup>2</sup> Experimental Group Variance S <sub>c</sub> <sup>2</sup> Control Group Variance

### **5.3. Organizing the Data Search**

The basic source of data to carry out meta-analysis is ‘previously published, unpublished’ studies on the topic under research. In the absence of previous studies, meta-analysis can not be attempted, so can not contribute to the existing research. It might be possible that meta-analysis may provide some important information that existing studies are unable to provide individually. The search for data after exploring previous studies is pain taking and needs a lot of efforts. Data collection process should be planned according to research question and must be unbiased. It might happen that a research method has its own constraints on the type of data collection procedures so the researcher should find some creative ways to cope with the situation. A large amount of information might be available in public domain data sets. Data sets very concerned to the study domain might be searched for secondary analysis. Cook et al. (1994) suggested computerized databases, examine the list of references at the end of papers/reports and to contact fellow scholars as possible sources. The main goal of these approaches is to find and include maximum related studies in analysis. The author attempted all of the three approaches in addition to Internet facilities. For example, computerized databases such as INSPEC, INSIDE WEB, WEB of SCIENCE, BIDS, and other sources like ACM digital library, table of contents and abstracts of relevant journals, nearest university libraries and British library are accessed. The list of references at the end of papers was found to be very useful. IS researchers/scholars were contacted personally by emails.

#### **5.3.1. Unpublished Studies**

Cook et al. (1994) argued that the data with dissertations are mostly of high quality. Unpublished studies are difficult to search and then collect. On including unpublished studies the meta-analyst may cope with ‘file-drawer’ problem. Rosenthal (1979) identified ‘file-drawer’ problem as a situation in which published studies are bias towards reporting only significant results. Although author was not able to collect many unpublished studies such as dissertation, working papers and studies even after repeated requests on the net (i.e. using IS

World platform) but the response was not entirely hopeless. A few of the authors sent copies of their dissertations and publications whereas many others sent their publications, working papers on my request almost free of cost. In addition, some dissertations were acquired from UMI Dissertation Publishing. Further, in case if data was missing or myself was not clear about findings, the authors were requested for their opinion/advice. Most of the authors responded and treated my request sympathetically. They co-operated well and provided needed information at their convenience. Many think that every study should be found. To collect and include each and every study on the subject likely to be very difficult if not impossible.

#### **5.4. Publication Bias: A Problem**

It is unlikely that one can uncover every study concerned with the hypothesis under research. It may be assumed that a number of studies with non-significant effect size are either rejected or not being submitted for publication. Generally the published literature reports more significant findings as compared to unpublished (Light and Pillemer, 1984; Hunt, 1997; Cook et al., 1994; Lipsey and Wilson, 2001). Smith (1980 p. 22) mentioned that published literature represent only 5% of false positives in a population of studies wherein the null hypothesis is true. He further added that findings reported in journals are one-third standard deviation more favourably disposed towards the favoured hypotheses of the researcher as compared with findings reported in dissertations. Greenwald (1975) found that authors prefer more to submit their significant findings versus non-significant for publications. Such features likely to cause publication bias. According to Rosenthal (1979), the studies supporting the null hypothesis of no significant results are more likely to be buried away in file drawers. In this way a biased conclusion may be obtained from a meta-analysis that includes the effects of a strong bias toward publishing positive but not negative results. Kraemer and Andrews (1982, p. 405) wrote that published research studies tend to be biased towards positive findings. Similarly, Wolf (1986, p. 37) says that "Reports of non significant findings are generally unpublished". Researchers (Rosenthal, 1979; Hedges and Olkin, 1985) have

addressed this problem and they suggested to find the number of studies confirming the null hypothesis that would be needed to reverse a conclusion that a significant relationship exists. Cooper (1979) called it “Fail Safe N ( $N_{fs}$ )”.

#### **5.4.1. Dealing with Publication Bias**

The problem of publication bias may be reduced by unearthing unpublished studies by some possible means such as phoning, writing and asking knowledgeable investigators. Again it is difficult to find each and every study on the subject under research. Rosenthal (1979) approach deals with file drawer problem and assumes that unpublished studies have an average significance zero. Although this approach is in use but was criticized by others because it is based on the null hypothesis and assumes an average zero significance for unknown studies (Hunt, 1997). Orwin (1983) mentioned fail-safe N calculation using effect size 'd'. He stated absence of a statistical model as shortcomings of fail-safe N.

The question is how many studies of this kind are needed to negate the results of meta-analysis. Hunter and Schmidt (1990) suggest to calculate, how many “lost” studies must exist to bring  $r_k$  to  $r_c$  (where  $r_k$  is the mean effect size  $r$  for  $k$  studies,  $r_c$  the critical mean effect size  $r$  that may be considered theoretically or practically significant) and derived certain formulas (see more details under heading Fail-Safe N). It determines the number of additional studies needed to reduce the mean effect size to a specified or criterion level. Although this technique have the advantage to calculate the number of studies needed but the careful sampling might be a good protection against publication bias (Lipsey and Wilson, 2001).

### **5.5. Data Collection**

A brief summary of studies that are included in this research is mentioned on next page. The details consist of number of studies per Journal/Conference (see Table-5.3), the No. of effect sizes included for each relationship (see Table-5.4) (for example, user participation Vs user satisfaction, effective communication Vs user satisfaction, user expectation Vs user satisfaction and others).

Published/Un-published Studies	User participation and Satisfaction <sup>3</sup>	Effective Communication and User Satisfaction	User Expectations and Satisfaction	System Usage and User Satisfaction <sup>3</sup>
Journals	82	07	15	51
Conferences	16	02	01	05
Dissertations	10	01	01	01
Working Papers/Books	01	01	-	-
<b>TOTAL</b>	<b>109</b>	<b>11</b>	<b>17</b>	<b>57</b>

Table-5.3. Source of studies included in meta-analysis

Table 5.4. No. of studies for each relationship included in meta-analysis

Study Characteristics	Year Range	No. of Studies
<b>Year Published</b>	<b>1975-2000</b>	
<b>No. of Articles:</b>		
<b>Specified Relationship:</b>		
i) User Participation/Involvement and User Satisfaction <sup>4</sup>	1973-2000	109
ii) Systems Usage and User Satisfaction	1981-1998	55
iii) User Expectation and User Satisfaction	1981-1998	17
iv) Effective Communication and User Satisfaction	1977-1999	11
<b>No. of Effect Sizes:</b>		
i) User Participation and User Satisfaction	1973-2000	26
ii) User Participation and system Usage	1979-1996	14
iii) User Participation and perceived Usefulness	1986-1995	08
iv) User participation and System Quality	1981-1999	06
v) User participation and Information Quality	1984-1999	06
vi) User Involvement and User Satisfaction	1974-1999	53
vii) User Involvement and System Usage	1974-1999	24
viii) User involvement and Perceived Usefulness	1986-1999	12
ix) User involvement and System Quality	1975-1999	10
x) User involvement and Information Quality	1986-1999	08
xi) User involvement and System Acceptance	1976-2000	02
xii) User involvement and Ease of Use	1988-1994	02
xiii) Systems Usage and User Satisfaction	1981-1998	58
xiv) User Expectation and User Satisfaction	1981-1998	17
xv) Effective Communication and User Satisfaction	1977-1999	11

<sup>3,4</sup> User satisfaction is considered as multi-dimensional construct in the research model. Data of some studies was repeatedly published, so included once. It leads to 101 studies included in meta-analysis. Similarly, avoiding repeatedly published studies leads to 55 studies regarding system usage and user satisfaction relationship.

### 5.5.1. System Usage Vs User Satisfaction Studies

The data collected from individual studies are aggregated and analyzed statistically to reach some conclusion. The findings from 55 empirical studies were included for meta-analysis (Table-5.5). An Effect size for each study determining the correlation between systems usage and users' satisfaction was calculated. In some studies (Sanders and Courtney 1985; Mawhinney and Lederer, 1990) more than one effect size value was available and so was included. The Effect Size (Pearson's 'r') is used because it is a well-known statistic. The value of 'r' is either obtained from the publication directly or converted from other reported statistics such as F, t, d, or  $\chi^2$  to 'r' using standard formulas (Wolf, 1986; Lyons, 1998). Most of the studies considered the system usage construct as behaviour and user satisfaction as attitude. Details of data and calculated effect sizes are mentioned Table-5.5.

Table-5.5. The relationship 'r' between System Usage and User Satisfaction (studies included in meta-analysis)<sup>1</sup>

S. No.	Study	Year	Sample N	Effect Size 'r'
1	Igbaria, M. and Zviran, M	1991	294	0.26
2	Igbaria, M.	1990	187	0.14
3	Kivijarvi, H. and Zmud, R. W.	1993	159	0.44
4	Barki, H. and Huff, S. L.	1985	42	0.394
5	Choe, J.	1998	450	0.515
6	Baroudi et al.	1986	200	0.28
7	Gelderman, M.	1998	73	0.17
8	Ang, J. and Soh, P. H.	1997	133	0
9	Igbaria, M. and Nachman, S.	1990	104	0.27
10	Udo, G.	1992	201	0.1728
11	Sanders, G. L. and Courteney, J. F.	1985	132	0.317
			156	0.228
			90	0.278

<sup>1</sup> For references, see appendix-E



12	Torkzedah, G. and Doll, W. G.	1999	409	0.29
13	Lee et al.	1995	236	0.287
14	Leidner, D. E.	1996	89	0.15
15	Bergeron et al.	1995	38	0.33
16	Liang, T. P.	1986	35	0.114
17	Snitkin, S. R. and King, W. R.	1986	31	0.352
18	Ein-Dor, P. and Segev, E.	1986	18	0.545
19	Ettema, J. S.	1985	131	0.073
20	Raymond, L.	1990	34	0.286
21	Suh et al.	1994	150	0.29
22	Igbaria, M. and Tan, M.	1997	371	0.39
23	Winter et al.	1998	279	0.26
24	Amoroso, D. I. and Cheney, P. H.	1991	506	0.18
25	Yoon, Y. and Guimaraes, T.	1995	69	0.54
26	Guimaraes et al.	1996	114	0.5
27	Ein-Dor et al.	1984	490	0.462
28	Conrath, D. W. and Sharma, R. S.	1993	167	0.55
29	Mawhinney, C. H. and Lederer, A. L.	1990	66	0.23
			39	-0.02
30	Udo, G. J. and Guimaraes, T.	1994	201	0.17
31	Ein-Dor et al.	1981	18	0.302
32	Loh, L. and Ong, Y.	1998	84	0.014
33	Nath, R.	1989	98	0.32
34	Maish, A. M.	1979	50	0.356
35	Srinivasan, A.	1985	29	-0.05
36	Cheney, P. H. and Dickson, G. W.	1982	79	0.233
37	Igbaria et al.	1994	471	0.24
38	Robey, D.	1979	66	0.42
39	Mawhinney, C. H.	1990	95	-0.002
40	Khalil, O. E. M. and Elkordey, M. M.	1999	120	0.359
41	Kim et al.	1998	134	0.255
42	Schewe, C. D.	1976	79	0
43	Sanders, G. L.	1983	264	0.247
44	Lawrence, M. and Low, G.	1993	155	0
45	Saarinen, T.	1996	48	0.28
46	Igbaria, M. and Guimaraes, T.	1994	185	0.195

47	Zinkhan et al.	1987	165	0.235
48	Wilkins, M.	1996	72	0.28
49	Harrison, A. W. and Rainer, R. K.	1996	653	0.11
50	Vlahos, G. E. and Ferratt, T. W.	1995	55	0.27
51	Guimaraes, T. and Igarria, M.	1997	186	0.21
52	Raymond, L.	1985	464	0.356
53	McGill et al.	2000	79	0.274
54	Seddon and Kiew	1996	94	0.572
55	Zenatelli, N.	1994	358	-0.14

### 5.5.2. User Expectations Vs User Satisfaction Studies

The studies included in meta-analysis to find out the relationship between user expectations and user satisfaction are mention in the following table.

**Table-5.6 The relationship 'r' between User Expectations and User Satisfaction (studies included in meta-analysis)<sup>1</sup>**

S. No	Author	Year	Sample N	Effect Size ('r')
1	Rushinek, A. and Rushinek, F. S.	1986	4448	0.361
2	Ryker, R., Nath, R. and Henson, J	1997	252	0.14
3	Spreng, R. A., Mackenzie, B. S. and Olshavsky, R. W.	1996	207	0.26
4	Barki, H.	1990	144	0.20
5	Udo, G. J. and Guimaraes, T.	1994	201	0.08
6	Lawrence, M. and Low, G.	1993	59	0.260
			96	0.360
7	Yoon, Y., Guimaraes, T. and O'Neal, Q.	1995	69	0.380
8	Kahai, S. S., Solierri, S. A., Felo, A. J.	1998	115	0.476
9	Loh, L. and Ong, Y.	1998	84	0.46
10	Galletta, D. F., Ahuja, M, Teo, T. and Peace, A. G.	1995	32	0.323
11	Ginzberg, M. J.	1981	29	0.256
12	Barki, H. and Huff, S. L.	1985	42	0.396
13	Szajna, B. and Scamell, R. W.	1993	159	0.15
14	Marcolin, B. L.	1994	120	0.282
15	Palvia, P. C.	1996	100	0.12
16	Compeau, D., Higgins, C. A., and Huff, S.	1999	394	0.40 <sup>2</sup>
17	Henry, J. w. and Martinko, M. J.	1997	139	0.368

<sup>1</sup> For references, see appendix-C

<sup>2</sup> User's performance related expectations

### 5.5.3. User-Developer Effective Communication Vs User Satisfaction Studies

The data representing the relation between user-developer effective communication and user satisfaction from various studies that are included in meta-analysis are given in Table-5.7.

Table-5.7. The relationship 'r' between Effective Communication and User Satisfaction (studies included in meta-analysis)<sup>1</sup>.

S. No	Author	Year	N	Effect Size ('r')
1	McKeen, J. D., Guimaraes, T. and Wetherbe, J.C.	1993	151	0.188
2	Guimaraes, T. and McKeen, J. D.	1993	151	0.188
3	Edstrom, A.	1977	13	0.57
4	Udo, G.	1992	201	(Sys. Use) 0.2473
5	Palvia, P. C.	1996	100	0.189
6	Srivihok, A	1999	52	0.72
7	Ebadi, Y. M. and Utterback	1984	113	(Proj. Succ) 0.642
8	Raymond, L.	1987	464	0.08
9	Young and Watson	1995	81	-0.116
10	Pinto, J. K. and Mantel, S. J.	1990	97	0.20
11	Sartore, A.	1977	111	0.6708

### 5.5.4. User Participation Vs User Satisfaction Studies

User satisfaction has been considered as a dependent variable. Different factors that represent and contribute towards satisfaction and are abbreviated as below:

---

<sup>1</sup> For references, see appendix-D

1) **US**: User Satisfaction 2) **IQ**: Information Quality 3) **PU**: Perceived Usefulness 4) **SQ**: System Quality 5) **SA**: System Acceptance 6) **SU**: System Usage 7) **EOU**: Ease of Use

Table-5.8. The relationship 'r' between User Participation and User Satisfaction (studies included in meta-analysis)<sup>1</sup>.

S. No	Author	Term Used	Year	(N)	US	SQ	IQ	PU	SA	SU	EOU
1	Sioukas, A. V.	Involvement	1995	75	0.41						
2	Garrity, E. J.; Cervený and Sanders, G. L.	Participation	1995	107				0.14			
		Participation	1995	167				0.35			
3	Garrity, E. J.	Participation	1994	107				0.14			
		Participation	1994	141				0.33			
		Participation	1994	27				0.45			
4	Guimaraes, T. and McKeen, J.	Participation	1993	151	0.225						
5	Yap, C. S., Soh, C. P. P. and Raman, K. S.	Participation	1992	94	0.229						
6	MC Keen, Guimaraes, T. and Wetherbe, J. C.	Participation	1994	151	0.414						
7	Yoon, Y. Guimaraes, T. and O'Neal, Q	Involvement	1995	69	0.34	0.114	0.25				
8	Igbaria, M. and Guimaraes, T.	Involvement	1994	185	0.46			0.45		0.265	0.06
9	Roth, L. and Bartholome, L.	Participation	1994	115	0.135						

<sup>1</sup> For references, see appendix-B

10	Nicholos, P. and O'Connor, M.	Involvement	1990	77	0.34						
11	Franz, C. R. and Robey, D.	Involvement	1986	118				0.285			
12	Doll, W. J. and Torkzadeh, G.	Involvement	1989	564	0.321						
13	Kappelman, L. A. and McLean, E. R.	Participation	1991	140	0.238						
		Involvement	1991	126	0.339						
14	King, W. R. and Lee, T.	Participation	1991	91	0.33						
		Involvement	1991	91	0.28						
15	Lawrence, M. and Low, G.	Involvement	1993	96	0.66					-0.1	
		Involvement	1993	59	0.72					-0.22	
16	Baroudi J. J., Olson, M. H., and Ives, B.	Involvement	1986	200	0.18					0.28	
17	Allingham and O'Connor	Involvement	1992	77	0.34						
18	Amoako-Gyampah and White	Involvement	1993	52	0.43						
19	Guimaraes, T., Yoon, Y. and Clevenson, A.	Involvement	1996	114	0.2					0.09	
20	Srivihok, A.	Participation	1999	52	0.37	0.4	0.26				
		Involvement	1999	52	0.39	0.43	0.42				
21	Igersheim, R. H.	Involvement	1976	225	0.39				0.43		
22	Swanson, E. B.	Involvement	1974	37	0.514					0.276	
23	Kim, E and Lee, J.	Participation	1986	75						0.206	
24	Powers, R. and Dickson, G.	Participation	1973	20	0.286						
25	Page, S. M.	Involvement	1998	54				0.321		0.095	
		Involvement	1998	61							

26	Edstrom, A.	Involvement	1977	13	0.51						
27	Maish, M. A.	Participation	1979	56	0.197					0.21	
28	Blili, S., Raymond, L. and Rivard, S.	Participation	1998	505	0.282						
29	Farhoomand, A. and Drury, D	Participation	1996	242		0.142	0.319				
30	Leonard-Barton, D. and Sinha, D. K.	Involvement	1993	34	0.17	-0.08					
31	Saarinen, T. and Saaksjarvi, M.	Participation	1990	132			0.154			0.34	
32	King, W. R. and Rodriguez, J. I.	Participation	1981	45		0.125	0.14			0.047	
33	Barki, H. and Huff, S. L.	Participation	1990	42	0.68					0.637	
34	Koh, H. L. and Lawrence, M. J.	Involvement	1988	53	-0.19						
		Involvement	1988	10	-0.18						
35	Olson, M. H. and Ives, B.	Involvement	1981	83	0.07	0.13					
36	Kaiser, K. M. and Srinivasan, A.	Involvement	1980	45	0.613						
37	Doll, W. J. and Deng, X.	Participation	1999	402	0.363						
38	Joshi, K.	knowledge and Involvement	1992	322	0.512		0.539				
39	Baronas, A. K. and Louis, M. R.	Involvement	1988	92	0.319						
40	Vanlommel, E. and De Brabander, B.	Involvement	1975	20		0.087				-0.09	
41	Doll, W. J. and Torkazeh, G.	Involvement	1988	618	0.32		0.321				0.2
42	Saleem, N.	Participation	1996	60	0.296					0.381	

43	Kivijarvi, H. and Zmud, R. W.	User Commitment	1993	159	0.28					0.3	
44	Ginzberg, M. J.	Involvement	1981	24	0.28	0.285				-0.06	
45	Hunton, J. E. and Price, K. H.	Task Meaningfulness	1997	144	0.44						
46	Igbaria, M. and Nachman, S. A.	Involvement	1990	104						0.19	
47	Lu, H and Wang, J.	Participation	1997	57	0.472						
48	Hawk, S. R.	Involvement	1993	87	0.085						
49	Franz, C.R.	Involvement	1979	150						0.31	
50	Hawk, S. R. and Aldag, R. J.	Involvement	1990	85	0.4						
51	Sartore, A.	Participation	1976	111	-0.21						
52	Joshi, K., Bostrom, R. P. and Perkins, W. C.	Knowledge and Involvement	1986	28	0.29		0.44				
53	Lucas, H. C.	Involvement	1975	683		0.22					
		Involvement	1975	616		0.15					
54	Gallagher, C. A. <sup>1</sup>	Participation	1974	74	0.33						
55	Fuerst, W. L. and Cheney, P. H.	Involvement	1982	64						0	
56	Guimaraes, T. and Yoon, Y.	Involvement	1996	97	0.24						
57	Kim, K. K.	Participation	1990	29	0.25						
58	Grover, V. and Teng, T. C.	Participation	1994	73				0.23		0.197	
59	Zinkhan, G. M., Joachimsthaler, E. A. and	Involvement	1987	165	0.086						

<sup>1</sup> Correlation 'r' was adapted from Hawk and Aldag (1990 p. 611) for this study.

	Kinnear, T. C.										
60	Guimaraes, T., Igbaria, M. and Lu, M.	Involvement	1992	118	0.06			0.25			
61	Torkzadeh, G. and Doll, W. J.	Involvement	1999	409	0.3			0.332		0.31	
62	Stefanou, C. J.	Participation	1999	143	0.292	0.445	-0.06				
63	Benard, R. and Satir, A.	Involvement	1993	32	0.089						
64	Nath, R.	Participation	1989	98						0.21	
65	Choe, J.	Involvement	1996	101	0.354					0.368	
66	Bruwer, P. J. S.	Involvement	1984	114	0.21					0.14	
67	Ein-Dor, P. and Segev, E.	Participation	1986	18	0.39			0.38		0.43	
68	Doll, W. J. and Torkzadeh, G.	Involvement	1990	618	0.311						
69	Guimaraes, and McKeen, J. D.	Participation	1995	151	0.416						
70	Iivari, J.	Participation	1995	105				0.24			
71	Yoon, Y. and Guimaraes	Involvement	1995	69	0.34			0.31		0.12	
72	Ryker, R., Nath, R. and Henson, J	Involvement	1997	252	0.093						
73	Magal, S. R.	Participation	1991	174			0.34				
74	Jarvenpaa, S. and Ives, B.	Involvement	1991	55						0.57	
		Participation								0.39	
75	Raymond, L.	Participation	1987	464	0.16						
76	Doll, W. J. and Torkzadeh, G.	Involvement	1991	618	0.32	0.2	0.263				0.2
77	Joshi, K.	Involvement	1990	226	0.516		0.53				
78	Kappelman, L. A.	Participation	1995	140	0.22						
		Involvement	1995	139	0.33						



79	Motazemi, A. R.	Involvement	1988	40	0.494						
80	Hawk, S. R. and Dos Santos, B. L.	Participation	1991	93	0.05						
81	Seddon, P. and Kiew, M.	Involvement	1994	102	0.456	0.421	0.327	0.618			
82	Saarinen, T	Participation	1996	48	0.41						
83	Hartwick and Barki	Involvement	1994	105	0.31					0.295	
84	Barki and Hartwick	Participation	1994	127	0.31						
		Involvement	1994	127	0.64						
85	Khalil, O. E. M. and Elkordy, M. M.	Involvement	1997	120	0.203		0.124			-0.13	
86	Park, S. W., Jih, K. and Roy, A.	Participation	93/94	106	0.226					0.16	
87	Schew, C. D.	Involvement	1976	79	0	0				0	
88	McKeen J. D. and Guimaraes, T	Participation	1997	151	0.416						
89	Tait, P. and Vessey, I.	Involvement	1988	42	0.195						
90	Jackson, C. M., Simeon, C. and Leitch, R. A.	Involvement/ Participation	1997	111				0.075		0.166	
91	Hardgrave, B. C., Wilson, R. L and Eastman, K.	Participation	1999	111	0.171						
92	Lin, W. T. and Shao, B. B. M	Participation	2000	32	0.368						
93	Jiang, J. J., Muhanna, W. A., and Klein, G.	Involvement	2000	66					0.241		
94	Jackson, C. M.	Participation	1992	111				0.059		-0.14	
		Involvement	1992	111				0.533		-0.86	
95	McQueen, T. J.	Involvement	1995	67	0.362						
96	Roth, L. M.	Participation	1994	115	0.136						
97	Wilkins, M.	Participation	1996	72						-0.13	

98	Ryker, R. E.	Involvement	1994	311				0.489			
99	Momcilovich, H. M.	Involvement	1987	44	0.364			0.321			
100	Alai Tafti, M. H.	Participation	1984	196	0.12	0.097	0.10				
101	Foster, S. t. and Franz, C. R.	Involvement	1999	87				0.372			
102	Guimaraes,T., Yoon, Y., and Clevensen, A..	Involvement	1997	62	0.40						
103	Ravichandran, T. and Rai, A.	Participation	1999	123		0.35					
104	Wong, B. K.	Involvement	1990	114				0.634			
105	Barki, H. and Hartwick, J.	Participation	1991							0.17	
		Involvement								0.40	
106	Guimaraes, T.	Involvement	1993	63	0.01						
107	Vogel, F. J.	Participation	1989	46				0.0			
108	Mahmood, Mo. A. and Medowitz, J. N.	Involvement	1985	48	0.394					0.325	
109	Alavi, M. and Henderson, J. C.	Involvement	1981	45	0.247						

Some publications mentioned repeated data. Such studies have been included once in the calculations of mean effect size to avoid biasing. Some authors mentioned effect of user participation/involvement in terms of system success, so considered as satisfaction of users in this research. Further, the studies with qualitative findings, or quantitative findings that did not mentioned effect size suitable to be included in meta-analysis, or reported insufficient data are ignored.

## 5.6. Data Manipulation

### 5.6.1. Combination of Effect Sizes

“Correlations” are considered to be the best means of handling effect sizes. They not only describe the strength of the relationship between two variables but also the direction (i.e. positive or negative association). The values of effect sizes collected from the studies for this research are given in the above mentioned tables. The author used Pearson’s correlation ‘r’ as an effect size and its value falls within the range of -1.0 to +1.0. As the sample size (N) of studies are different so it looks fair to assign more weight to studies with large N. The weighted average of all correlation may be the best estimate. Hunter and Schmidt (1990) noted that it would be a very rare case that an unweighted analysis would be better. So I took the sample size of the study as its weight for further analysis. The estimate of population correlation, observed variance and an estimate of error due to sampling are calculated using formulas given by Hunter and Schmidt (1990).

$$\text{Estimate of population correlation (i.e. Mean) } \bar{r} = \sum [ N_i r_i ] / \sum N_i \quad (1)$$

Where:

$\bar{r}$  = weighted average estimate of the population correlation.

$r_i$  = observed correlation for sample i.

$N_i$  = number of individuals in sample i.

$\sum N_i$  = sum of all individuals in all samples included in this study.

### 5.6.2. Homogeneity Testing

Different study artifacts can alter the size of study correlation (Hunter and Schmidt, 1990). A mean effect size with large variance may not be a better representative of a distribution but with a small variance (Lipsey and Wilson, 2001). The homogeneity testing based on the comparison of the observed variation in effect sizes with an estimate of the variance that might be expected

from sampling error alone. If the effect sizes are found to be heterogeneous then to examine the affect of the moderating variables on the relation between the variables under study is advised.

The observed variance is calculated using weighted sum of squares formula (Hunter and Schmidt, 1990 p. 100).

Sample Weighted Variance (i.e. Observed Variance) is:

$$s_r^2 = ( \sum N_i (r_i - \bar{r})^2 ) / \sum N_i \quad (2)$$

Where:

$S_r^2$  = frequency weighted average squared error. Others are already mentioned.

The sampling error is function of sample size. An estimate of error due to sampling is:

$$\sigma_e^2 = ((1 - \bar{r}^2)^2 K) / \sum N_i \quad (3)$$

Where:

$\sigma_e^2$  = estimate of sampling error.

K = the number of results included in the analysis. Others are already mentioned.

The residual variance can be calculated by subtracting estimates of the variance due to sampling error from observed variance. So

$$\text{Residual Variance} = S_r^2 - \sigma_e^2 \quad (4)$$

"Residual Variance" is the variance that is due to the true differences among results from different studies. If the residual variance is sufficiently small then the difference between correlations are due to just sampling error (Hunter and Schmidt, 1990). As a rule of thumb if the residual standard deviation does not exceed 25% of the mean effect size then the residual variance is considered to be small (Stoffelmayr et al., 1983). If the residual standard deviation found to be greater than ¼ of the mean effect size then the difference of correlation between

variables under study along sample studies may be due to other artifacts, and not only due to sampling error. Trotman and Wood (1991) suggested a test for moderator effects in case the residual variance is large.

### 5.6.3. The Statistical Significance Test

The significance test may be useful to evaluate any significance difference between two means of correlation (i.e. effect size) of independent variables with the same dependent variable.

Hunter and Schmidt (1990) described a formula to translate the difference between two mean effect sizes in terms of standard 'Z' value. They mentioned the comparison difference, let C be:

$$C = R_1 - R_2 \quad (5)$$

where  $R_1$  and  $R_2$  are two mean effect sizes.

The sampling error variance of C is

$$\text{Var} (C) = S_1^2 + S_2^2 \quad (6)$$

where  $S_1, S_2$  denote second order sampling error.

The value of 'Z' as:

$$Z = C / \sqrt{\text{Var} (C)} \quad (7)$$

Under the null hypothesis that two means are equal, the statistics 'z' has a standardized normal distribution. The 5% critical value for Z is 1.64 (Hunter and Schmidt, 1990).

### 5.6.4. Fail-Safe N

The published studies are suspected to be biased towards showing statistically significant findings (see McNemar, 1960; Kraemer and Andrews, 1982; Lipsey and Wilson, 1993). On the other hand the studies supporting the null hypothesis of no significant results are likely to less appear as published literature and

usually buried away in file drawers. Rosenthal (1979) called it "file drawer problem". Kraemer and Andrews (1982, p. 405) wrote that published research studies tend to be biased towards positive findings. Similarly, Wolf (1986, p. 37) says that studies with non-significant findings are difficult to be published. McNemar (1960 p.299) mentioned some factors that operate in such a way that data which do not support hypotheses and/or theory may be less apt to be published. Researchers addressed this problem and suggested for evaluating the number of studies confirming the null hypothesis that would be needed to reverse the conclusion "a significant relationship exists". Cooper (1979) referred it to as "Fail-Safe N ( $N_{fs}$ )". Fail-safe N explains the number of additional studies in a meta-analysis that would be necessary to reverse the overall probability obtained from the combined test to a value higher than our critical value for statistical significance (Lipsey and Wilson, 2001; Wolf, 1986).

Hunter and Schmidt (1990) suggested a formula in order to know how many "lost" studies must exist to bring  $r_k$  to  $r_c$  (where  $r_k$  is mean effect size  $r$  for  $k$  studies, and  $r_c$  is critical mean effect size  $r$  that may be considered theoretically or practically significant).

$$x = k(r_k / r_c - 1) \quad (8)$$

where  $K$  denotes the number of studies.  $X$  denotes the file drawer studies that are required to bring the effect size to the critical defined level, for example  $r_c=0.05$ , or  $r_c= 0.1$ . This formula determines the number of additional studies needed to reduce the mean effect size to a specified or criterion level. Although this technique has the advantage to calculate the number of studies needed but the careful sampling might be a good protection against publication bias.

## 5.7. Summary

In any research activity, the observations (i.e. data) are the central resource that is processed/manipulated for further inferences of results. Data provide a base from which processing takes place to acquire information. Data always be required free

of error and unambiguous and must be related to specific research area, otherwise the results may be suspected. The nature of data and its format is very much related to the research question and the research methods adopted in research. The observations may be qualitative or quantitative. In terms of quantitative data, the unit of measurement must be well defined.

The research method adopted for this research is 'meta-analysis'. Its source of data are the earlier studies either published or unpublished on the topic under research. The common measure effect size (i.e. correlation Pearson 'r') has been chosen as to explain the relationship between independent and dependent variables. The studies those mentioned their findings using statistics other than Pearson 'r' are converted into Pearson 'r' using standard formulae mentioned in Table-5.2 for further processing. Only studies those are very much related to the research questions are included in meta-analysis in order to avoid the criticism that meta-analysis 'mixes oranges and apples'. The predictors of user satisfaction (i.e. dependent variable) are mentioned in the research framework clearly, and those factors are only considered during data collection. The relationship of user participation, user expectations, user-developer effective communication with user satisfaction has been explored during this research. Further, user participation has been mentioned in terms of user participation and user involvement, so their effects on user satisfaction require to be manipulated independently and collectively.

Various techniques such as databases search, manual search, bibliography, the citation index at the end of the papers, and contacting authors personally by email/fax are used to collect the studies. Despite different limitations an attempt is made to collect maximum studies on the subject under research comprising published journals, conference proceedings, and unpublished studies such as working papers and dissertations. Various studies included in meta-analysis for each relationship (i.e. system usage Vs user satisfaction [Table-5.5], user expectation Vs user satisfaction [Table-5.6], user-developer effective communication Vs user satisfaction [Table-5.7], and user participation Vs user satisfaction [Table-5.8]) are reported separately in different tables. Each table

contains name of the author, year of publication, sample size (N), and the effect size ( $r$ ) for each study. For references of studies (see appendices). The research findings, author's analysis, and limitations of study are included in the next chapters.



## 6. Research Findings and Analysis

### 6.1. Introduction

This chapter discusses the findings of this research keeping in view the research model and research questions mentioned in chapter-3. Research findings for each relationship discussed earlier are tabulated and are then discussed under heading 'discussion of results' in this chapter. Previous chapter explained the details of studies included in meta-analysis for each relationship between variables under study, data collection techniques, standard formulae that might be used for conversion of different reported statistic (that shows relationship between two variables) into a common metric (i.e. effect size 'r'). Effect Size ('r') has been suggested to compare and aggregate the findings during analysis.

As the criticality of IS continues to grow, the need to evaluate the systems in terms of its success, and how successful systems can be achieved is also growing. IS researchers are attempting to investigate the factors that may lead to improved performance of systems, and the best possible measure to evaluate system performance. As evidenced in past research, system usage and user satisfaction both are commonly used measures for system success. User satisfaction is a perceptual or subjective whereas system usage is behavioural measure of IS success. Davis and Srinivasan (1988) broadly mentioned system usage, user satisfaction, system's performance and decision performance as system assessment approaches. This chapter explains the findings of current research that concern how user related factors such as user participation, user expectations and user- developer communication affect user satisfaction. Various past studies attempted to measure the effects of such prominent factors on user satisfaction independently. Despite extensive research the relationship of such factors with user satisfaction is hardly clear due to inconclusive and controversial findings amongst studies. Various reasons that cause such inconsistent results still require explanation. A plethora of factors related to user characteristics, system

characteristics, organizational characteristics, and task characteristics may affect user satisfaction with the system.

A number of instruments used to measure user satisfaction (see Jenkins and Ricketts, 1979,1985; Pearson and Bailey, 1979,1980; Bailey and Pearson, 1983; Ives et al., 1983; Joshi, 1990; Raymond, 1985, 1987; Montazemi, 1988; Doll and Torkezadeh, 1988, Saleem, 1996; Blili et al., 1998), and user participation (Doll and Torkzadeh, 1989; Barki and Hartwick, 1994; Raymond, 1985; Saleem, 1996; Franz and Robey, 1986) have been developed/ revised and used in IS research. System usage is also measured differently using frequency of use, time spent, number of queries made by user, and number of tasks for which system is used (King and Rodriguez, 1981; Srinivasan, 1985; Igbaria et al., 1997; Thompson et al., 1991; Teo et al., 1999; DeLone, 1988; Sanders and Courtney, 1985; Igbaria and Zviran, 1991; see DeLone and McLean, 1992). Such instruments differ a bit in their constructs, for example some considered user satisfaction in general whilst the others measured user satisfaction in terms of system quality and information output quality. Similarly, a number of instruments that evaluates the strength of user participation and how it influences systems development have been introduced and used that also differ in their construct. These instruments vary in a number of items considered to measure user participation/involvement. Unfortunately some instruments have been validated in past research but not all. The validity of such instruments is questionable when researchers use these instruments with modifications but hardly attempt to validate them.

Barki and Hartwick (1989) argued that operational definition of user participation/involvement has contributed towards mixed findings about the relationship between user involvement and system usage within the past research. Due to various reasons discussed already, past research shows varying and controversial findings about the effect of user participation on user satisfaction. One of the reasons for varying results may be attributed to varying evaluation criteria and instrument validation problems. Both of the phenomena such as user participation and user satisfaction are found to be complex and multidimensional. Plenty of factors, for example user types and their characteristics, systems types,

and task characteristics may influence the relationship between user participation and user satisfaction and argued to be the cause for variation among research findings.

In past research, controversial findings about the effects of user participation towards user satisfaction and consequently systems success have hardly been able to provide evidence about whether user participation is crucial to achieve user satisfaction and systems success. Some traditional research reviews (for example, Ives and Olson, 1984; Cavaye, 1995) have been carried out to integrate previous findings. These research endeavours showed how many studies have positive, negative, and no relationship between user participation and systems success but are unable to show the strength of this relationship. The systems success has been mostly measured in terms of systems usage and user satisfaction but not restricted to such measures only (DeLone and McLean, 1992). The findings of past research about the relationship between system usage and user satisfaction are also inconclusive. Thong and Yap (1996 p. 604) argued mis-specification of research models, and mixed findings in IS research as the consequences of incorrect application of user satisfaction. Keeping in view such aspects a detailed meta-analysis has been carried out that might help to resolve these controversies in past research and hoping that it might be helpful in reaching some conclusions. It encompasses many empirical studies that explored the effect of user participation on user satisfaction in which various user participation and user satisfaction constructs and their subsets are used to find the relationship between these two dimensions with reference to IS development and implementation.

Secondly, the effect of 1) user-developer effective communication, user expectations on user satisfaction respectively, and 2) the relationship between system usage and user satisfaction has been explored. The current research attempted meta-analysis as a research method arguing that it might help in resolving different opinions/controversies among researchers about the relationships between above mentioned variables and also reaching towards further conclusions. The current research findings are discussed in the next section.

## **6.2. Research Findings**

### **6.2.1. Strength of Relationship: An Interpretation**

#### **a) Effect Size ('r')**

Effect size estimates need to be understood for their substantive and practical significance. The findings of current research are interpreted in the light of Cohen's (1969) guidelines that are almost agreed. He interpreted what constitutes a 'large, medium or small' effect for correlational studies. He stated  $r = 0.10$  as small,  $r = 0.30$  as medium, and  $r = 0.50$  as large effect size, however he mentioned these judgements such as large, small to be relative. Cohen (1969) reported his general observation. Lipsey and Wilson (2001) also interpreted 'effect size' as small (i.e.  $r \leq .10$ ), medium (i.e.  $r = 0.25$ ), and large (i.e.  $r \geq 0.40$ ).

In some studies the information available to calculate effect size are insufficient. For example, author only reports that an effect is not statistically significant or may report that there exists no relationship between the variables under study. There are different approaches (see Pigott, 1994; Lipsey and Wilson, 2001) to deal with the problem. One approach is to impute a value zero for such missing effect size. Pigott (1994) stated that what values a reviewer can impute for missing effect size, it depends upon his assumption about how the missing data occur. If he believes that missing effect size in the sample is probably a small value then he can replace the missing effect size with zero. This approach faced a criticism for resulting in a downward bias whereas ignoring it also not considered as a proper way to deal with.

#### **b) The Confidence Interval**

Confidence intervals are advocated better than significance tests. These explains better the extent of uncertainty that may surround the results and also the interval is correctly centred on the observed value rather than hypothetical value of a null hypothesis (Hunter et al., 1982 p. 22). The interpretation of the confidence interval concerns the sign (i.e. positive or negative) of the lower and upper bound and whether the interval contains zero or not. It can be used to reject the null

hypothesis that the size of a correlation is zero. If the 95% confidence interval does not include zero then the null hypothesis can be rejected (Cooper, 1997). When the observed variance is totally explained by sampling errors only then the confidence interval becomes zero. The 95% confidence interval has been calculated and explained for each relationship under study in results discussion.

### **6.2.2. Variation Across Studies: An Interpretation**

There is common criticism against meta-analysis that on integrating studies that a reviewer covers might have differences in their characteristics, settings or procedures so mixing 'apples' and 'oranges'. According to Glass et al. (1981), there is no need to compare the studies having the same findings in all respects. Studies with fragmented findings on the subject concerned require integration to reach some conclusions otherwise they leave the reader confused. Another problem that one may face in IS research is to compare past studies on the same topic. According to Thong and Yap (1996), IS research is often criticized due to non-comparability across studies and for its inability to build on a common theoretical base. Similarly, Iivari (1992) stated that it is hard to find a single pair of empirical studies with their results that might be reasonably compared with each other. DeLone and McLean (1992) mentioned in their study that comparison of studies is difficult because multiple success measures have been used in research. As the findings across multiple studies may be regarded as a complex data set, so not more comprehensible without statistical analysis (Glass et al., 1981).

Hunter and Schmidt (1990) mentioned a formal test for evaluating variances across studies. They stated that "if the chi square is not significant, this is strong evidence that there is no true variation across studies, but if it is significant, the variation may still be negligible in magnitude" (pp. 112). The values  $\chi^2$  are mentioned in the results.

The observed variance is also calculated using weighted sum of squares formula to obtain an estimate of true variance. Different study artifacts can alter the size of study correlation (Hunter and Schmidt, 1990). For this research study

estimates of the variance due to sampling error and the residual variance are calculated. If the residual variance is sufficiently small then the difference between correlations are due to just sampling error (Hunter and Schmidt, 1990). As a rule of thumb, a residual standard deviation that does not exceed 25% of the population effect size may be considered as small (Stoffelmayr et al., 1983). In case the residual variance is small then the variance across studies is supposed to be due to just sampling error. In case of large residual variance, Trotman and Wood (1991) suggested test for moderator variables that might influence the relationship. A moderator variable is that "which systematically modifies either the form and/or the strength of the relationship between the predictor and criterion variable" (Sharma et al., 1981 p. 291).

### **6.2.3. Publication Bias: An Interpretation**

There exists a chance that the studies showing trends towards positive findings about a relationship might be usually published. It is unlikely that each and every study concerned with the hypothesis under research can be uncovered. According to Rosenthal (1979), the studies supporting the null hypothesis of no significant results are more likely to be buried away in file drawers. It may be assumed that a number of studies with non-significant effect size are either rejected, less encouraged to be published or were not submitted for publication. Kraemer and Andrews (1982, p. 405) wrote that published research studies tend to be biased towards positive findings. Smith (1980 p. 22) stated that the published literature only represents the 5% of false positives in a population of studies wherein null hypothesis is true. Similarly, Wolf (1986, p. 37) says that studies with non-significant findings are difficult to be published. In this way a biased conclusion may be obtained from meta-analysis that includes the effects of a strong bias towards publishing positive but not negative results. Smith (1980) concluded that failing to include unpublished studies in meta-analysis might produce misleading generalizations.

Funnel display (sample Size Vs Effect Size) might be helpful in identifying publication bias (Light and Pillemer, 1984; Begg, 1994; Lipsey and Wilson,

2001; Light et al., 1994). It is a useful way to detect potential bias due to under representation of studies with small subject samples and small effect sizes. If no bias is present, then the display should be shaped like a funnel. The funnel plots can be difficult to be interpreted in case the sample has few data points.

#### **6.2.4. Fail-Safe N**

There might be a tendency that studies with significant findings are usually published. Researchers addressed this problem and suggested evaluating the number of studies confirming the null hypothesis that would be needed to reverse the conclusion “a significant relationship exists”. Cooper (1979) called it “Fail Safe N ( $N_{fs}$ )”. Fail-safe N explains the number of additional studies in a meta-analysis that would be necessary to reverse the overall probability obtained from the combined test to a value higher than our critical value for statistical significance, i.e. .05 or .01 (Wolf, 1986). The calculation of Fail-safe N are made considering critical mean effect sizes  $r_c = 0.05$  and  $r_c = 0.1$ .

No literature review can uncover every relevant hypothesis test ever conducted in research. So, Fail-Safe N may allow the reader to evaluate how many studies totalling a null hypothesis confirmation would be needed to reverse the conclusion that a relationship exists between the factors under study. The required studies to reverse the relationship are mentioned in the results for each relationship considered in this study.

#### **6.2.5. The Statistical Significance Test**

The correlation of user participation, and user involvement with user satisfaction construct variables are carried out considering user participation and user involvement as separate concepts (see Barki and Hartwick, 1994). The significance test may be useful to evaluate any significance difference, if any, between user participation and user involvement on user satisfaction construct variables. Hunter and Schmidt (1990) described a formula to translate difference between two mean effect sizes in terms of standard 'Z' value already described in chapter-5.

### **6.2.6. Effects of Users' Participation/Involvement on Users' Satisfaction**

The measurement of the effect of user participation during IS development on user satisfaction remained and presently exists as a subject of interest within IS research. Various studies attempted to explore the benefits of user participation but produced contradictory results. Such a situation can hardly help to generalize the past findings. Hartwick and Barki (1994) differentiated user participation and user involvement conceptually as two constructs whereas in past IS research both words were used interchangeably. User participation is supposed to lead to user involvement as already mentioned in chapter-2.

The current study considered both of the concepts and attempted to explore their effect on user satisfaction. Users satisfaction is considered as a multi-dimensional [i.e. user information satisfaction, system usage, system acceptance, perceived usefulness, ease of use, system quality, information quality] construct, so the effect of user participation and user involvement on each aspect of user satisfaction has been included in the research. The relationship between 1) user participation and user satisfaction, and 2) user involvement and user satisfaction is calculated on each aspect considered as a contributing factor for user satisfaction. The findings regarding these relationships are described in next section.

#### **a) The Relationship Between User Participation and User Satisfaction**

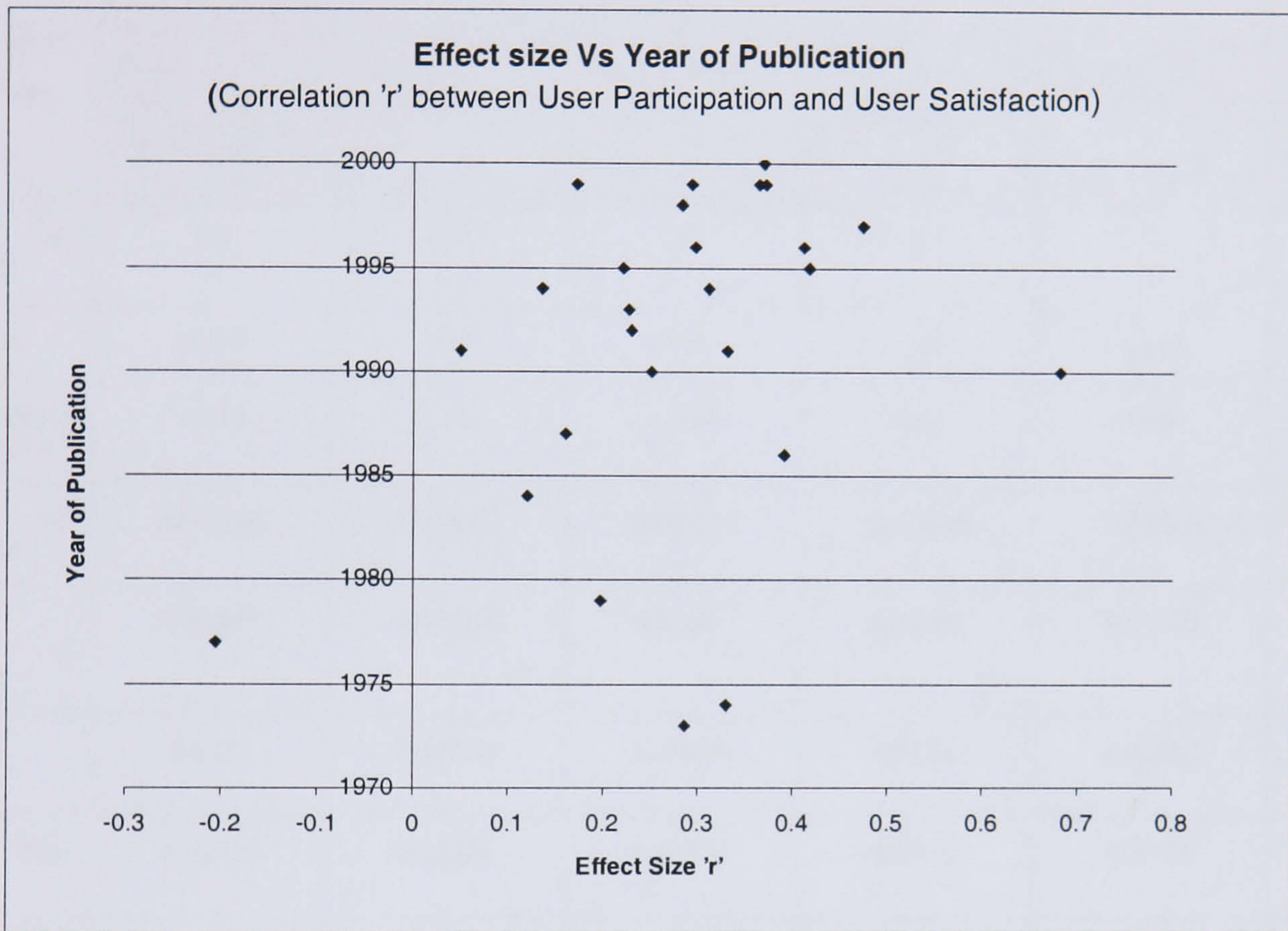
Despite the axiom that user participation contributes to user satisfaction leading to system success, the findings from past research regarding this relationship are not conclusive. The researchers differ in their opinion whether user participation during system development contributes towards achieving user satisfaction or not. The results of empirical studies are plotted and are shown in scatter diagrams that show how the findings about relationships of variables under study vary among researchers.

For example, the following display shows variations across studies relating user participation and user [Information] satisfaction relationship. The display does



not appear to be converging to near about one effect size with the passage of time. User information satisfaction has been taken as one aspect of the user satisfaction construct considered in this research.

Fig.6.1. **Relationship variability across studies** (User participation and User Satisfaction)



Publications within same years exhibit variations among research findings. The display does not appear to be converging to a single point with the passage of time. Similar variations are observed in other dimensions of user satisfaction.

Meta-analysis provides an opportunity to sum up previous research findings. It can help to resolve existing controversies among studies. The effect of user participation on each dependent variable (i.e. mentioned in users satisfaction construct) is explored and evaluated individually in terms of effect size ('r').

**i) Meta-Analysis Results (Effect of User Participation)**

Table 6.1 shows the meta-analytical findings of current research about the relationship between user participation with different dimensions of user satisfaction. As mentioned earlier, user satisfaction has been considered as a

multi-dimensional construct. The mean effect size for each dimension shows its strength of correlation with user participation.

**Table:6.1.Meta-Analysis Results (User Participation and User Satisfaction Relationship)**

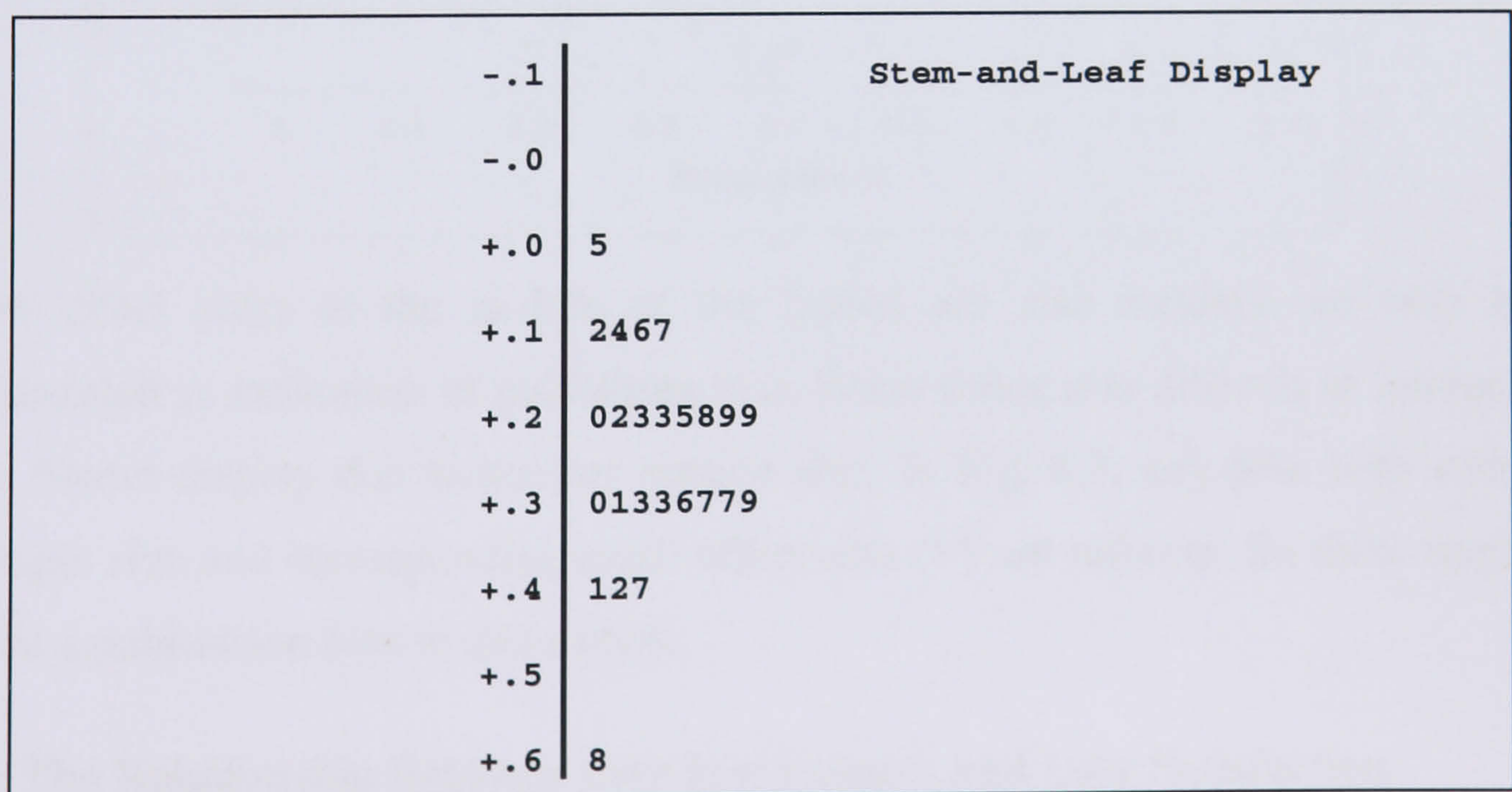
		<i>User Satisfaction Construct</i>						
Dependent Variables Findings		User [Information] Satisfaction	System Quality	Information Quality	Perceived Usefulness	System Usage	System Acceptance	Ease of use
Studies/No. of Effect Sizes		26	6	6	8	14	-	-
Sample Size		3337	786	939	749	1033	-	
Weighted Mean Effect Size ('r')		0.249	0.235	0.193	0.25	0.191	-	-
Strength of relationship		Medium	Medium	Medium	Medium	Medium	-	-
Observed Variance of Effect Sizes		0.01857	0.01965	0.02011	0.01247	0.03587	-	
Residual Variance		0.0117	0.01284	0.01419	0.0031	0.02329	-	-
Residual Std. Deviation		0.10822	0.11331	0.11912	0.0555	0.1526	-	-
Residual Std. Deviation > 1/4 of Effect size ('r')		Yes	Yes	Yes	No	Yes	-	-
Confidence Interval		0.0371 to 0.461314	0.00262 to 0.4617	-0.04047 to 0.42646	0.141437 to 0.3592	-0.10816 to 0.4900	-	-
$\chi^2$		70.4 p = 0.000003 Heterogeneous	17.31 p= 0.00394 Heterogeneous	20.37 p = 0.001 Heterogeneous	10.63 p = 0.15 Homogeneous	39.91 p=0.00014 Heterogeneous	-	-
Fail-Safe N for $r_c = 0.05$		103	21	17	32	39	-	-
Fail-Safe N for $r_c = 0.1$		38	7	5	12	12	-	-

The row 'weighted mean effect size ('r')' shows the value of effect size for each relationship (i.e. user participation vs user satisfaction determinants/dimensions). The value of each relationship (i.e. Effect Size 'r' ) falls within a range  $0.1 > r < 0.5$ . So the interpretation of effect size under the suggestion (Cohen, 1969) leads to the conclusion that there exists a positive relationship between user participation and user satisfaction, and its strength is 'medium'. The relationship

of user participation and user acceptance is mentioned as non significant only in one study but the author did not mentioned value (i.e. Effect Size), so excluded. Any study regarding the effect of user participation on ease of use was not found so missing in Table-6.1.

The ratio of residual standard deviation with each effect size is mentioned in a row (i.e. 'Residual Std. Deviation') of above Table 6.1. If residual standard deviation is greater than 25% of the effect size then variation in the strength of relationship across different studies might be due to cause of moderating variables (i.e. The variables that may affect the relationship under study and are different from those considered in finding relationship). The smaller value predicts that the variation may be only due to sampling error. The relationship of user participation with each determinants of satisfaction mentioned in the table are argued to be affected by the influence of moderating variables except perceived usefulness because residual standard deviation was found to be greater than 25% of effect size for each relationship. A Stem-and-Leaf-display is plotted for 26 studies (Effect Size 'r') regarding relationship between user participation and user [User Information] Satisfaction (see Fig. 6.2).

Fig. 6.2. Stem-and-Leaf Display (User Participation and User Satisfaction relationship)



The Stem-and-Leaf display (Fig. 6.2) shows that most of the effect sizes (r) fall between 0.2 to 0.39 and have positive values. It describes the trend of

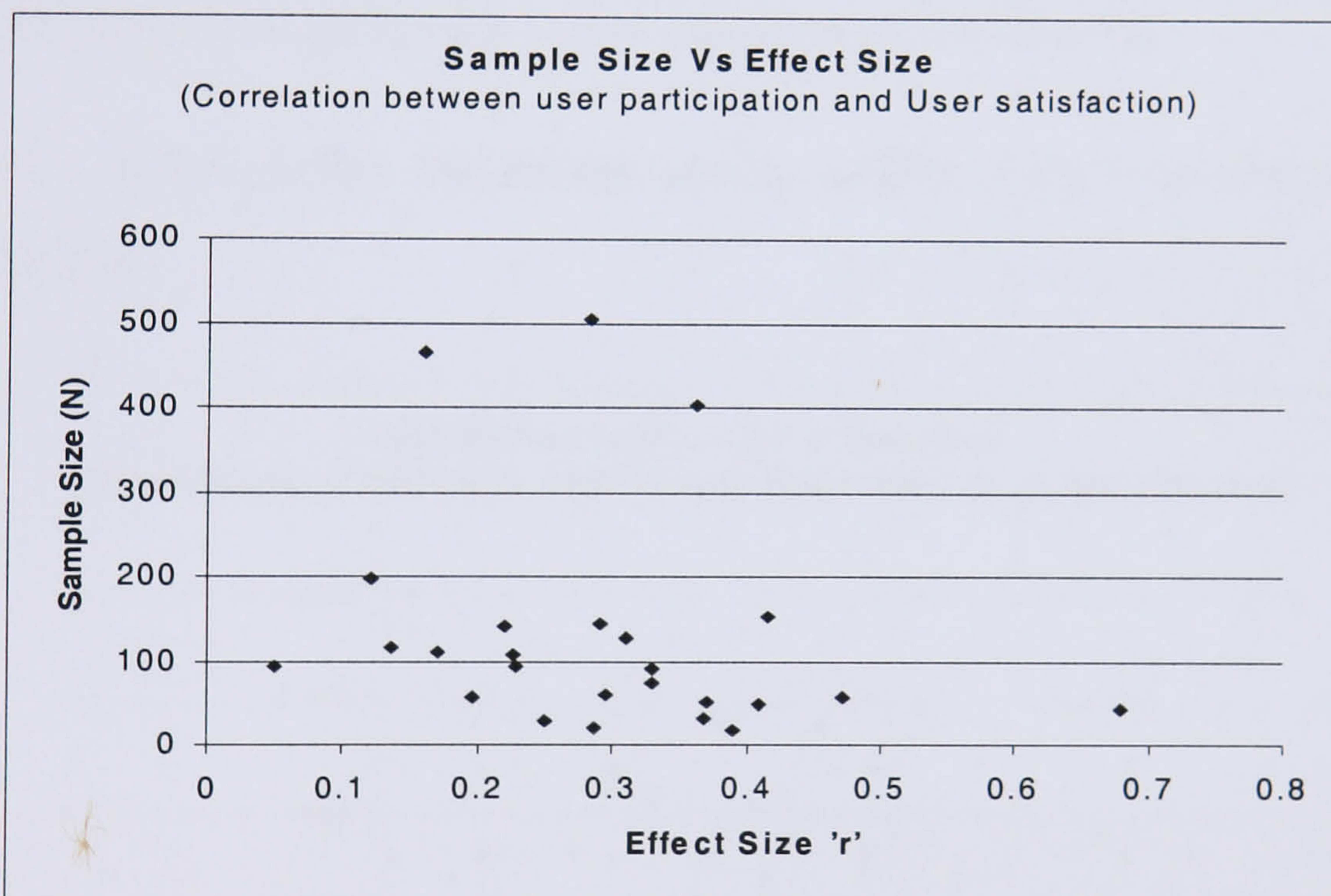
relationship as positive between user participation and user [information] satisfaction.

Last two lines of Table-6.1 shows Fail-Safe N, the number of studies that might be required to reverse the nature of observed relationship, and is calculated for each relationship mentioned in the table.

## ii) Publication Bias

The following figure (Fig. 6.3) shows the trends of published studies regarding the relationship of user participation and user [information] satisfaction as biased. This is why a bite near the effect size zero (i.e.  $r = 0.0$ ) appears in the display.

Fig. 6.3. **Publication Bias** (User Participation and User Satisfaction relationship)



The effect sizes in the middle of the funnel are also missing, so may be speculated as indication of publishing bias. Some times it is difficult to interpret the funnel display due to smaller sample size. In Fig. 6.3, any data with small sample size and corresponding small effect size ( $r$ ) are missing. So there might exist a publication bias in this sample.

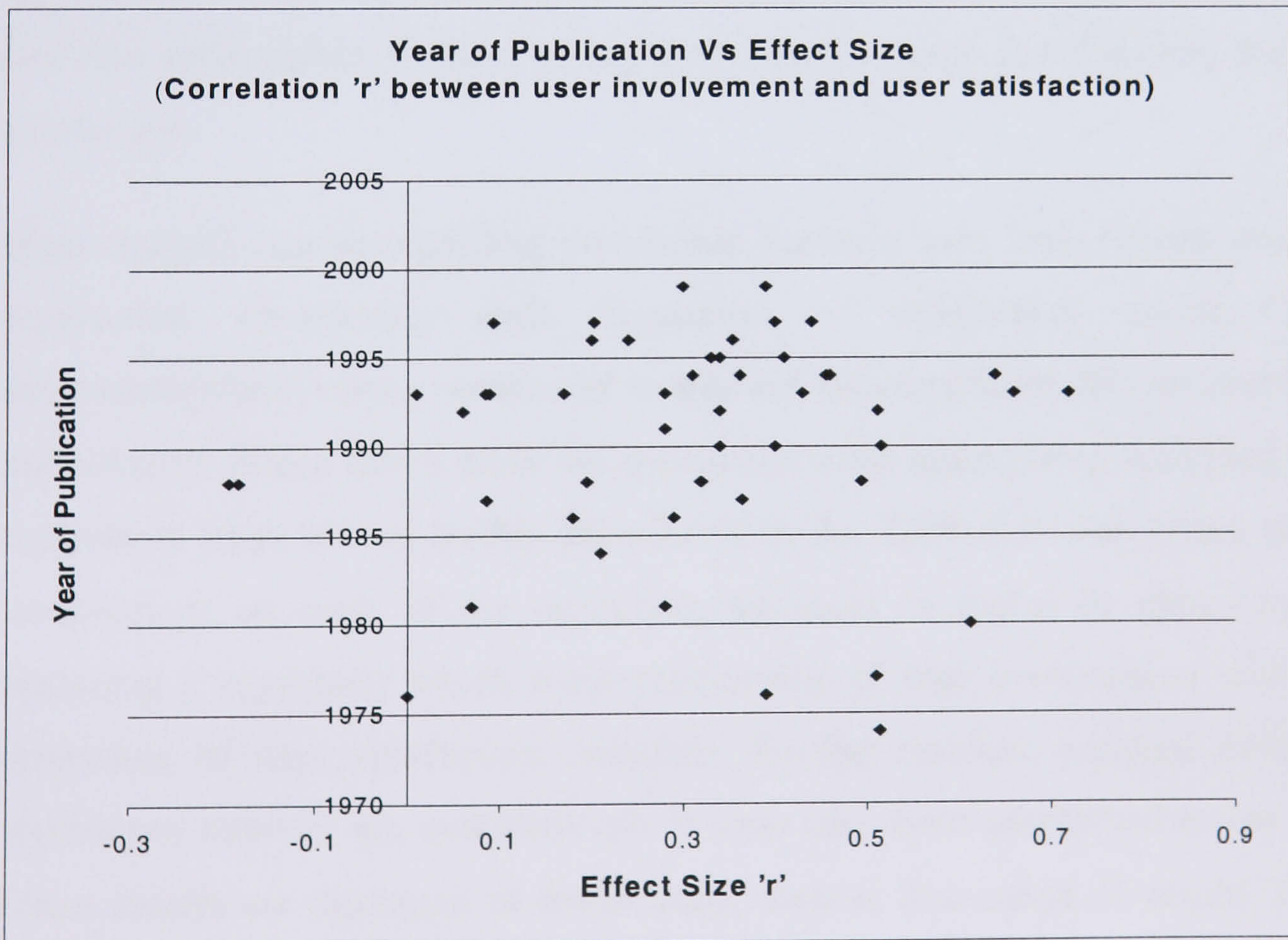
## b) The Relationship Between User Involvement and User Satisfaction

The effect of user involvement on user satisfaction is explored next. As mentioned earlier that both concepts of user participation and user involvement

are considered differently (Jarvenpaa and Ives, 1991; Barki and Hartwick, 1994) although before mentioning their distinct identity both were used interchangeably in past research. However, the effect of user involvement on user satisfaction has also been mentioned as varying in past research. Traditional reviews (Ives and Olson, 1984; Cavaye, 1995) lead to the conclusion that research regarding the effect of user involvement on user success is inconclusive. The data from 52 empirical studies regarding the relationship between user involvement and user satisfaction has been collected since 1970s.

The data plotted in a scatter diagram may help to visualize the pattern of strength of relationship in various studies. The following display shows variability in the strength of relationship between user involvement and user [information] satisfaction and it does not look to be converging. Different studies even within the same year show difference in their strength of relationship.

Fig. 6.4. **Relationship variability across studies** (User Involvement and User Satisfaction)



The display (Fig. 6.4) provides an evidence about the variations among studies about the strength and nature of relationship mentioned in terms of correlation (Effect Size 'r') between user involvement and user [information] satisfaction. The data was plotted since 1970s. The display did not look to be converging nearer to a single value with passage of time. The contemporary studies within same years also bears different values of correlation describing this relationship. Some authors mentioned negative correlation between user involvement and user [information] satisfaction as appears in Fig.6.4. The relationship of user involvement with other determinants/dimensions of user satisfaction also bears the same pattern of varying nature and strength of relationship. It shows how past studies differ in specifying this relationship.

#### **i) Meta-Analysis Results (Effect of User Involvement)**

The findings of current research regarding the relationship between user involvement and user satisfaction have been presented in the Table-6.2 on next page. The effect of user involvement on each determinant/dimension of user satisfaction is evaluated in terms of common metric (Effect Size 'r'), therefore to find the relationship if there exists any between user involvement and user satisfaction.

Meta-analysis results regarding correlation between user involvement and user satisfaction considering each dimension of satisfaction construct (i.e. determinants/dimensions mentioned in research framework/model) are mentioned individually. These effect sizes are mentioned after aggregating weighted mean correlation from No. of studies mentioned in the Table-6.2. The effect of user involvement on each of the dependent variables is useful in observing and analyzing it separately which show relationship of user involvement with each dimension of user satisfaction construct. Further residual standard deviation, confidence interval,  $\chi^2$ , and Fail-Safe N have also been mentioned in the table. These results are discussed in detail under section 'discussion of results' in this chapter. These findings are also described after the Table-6.2.

Table 6.2. **Meta-Analysis Results (User Involvement and User Satisfaction Relationship)**

		<i>User Satisfaction Construct</i>					
Dependent Variables Findings	User [Information] Satisfaction	System Quality	Information Quality	Perceived Usefulness	System Usage	System Acceptance	Ease of use
Studies / No. of Effect Sizes	53	10	8	12	24	2	2
Sample Size	5929	1762	1537	1722	2529	291	803
Weighted Mean 'r'	0.3186	0.189	0.385	0.415	0.193	0.387	0.1677
Strength of relationship	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Observed Variance of Effect Sizes	0.02635	0.00936	0.01616	0.01333	0.03202	0.00626	0.00348
Residual Variance	0.01914	0.0027	0.0124	0.0085	0.02323	0.0013	.00112
Residual Standard Deviation	0.113833	0.05163	0.01129	0.0925	0.1524	0.03601	0.03351
Residual Std. Deviation > 1/4 of Effect size ('r')	Yes	Yes	Yes	No	Yes	No	No
Confidence Interval	0.04748 to 0.5897	0.0634 to 0.3139	0.16662 to 0.60287	0.23333 to 0.59586	-0.10831 to 0.48789	0.31654 to 0.4577	0.10207 to 0.23342
$\chi^2$	193.54 p = 0.000 Heterogeneous	17.73 p= 0.038 Heterogeneous	34.22 p = 0.000 Heterogeneous	33.47 p = 0.00044 Heterogeneous	87.41 p=0.000 Heterogeneous	2.52 p=0.000 Homogenous	2.95 p=0.085 Homogenous
Fail-Safe N for $r_c = 0.05$	284	25	53	87	68	13	4
Fail-Safe N for $r_c = 0.1$	115	7	22	37	22	5	1

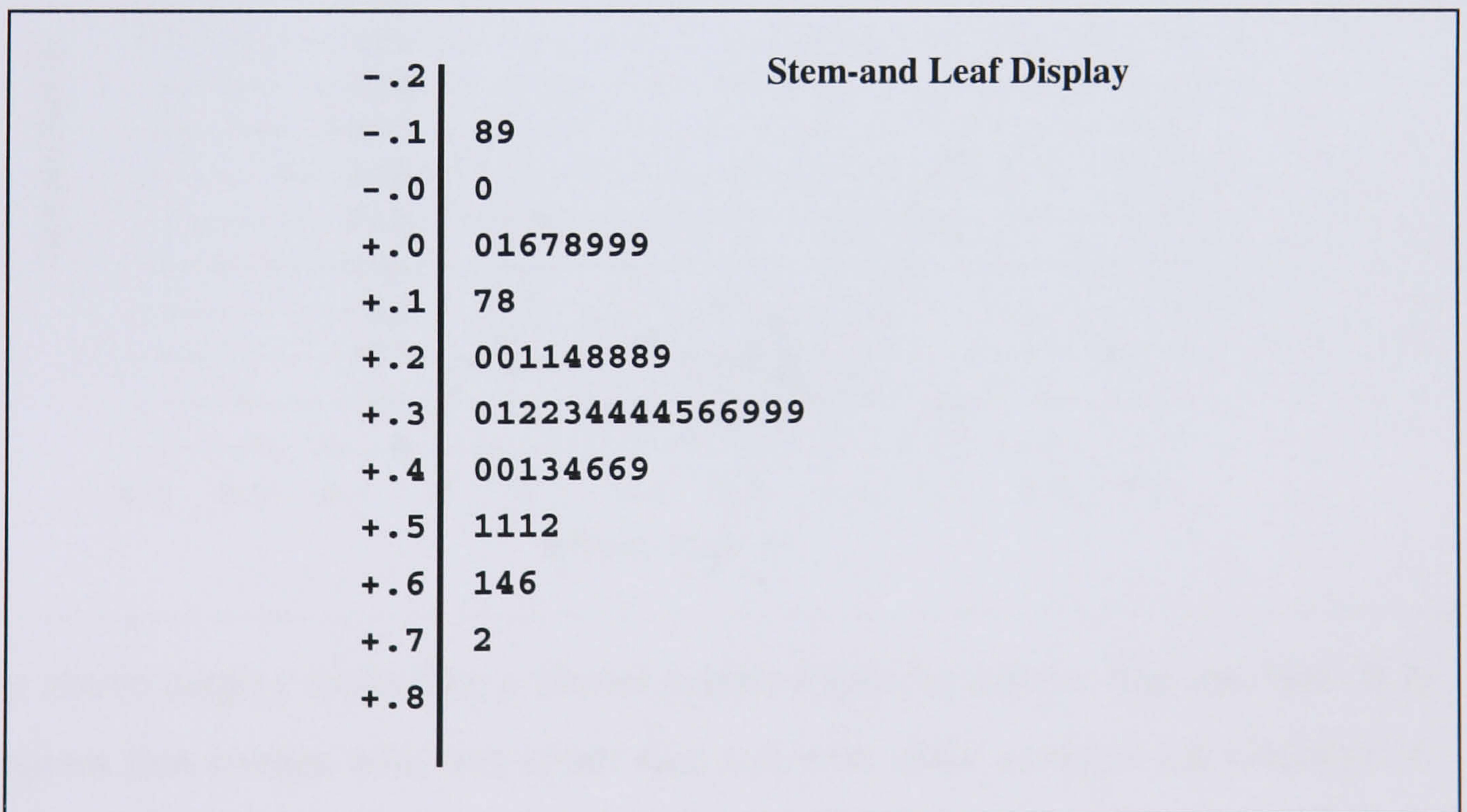
The above mentioned results leads to the findings that their exist a positive relationship between user involvement and user satisfaction. The effect size (i.e. weight mean 'r' in the above table) for each relationship of user involvement with user satisfaction determinants/dimensions lies within  $0.1 > r < 0.5$ . So one may interpret it as suggested by (Cohen, 1969) that there exists a positive relationship between user involvement and each dimension of user satisfaction. Generally, the strength of relationships between user involvement and each dependent variable (i.e. dimension of user satisfaction) is 'medium'. The values of residual standard deviation that are greater than 25% of effect size for any relationship argue that

any variation in 'r' in past studies are not only due to sampling error but moderator variables. The results are further discussed at the end of chapter.

The Stem-and-Leaf plot (Koopmans, 1981; Lipsey and Wilson, 2001) can help to visualize the central tendency and variability of the 'effect sizes' distribution. It displays the frequency distribution of effect sizes. The following plot is an example of the relationship between user involvement and user [information] satisfaction. The following stem-and-leaf plot displays the variability and central tendency of the effect sizes. The majority of effect sizes fall within a range 0.2 to 0.4. The 95% confidence interval also explains it and may be argued that the relationship is positive.

The Stem-and-Leaf Display for 53 Effect Sizes (User Involvement and User [Information] Satisfaction relationship) is as below.

Fig. 6.5. Stem-and-Leaf Display (User Involvement and User Satisfaction relationship)



## ii) Publication Bias

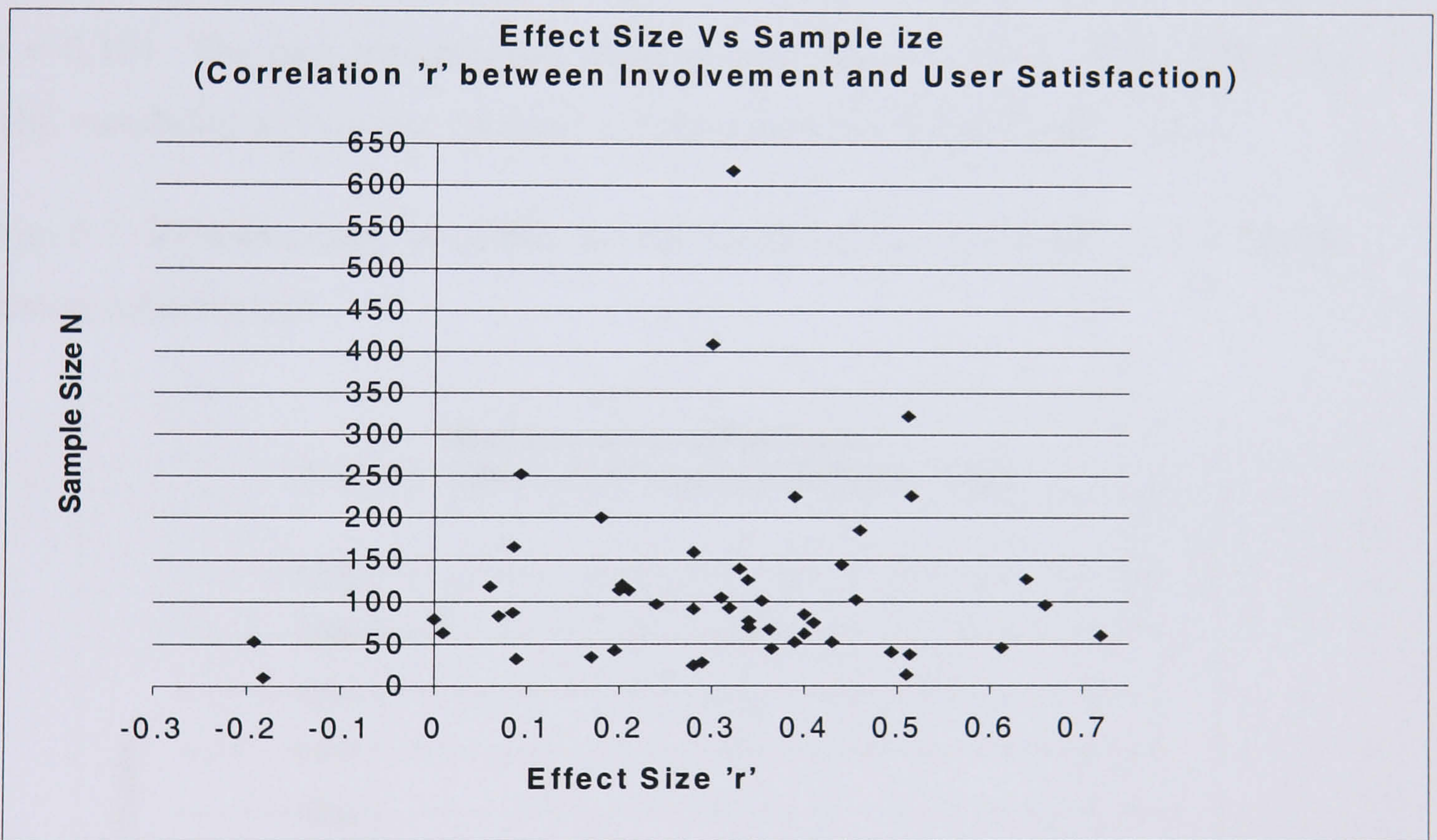
A scatter diagram regarding relationship between user involvement and user [information] satisfaction versus sample size is drawn to visualize publication



bias if any that may exist. The following display shows publications trend of studies mentioning the effect of user involvement on user [information] satisfaction.

The following display looks like a funnel inverted and the sample available is less bias. It is apparent that studies having small effect size with small samples are also available and might be helpful to overcome the problem of biasing and may lead to less biased research findings. Usually biasing occurs when finding with small effect sizes that have been hardly published. These studies are difficult to locate, so might be unavailable to be included in meta-analysis and are argued to affect the meta-analytical findings.

Fig. 6.6. **Publication Bias** (User involvement and User Satisfaction relationship)



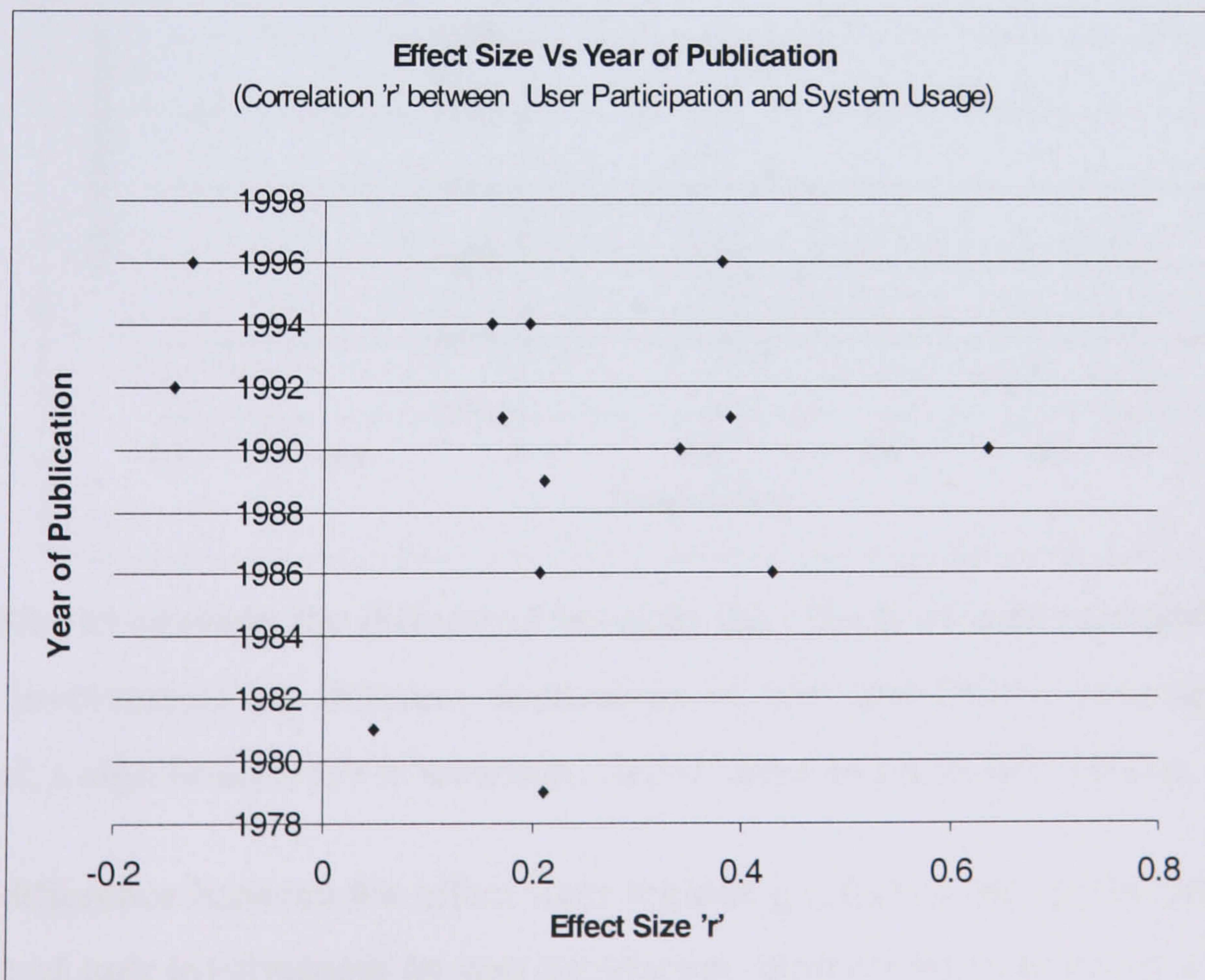
The above display looks like a funnel inverted and the sample has less bias. It is apparent that studies with less effect size and with small samples are available in sample data. It helps to overcome the problem of biasing. Usually biasing occurs when findings with small effect sizes have hardly been published and are unavailable for analysis.

### 6.2.7. The Relationship Between Users' Participation and System Usage

The use of the system is also mostly advocated as surrogate measure of systems success. User participation is mostly advocated in system development and argued to be effective toward systems usage. Past research findings are mixed and inconclusive. The relationship variability across studies is displayed in the following diagram. The display does not look converging and shows how findings differ with each other regarding the relationship of user participation and system usage.

The relationship of user participation with system usage is also calculated in terms of Pearson's correlation ( $r$ ). Meta-analysis of available studies on the subject (i.e.14 studies) leads to the conclusion that the relationship is 'medium'. The strength of the relationship in terms of weighted correlation is evaluated as  $r = 0.191$ . The past research has controversial findings about this relationship. The variability among past research is apparent in the figure given below.

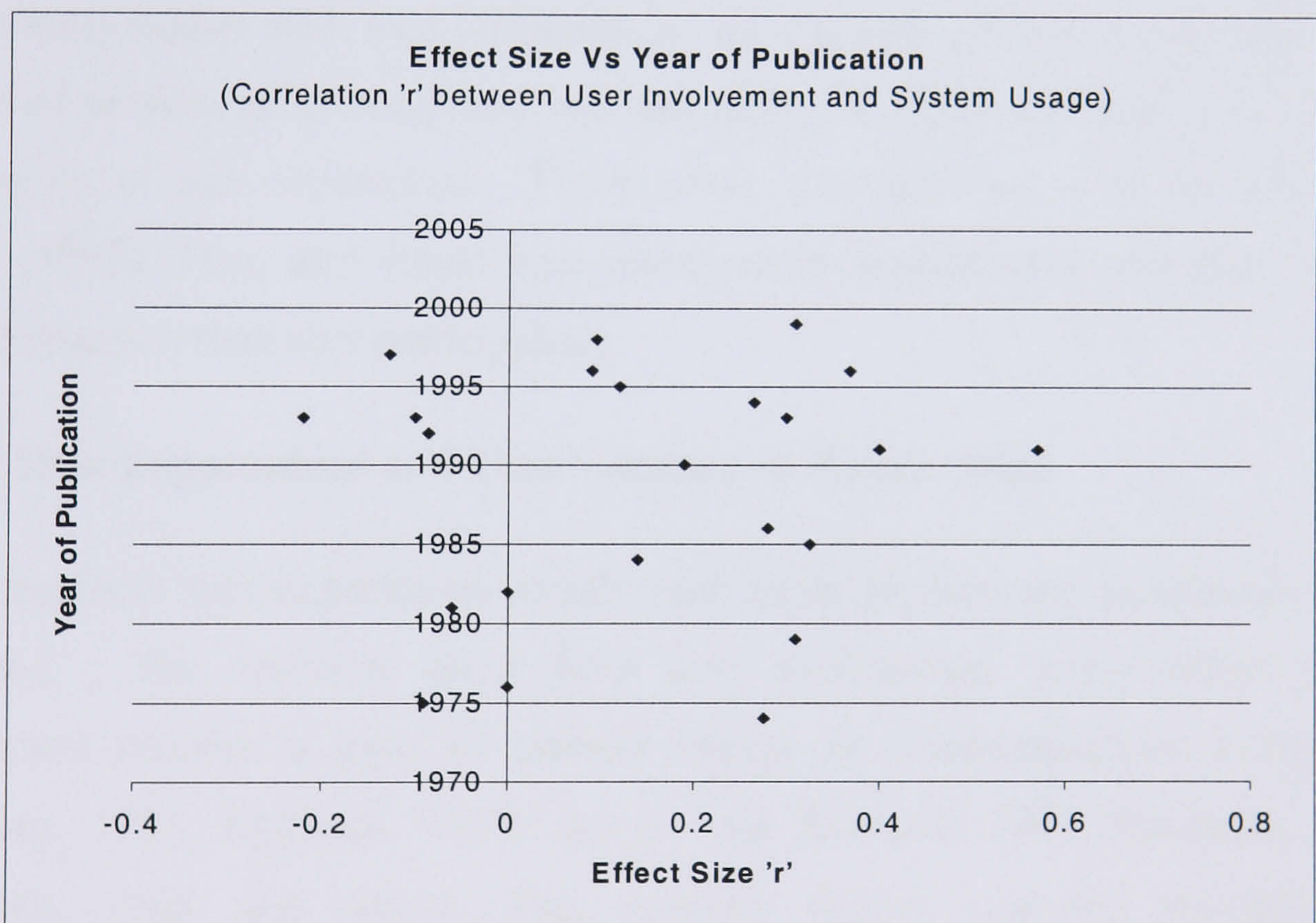
Fig. 6.7. **Relationship variability across studies** (User Participation and System Usage relationship)



### 6.2.8. The Relationship Between User Involvement and System Usage

Past research findings about the relationship between user involvement and system usage are also controversial and inconclusive. Some studies mentioned that this relationship is positive whereas other found it to be negative. The strength of the relationship also varies among studies. Results of 23 studies from past research are included in meta-analysis. The following display shows variability among studies about the effect of user involvement on system usage. The display does not seem to be converging with the passage of time. It shows that researchers differ in their opinion about how user involvement is effective towards system usage.

Fig. 6.8. **Relationship variability across studies** (User Involvement and System Usage relationship)



In order to evaluate the difference between the effects of user participation and user involvement on different dimensions of user satisfaction considered in a model, a significance test is recommended (Hunter and Schmidt, 1990 p. 438).

The difference between the effect sizes regarding effect of user participation, and effect of user involvement on user satisfaction dimensions in terms of a standard Z value is calculated. Under the null hypothesis that if two mean effect sizes are

equal then the statistic Z has a standard normal distribution. The 'Z' values corresponding 'p' values are shown in the Table 6.3.

Table. 6.3. **Mean Effect Sizes Differences:** (Relationship of User Participation, and User Involvement with User Satisfaction construct)

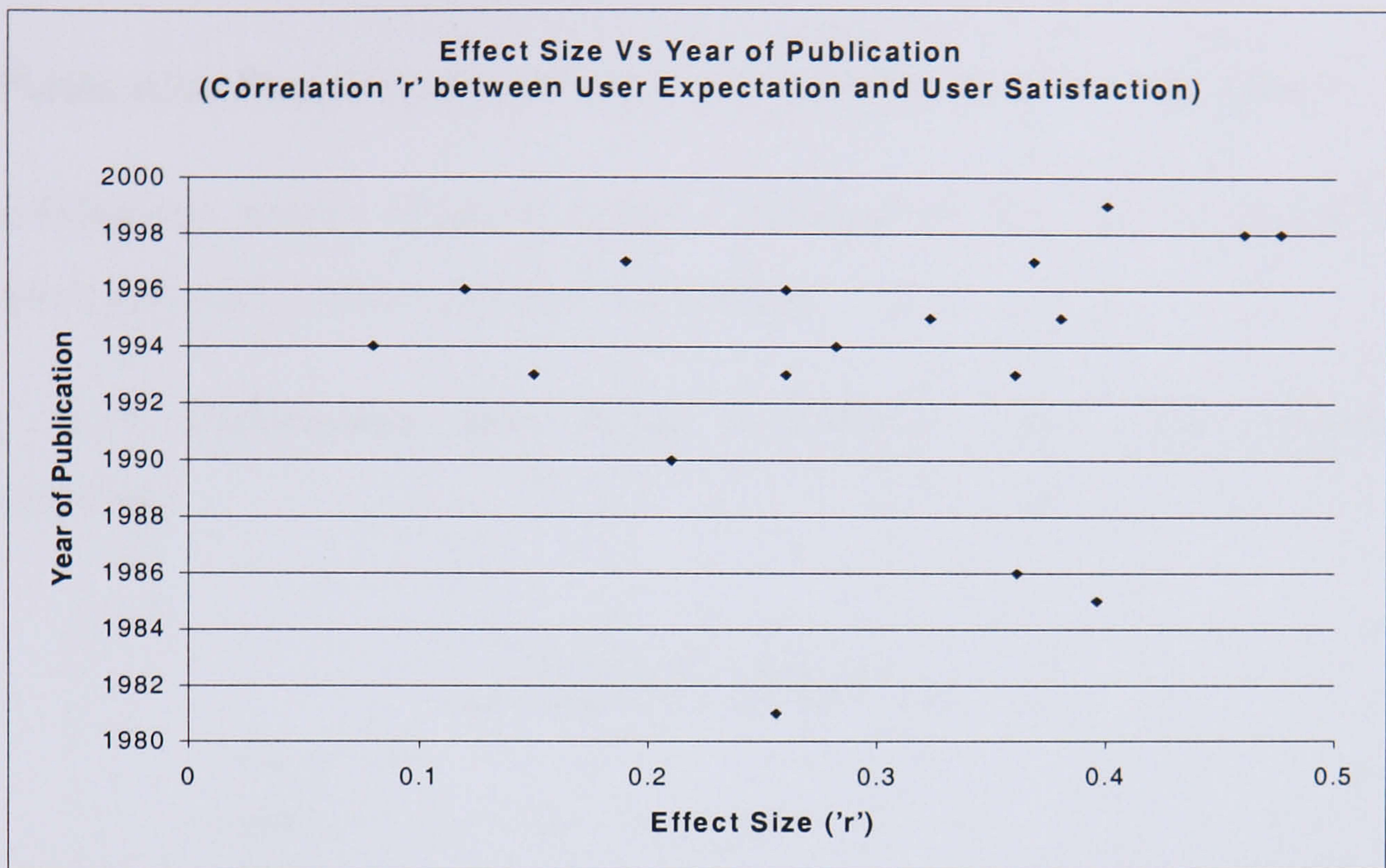
User Satisfaction Dimension	Z	P
User [information] Satisfaction	1.9972	0.023
System Quality	0.662	0.2546
Information Quality	2.619	0.004
System Usage	0.016	0.4364
Perceived Usefulness	3.193	0.0007

The Z values for user [information] satisfaction, information quality, and perceived usefulness are found to be 1.9972, 2.619 and 3.193 respectively. Thus meta-analysis results provide evidence that user involvement correlates significantly higher with user [information] satisfaction, information quality and perceived usefulness as compared with the effect of user participation on these dimensions of user satisfaction. These results are consistent with Hwang and Thorn (1999). They also found user involvement significantly correlated with user satisfaction than user participation.

### 6.2.9. User Expectations and User Satisfaction Relationship

The unrealistic user expectation usually seen to be problematic as discussed in chapter-2. The research about how user expectations might affect user satisfaction remains a topic of interest among IS researchers (for example, Ginzberg, 1981, Lyytinen, 1988; Szajna and Scamell, 1993, Rushinek and Rushinek, 1986, and others). Past research reveals that the strength of relationship between user expectations and user satisfaction is varying among studies. A meta-analysis consisting of 17 studies has been carried out to evaluate some general trend about the relationship. A scatter diagram shows the variations among studies about the effect of user expectations on users satisfaction. Although the sample size is not too big but in the following display the variations in the strength of relationship are apparent.

Fig. 6.9. **Relationship variability across studies** (User Expectations and User Satisfaction relationship)



The display shows varying correlation between user expectations and user satisfaction. It is apparent that display does not converge to a single value with the passage of time.

**i) Meta-Analysis Results** (Relationship between User Expectations and User Satisfaction)

Table.6.4. **Meta-Analysis Results** (Relationship between User Expectations and User Satisfaction)

No. of studies/ Effect Sizes	Sample Size	Effect Size 'r' (weighted)	Residual Variance	Residual Standard Deviation	Residual Std. Deviation > 1/4 of Effect size ('r')	Confidence Interval	Fail-Safe N	
							$r_c = 0.05$	$r_c = 0.1$
18	6690	0.3323	0.0047	0.06859	No	0.1979 to 0.4667	102	42

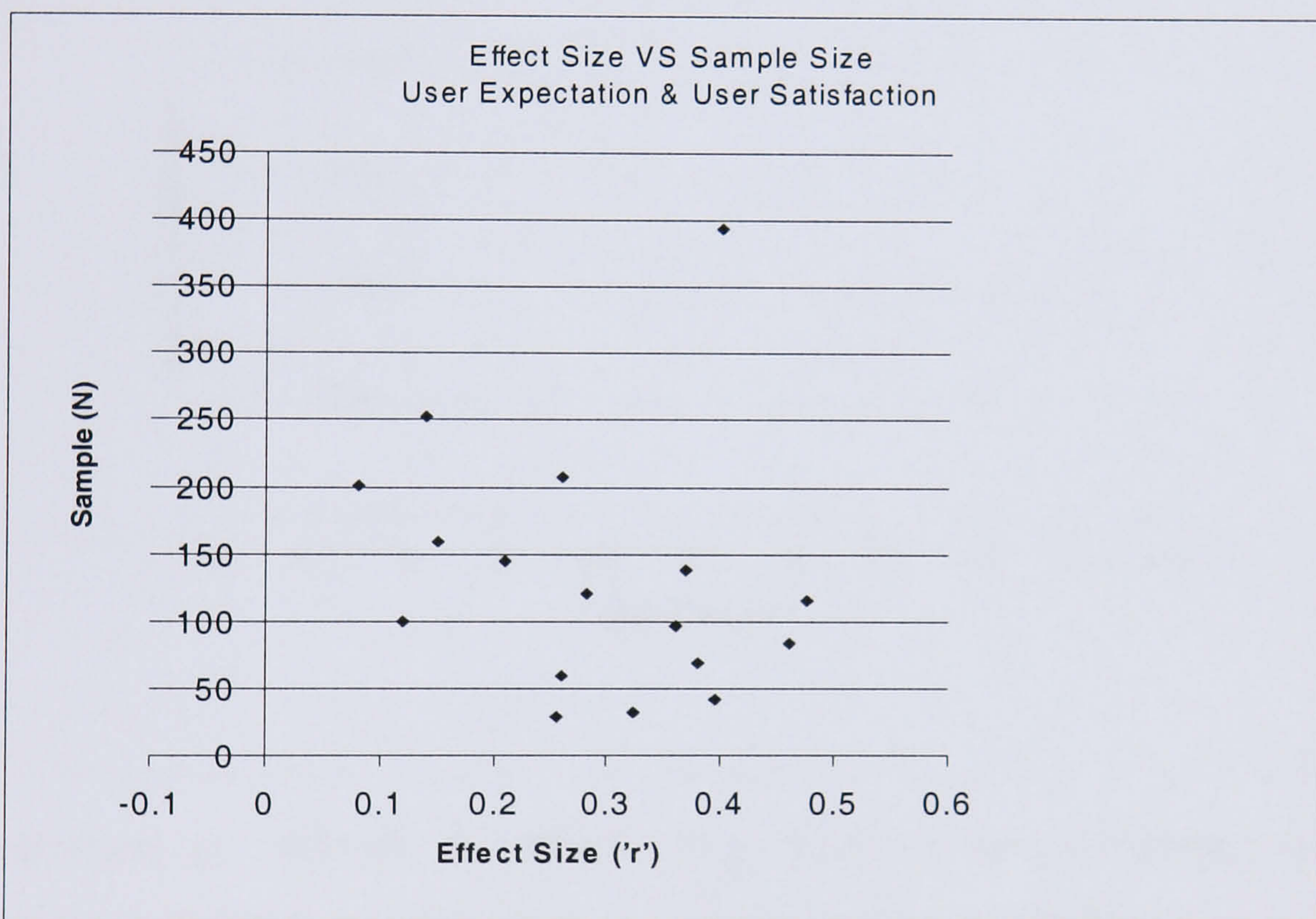
The results lead to the conclusion that user expectations are positively correlated with user satisfaction. The strength of relationship ( $r' = 0.3323$ ) is not 'large' but 'medium'. These findings highlight the importance of user expectations that may emerge/evolve during IS development and need management to be realistic that ultimately influence users satisfaction. Managing/restricting user expectations to

be realistic may play a positive role towards achieving user satisfaction and consequently systems success. As residual standard deviation is not greater than 25% of effect size, so variation among studies are due to only sampling error.

**ii) Publication Bias (User Expectations and User Satisfaction relationship)**

The following scatter diagram shows a publication bias for the relationship between user expectations and user satisfaction.

Fig. 6.10. **Publication Bias (User Expectations and User Satisfaction relationship)**



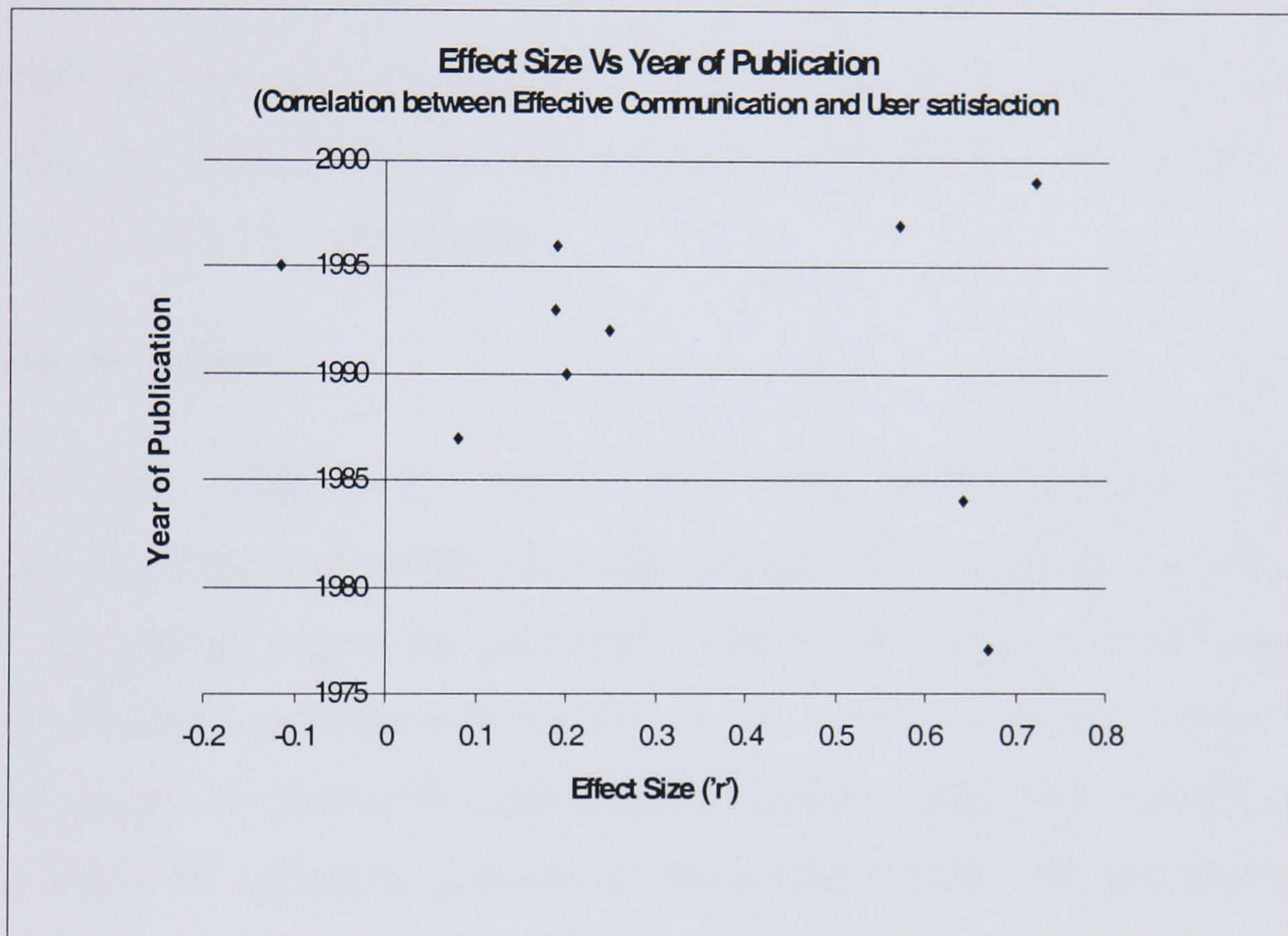
The diagram might be helpful in examining a publication bias regarding published studies representing the effect of user' expectations on user satisfaction. The missing bite near effect size zero is apparent. The studies with small effect sizes are hardly been published if there exist any. It may signal that there exists a publication bias.

**6.2.10. User-Developer Effective Communication and User Satisfaction Relationship**

User-developer interaction and effective communication are argued to be a necessary need during systems requirement elicitation. It helps all those involved

to be updated with what is going on during IS development. User and system developer communication in IS development may result in enhancing user participation/ involvement, increasing understanding, enhancing positive user attitudes, decreasing user resistance and enhancing the possibility of successful system implementation. Previous studies findings are shown in Fig-6.11.

Fig. 6.11. **Relationship variability across studies** (Effective Communication and User Satisfaction relationship)



The variation in strength of relationship between user-developer effective communication and user satisfaction is apparent within the studies.

**i) Meta-analysis Results** (Effective Communication and User Satisfaction relationship)

As already discussed, the need for effective user-developer communication during IS development has been argued by IS researchers. It benefits in requirement capturing, better user-developer relationships and consequently in achieving user satisfaction with the system. User participation during the IS development might be more useful when the participants have better skills to communicate their needs to the system developers. The results of meta-analysis are mentioned in Table-6.5 on next page.

Table-6.5. **Meta-analysis Results** (Relationship between User-Developer Effective Communication and User Satisfaction)

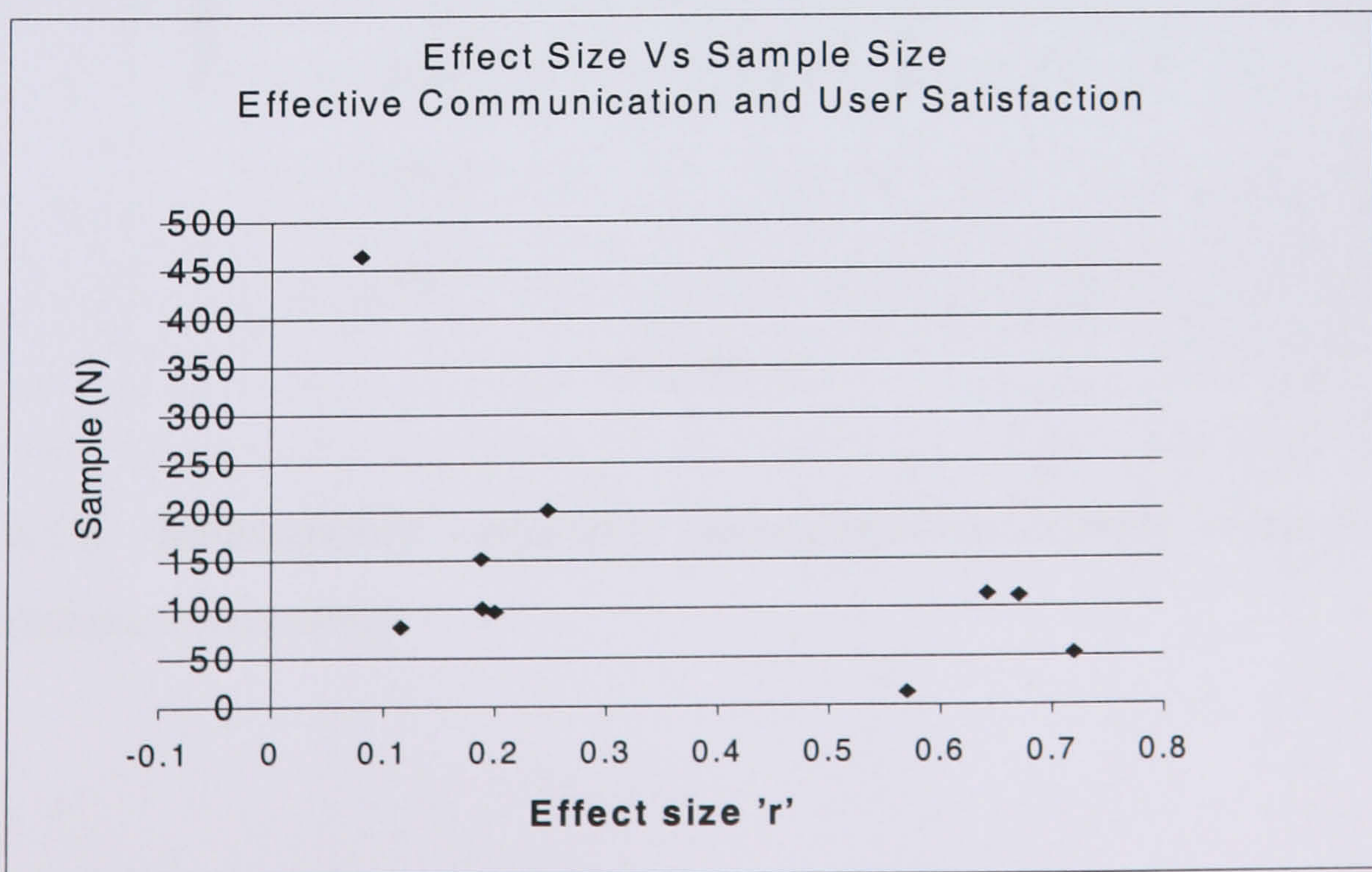
No. of studies/ Effect Sizes	Sample Size	Effect Size 'r' (weighted)	Residual Variance	Residual Standard Deviation	Residual Std. Deviation > 1/4 of Effect size ('r')	Confidence Interval	Fail-Safe N	
							$r_c = 0.05$	$r_c = 0.1$
10	1383	0.243	0.04799	0.21906	Yes	-0.186479 to 0.672254	38	14

User-developer effective communication is positively correlated with user satisfaction. The effect size  $r = 0.243$  indicates that the strength of relationship is not 'large' but 'medium'. As residual standard deviation is greater than 25% of effect size, so variation among past studies are argued to be due to moderating variables affecting this relationship.

**ii) Publication Bias**

The available sample to explore the relationship between effective communication and user satisfaction only consist of ten studies and is small. The following diagram represents publication studies with their sample sizes. To evaluate whether a publication bias exists or not, a funnel display is shown in the following figure. If there exist a publication bias then studies with smaller effects are not likely to appear in journals as there effect sizes will not statistically significant.

Fig. 6.12. **Publication Bias** (Effective Communication and User Satisfaction)





According to Light and Pillemer (1984) if such situation exists then the middle of funnel display may appear "hollow". The above funnel display has its middle part hollow, so it may be speculated that there exists a publication bias.

### 6.2.11. System Usage and User Satisfaction Relationship

It has been already discussed that the past research findings about the relationship between these two constructs (system usage and user satisfaction) are inconclusive. There is also no compromise among researchers about whether user satisfaction leads to system usage or vice versa. The data from 55 studies comprising 58 effect sizes have been included in meta-analysis. Variations in the strength of this relationship across studies are plotted in Fig. 6.13. The display does not converge to a single value. It leads to the argument that results of various studies are conflicting. The previous research hardly mentioned any conclusive findings about this relationship and it restricts the reader to reach any conclusion. The following figure shows variable finding across studies.

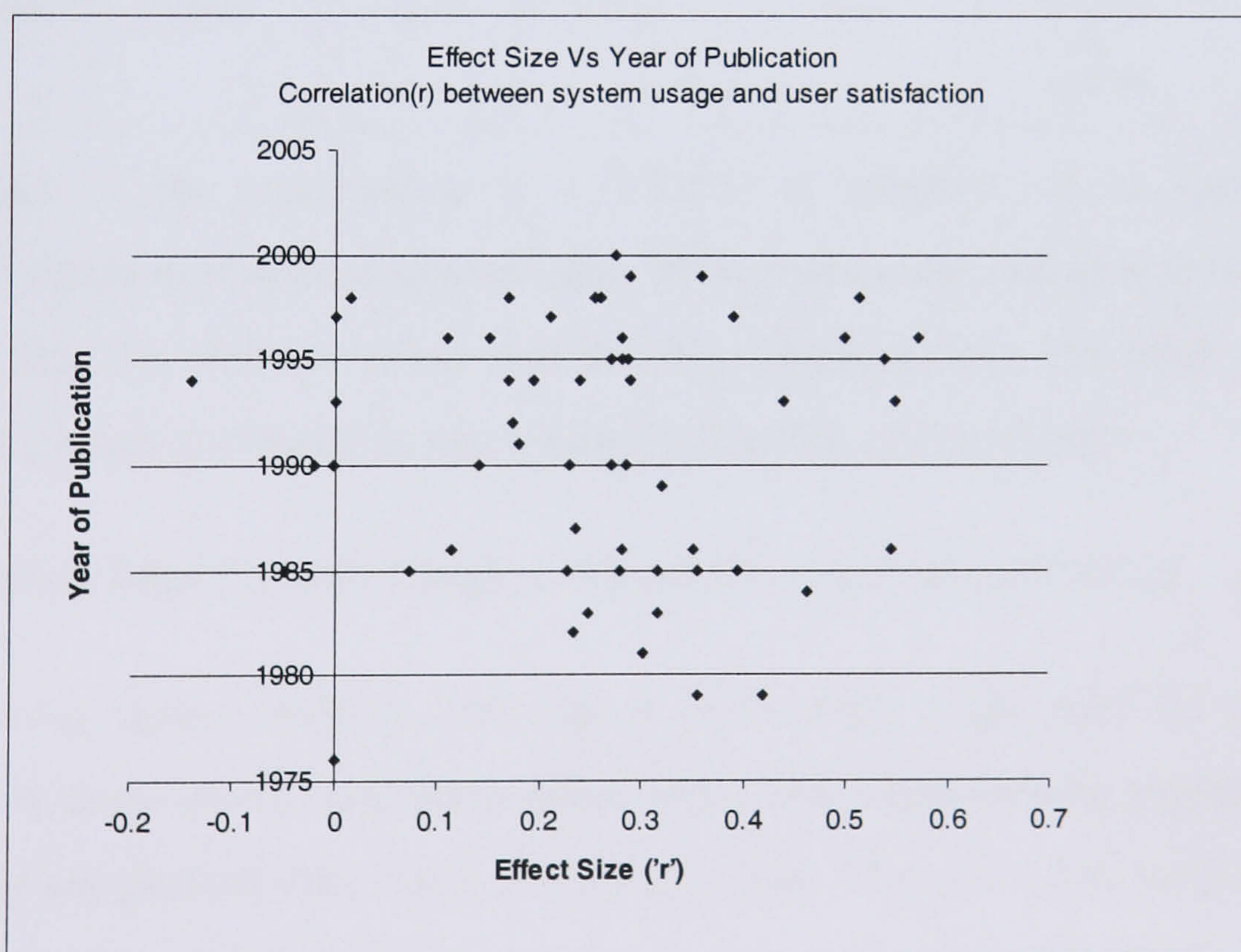


Fig. 6.13. **Relationship variability across studies** (System Usage and User Satisfaction relationship)

The display leads to the conclusions that the opinion of researchers about the relationship between system usage and user satisfaction is not conclusive. The current research found that there exists a positive correlation between system usage and user satisfaction and its strength is medium. The findings of meta-analysis are as under:

**i) Meta-Analysis Results (System Usage and User' Satisfaction relationship)**

The results mentioned below (see Table-6.6) showed a positive correlation between system usage and user satisfaction.

**Table. 6.6. Meta-Analysis Results (Relationship between System Usage and User Satisfaction)**

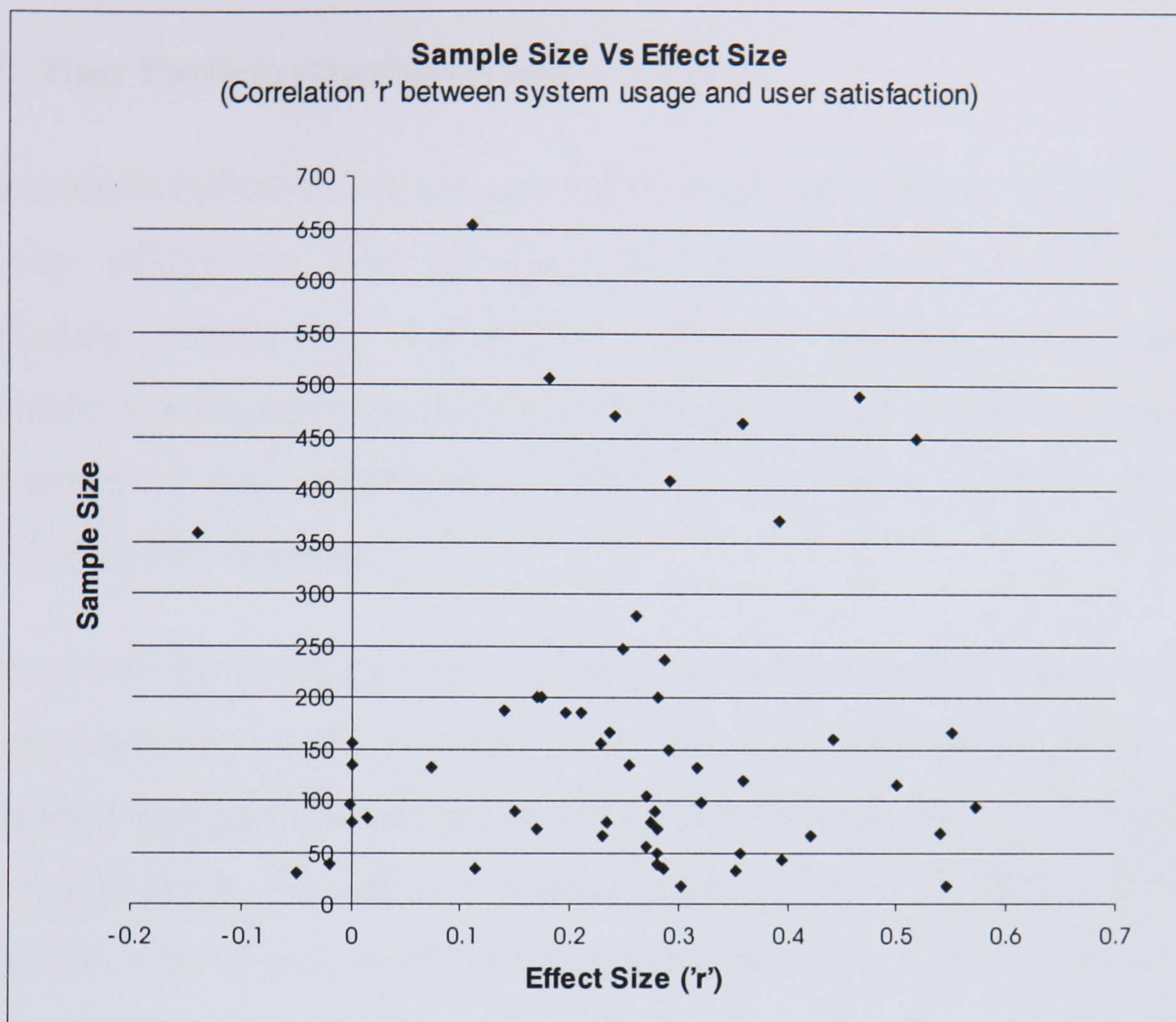
No. of studies/ Effect Sizes	Sample Size	Effect Size 'r' (weighted)	Residual Variance	Residual Standard Deviation	Residual Std. Deviation > 1/4 of Effect size ('r')	Confidence Interval	Fail-Safe N	
							$r_c = 0.05$	$r_c = 0.1$
58	9769	0.2555	0.01931	0.1389	Yes	-0.01688 to 0.52789	238	90

The strength of the relationship ( $r = 0.2555$ ) is 'medium' in its nature. The residual standard deviation is greater than 25% of the mean effect size, so it may be argued that the variance is not due to only sampling error but other artifacts. These findings are discussed in more detail at the end of this chapter.

**ii) Publication Bias (System Usage and User Satisfaction relationship)**

The following funnel display (see Fig. 6.14 on next page) may be useful in observing if there exists any publication bias. The observations regarding this relationship are plotted with respect to sample size. There is a bite near zero and shows that studies with small sample size and results with small effect size have hardly been published. The studies with non-significant effect sizes did not appear in the display. So a publication bias may exist.

Fig. 6.14. **Publication Bias** (System Usage and User Satisfaction relationship)



### 6.3. Discussion of Results

Despite considerable efforts from IS researchers about evaluating the effect of user participation on user satisfaction and consequently system success, the research is unable to produce consistent results in prior empirical investigations. Although the notion of involving the users in IS development in order to achieve successful system is appealing, it had hardly been corroborated within past research. Similarly, past research has also been unsuccessful in verifying the true strength of relationship between system usage and user satisfaction.

Meta-analysis may help to manage the inconsistencies among prior research findings and to reach some conclusions. Previous studies regarding the effects of different independent variables mentioned in chapter-4 on user satisfaction have been analysed using meta-analysis (i.e. a quantitative technique for research

synthesis). Meta-analysis revealed a clear picture of the relationship among the variables under study.

### **6.3.1. User Participation/Involvement Effects**

Meta-analysis indicated that user participation generally has a positive correlation with user satisfaction. User satisfaction has been considered in terms of user information satisfaction, information quality, system quality, perceived usefulness, system usage etc. as mentioned in the research model. The strength of relationship of user participation with each dependent variable was found "medium" in this research.

The relationship of user participation with system acceptance and ease of use was not calculated due to unavailability of studies. Only available study (i.e. Vogel, 1989) mentioned the relationship between user participation and user acceptance as non-significant but did not produce strength of correlation. One of the approaches is to impute a value for missing effect sizes as zero when any study reports that the effect size was not significant. This approach is criticized because of resulting downward bias in mean effect size. Some argue that such studies may be avoided (Piggot, 1994). The reason it was ignored and not included in meta-analysis.

The relationship of user participation with user [information] satisfaction was found to be medium ( $r = 0.249$ ). Considering a 95% confidence interval that ranges from 0.0371 to 0.46131 one can argue that he is positive about the effect of user participation on user satisfaction. The findings are consistent with previous meta-analysis findings (Hwang and Thorn, 1999). They mentioned positive correlation (i.e.  $r = 0.285$ ) between user participation and user satisfaction.

The value of  $\chi^2 = 70.4$ ,  $p=0.000$  is significant and shows that there may exist variations across studies. The residual standard deviation mentioned is greater than 25% of the effect size and may be interpreted as that there exist moderator variables that affect the relationship between user participation and user

[information] satisfaction. Different factors such as user characteristics, management role, task characteristics, system types, inconsistencies with user satisfaction measurement tools, inconsistencies in IS theoretical definitions have been observed in IS research that may be argued as cause of variation among studies. Fail-safe N in Table-6.1 explains the number of additional studies in a meta-analysis that would be necessary to reverse the conclusion found in this study.

The strength of relationship between user participation and user [information] satisfaction was found to be less strong than user involvement and user [information] satisfaction (i.e.  $r = 0.318$ ). The results are consistent with an earlier study (Hwang and Thorn, 1999).

The effect of user participation on system usage is also found to be of 'medium' strength (i.e.  $r = 0.19$ ) and positive but with less magnitude as compared to participation effect on user [information] satisfaction. The meta-analysis findings (Hwang and Thorn, 1999) for this relationship are also positive (i.e.  $r = 0.261$  for 5 studies included in meta-analysis, with 95% confidence interval 0.235 to 0.286. The 95% confidence interval for this relationship lies between -0.1038 to 0.4894 in current study. This range contains zero so differs from Hwang and Thorn's study. It may be argued that one may not be as positive about the effect of user participation on system usage as in case of user satisfaction where the calculated 95% confidence interval lies between 0.0371 to 0.46131 and does not contain a zero. The value of  $\chi^2$  is significant and also shows variation across studies. The value of residual standard deviation was found greater than 25% of effect size ( $r = 0.191$ ), so it may be argued that this relationship might be affected by the presence of moderator variables. These variables may be concerned to organizational aspects, user characteristics, or system characteristics (for example, the role of management, task complexity, system's ease of use and performance, user experience and attitude towards use of a system). User beliefs about how much efforts are required to use the system, how IS facilitate them in their jobs, and fulfilling their needs may influence their attitude towards using the

system. Similarly, management motivation may encourage user to use the system when the system usage is voluntary.

The correlation of user participation with system quality, information quality and perceived usefulness was also found positive and 'medium'. The 95% confidence interval for user participation and information quality (i.e. -0.04143 to 0.4264) contains zero, so one may be less positive about this effect as compared to participation's effect on user [information] satisfaction, perceived usefulness and system quality. The magnitude of the effect of user participation is comparatively of more strength with user [information] satisfaction, systems quality, and perceived usefulness as compared to system usage and information quality (see Table 6.1). The residual standard deviation regarding user participation and perceived usefulness relationship found to be less than 25% of effect size ( $r = 0.25$ ) and shows absence of moderator variables. The value of  $\chi^2 = 10.63$ ,  $p = 0.15$  is also non-significant and does not show variation among studies. The correlation of user participation with user satisfaction and perceived usefulness found to be greater than with system usage, information quality and system quality respectively although all effect sizes are 'medium'. The findings about the effect of user participation on user satisfaction dimensions showed that the residual standard deviations are greater than 25% of effect sizes evaluated for user [information] satisfaction, system quality, information quality, and system usage respectively except user perceived usefulness. It indicates that variation in findings within past studies is not only due to sampling error but moderating variables for all relationships except perceived usefulness.

The current meta-analysis results of 53 studies regarding the effect of user involvement of user [information] satisfaction found a positive relationship between user involvement and user [information] satisfaction (i.e.  $r = 0.3186$ ). The strength of relationship according to Cohen's rule is 'medium'. The nature of relationship is comparable with earlier meta-analysis findings. A comparison is given in Table- 6.7 on next page. (see Table- 6.7.)

Table. 6.7. **Comparison of current findings with past Meta-Analysis results**  
(User Involvement and User Satisfaction relationship)

Meta-Analysis Study	Year	Studies included (K)	Total Sample (N)	Dependent Variable	Effect Size 'r' (weighted)
Pettingell et al.	1988	3	108	System Success	r = 0.34
Alavi and Joachimsthaler	1992	7 5	(*) <sup>5</sup>	User attitudes towards DSS	d = 0.642 d= 0.486 (after removing outlier)
Gelderman	1997	12	1499	User Satisfaction	r = 0.312
Hwang and Thorn	1999	4	392	User Satisfaction	r = 0.457
Mahmood et al.	2000	10	1565	User Satisfaction	r = 0.661
Current research	2001	53	5929	User Satisfaction	r = 0.319

Although the strength of relationship varies across meta-analytical findings among studies but ultimately concludes that there exist a positive relationship between user involvement and user satisfaction. Straub and Tower (1988) also mentioned a positive relationship of medium strength (i.e.  $r = 0.239$ ) between user involvement and systems success in their meta-analysis findings. Only one of the studies findings (see Mahmood et al., 2000) falls within the range termed as 'large' relationship whereas other meta-analysts found this relationship as of 'medium' strength. The difference may be due to difference in sample size, or due to other artifacts that may influence results. These results are comparable because user satisfaction is almost considered as surrogate of system success. The large

---

<sup>5</sup> The total subjects mentioned for all independent factors are 2082. The respondents for user involvement studies are not mentioned independently.

sample size may produce more refined meta-analytical findings. According to Hunter et al., (1982), if the total sample size is large, then there exists a very little sampling error in the average correlation. The sample size for this study is larger than other meta-analysis studies (see Pettingell et al., 1988; Alavi and Joachimsthaler, 1992; Gelderman, 1997; Hwang and Thorn, 1999; Mahmood et al., 2000). The reduced value of the effect size for the relationship between user participation and user satisfaction, and user involvement and user satisfaction in the current study as compared with previous meta-analytical studies (i.e. Hwang and Thorn, 1999; Mahmood et al., 2000) can be argued as the result of less sampling error. The user involvement found to be more effective towards achieving user satisfaction as compared to effect of participation. Different studies (for example Kappelman and McLean, 1991) show that user participation leads to user involvement.

According to Mahmood et al. (2000), perceived usefulness is strongly correlated with user satisfaction ( $r = 0.58$ ). This study evaluated the effect of user involvement on perceived usefulness by analysing 12 available studies. In my study, the correlation between user involvement and perceived usefulness is found to be more strong (i.e.  $r = 0.415$ ) as compared to all other dimensions of user satisfaction although it is 'medium'. Considering the results of test of homogeneity, the residual standard deviation is less than 25% of effect size (i.e.  $r = 0.415$ ) and indicates that there exists no moderator variables which may affect this relationship. Although the value of  $\chi^2$  is significant but for small sample sizes the test is not preferred on the other tests (see Hunter and Schmidt, 1990).

The effect of user involvement on system usage is also not different from previous meta-analytical studies and the mean effect size is found to be  $r = 0.193$  (i.e. 'medium'). The 95% confidence interval lies between -0.1083 to 0.48789 and contains zero. The residual standard deviation found to be greater than 25% of effect size, so it argues about the existence of moderator variables. The value of  $\chi^2$  is also significant and shows variation among studies. The results of current research are in congruence with earlier meta-analytical findings. The following Table-6.8 represents a comparison of the current and past research findings.



**Table. 6.8. Comparison of current findings with past Meta-Analysis results (User Involvement and System Usage relationship)**

Meta-Analysis Study	Year	Studies included (K)	Total Sample (N)	Dependent Variable	Effect Size 'r' (weighted)
Pettingell et al.	1988	5	509	System Success	r = 0.11
Gelderman	1997	12	912	User Satisfaction	r = 0.165
Current research		24	2529	User Satisfaction	r = 0.193

The current research findings are supposed to be more explanatory as compared with previous ones because of greater sample size. The mean effect sizes regarding effect of user involvement on system quality (i.e.  $r = 0.189$ ), information quality ( $r = 0.385$ ), system acceptance ( $r = 0.387$ ) and ease of use ( $r = 0.167$ ) are 'medium'. The 95% confidence interval except system usage (see Table 6.2) has values within a range that contains no zero, so one should be more positive about their relationship. The residual standard deviation except user perceived usefulness, system acceptance, and ease of use are found greater than 25% of their effect sizes, so their relationship with user involvement might be influenced by other moderating variables. The effect of user involvement on information quality was found to be stronger as compared with effect of user participation on information quality. It might be speculated that a person more involved in IS development and after implementation may value information more than other who participated simply in design process. The 95% confidence interval for user involvement and information quality lies between 0.1666 to 0.6028 and contain no zero as found in user participation and information quality relationship. So one may be more positive about the effect of user involvement on information quality than participation does. On the other hand, user participation found to be strongly correlated with system quality ( $r=0.235$ ) as compared with correlation between user involvement and system quality ( $r = 0.189$ ). The results about the relationship of user involvement with systems acceptance and ease of use respectively are found to be positive and 'medium'.

The  $\chi^2$ , and the value of residual standard deviation for homogeneity test do not show variation among studies but these findings can not be generalized due to a very small sample size.

The significant test regarding correlation of user participation, user involvement with user satisfaction dimensions produced results in terms of 'Z' values such as 2.005, 2.619, and 3.193 with corresponding p-values 0.022, 0.004 and 0.0007 for user [Information] satisfaction, information quality, and perceived usefulness respectively. So one can infer that user involvement correlates significantly higher with user [Information] satisfaction, information quality, and perceived usefulness than user participation.

Various factors may affect the strength of relationship between user participation and user satisfaction. If a user involved in IS development has no influence and his/her suggestions are ignored then it is just surface participation. Lucas et al. (1990) say that time spent with IS developers does not mean that some one is involved, and such involvement may not lead to greater satisfaction or more usage. Zmud (1979) stated that system type and individual differences might play an important role in the system evaluation. Franz and Robey (1986) stated that lower level users might consider a system more useful as compared to higher level users. Cheney and Dickson (1982) stated that system satisfaction differs among different levels of management. Similarly, Nichols and O'Connor (1990) found technical users less satisfied as compared to administrative users. Mathieson and Ryan (1994) mentioned that user definitional variation of system evaluation may lead them to form different attitudes towards IS. So, it may be argued that different factors such as type of IS (Garrity, 1994), user characteristics (Igbaria and Nachman, 1990; Ang and Soh, 1997; Wrigley et al., 1997), user influence and type of users (Nicholas and O'Connor, 1990; Edstrom, 1977), user expectations (McKeen et al., 1994), task characteristics (McKeen et al., 1994; Trice and Treacy, 1986), user-developer communication (Srivihok, 1999; McKeen et al., 1994), organizational support (Bajwa et al., 1998; Guimaraes, 1993) can be considered as moderator variables in evaluating the relationship between user participation and user satisfaction. Users'

desire/willingness to participate, the IS development stage at which user participated, the type of participation, use of system design methodology, and the use of research methodology might be considered as moderator variables. Further, 1) different instruments that are developed and used to measure user participation and user satisfaction, and 2) the use of existing instruments with modifications without validating them again can also cause variations in measurements and ultimately among study findings.

### 6.3.2. User Expectations' Effect

User expectations and their management during IS development speculated to be an important factors towards achieving user satisfaction. Users with lower expectations have the tendency to be less involved during IS development (Cox et al. 1981). Szajna and Scamell (1993) found user more satisfied with the system having higher expectations as compared to users having moderate expectations. The findings about the effect of user expectations on user satisfaction vary among past research studies. The meta-analysis finding in this study found a positive correlation ( $r = 0.332$ ) and its strength is 'medium'. The residual standard deviation was found to less than 25% of effect size, so it may be argued that there was not found any heterogeneity and there may be no moderator variable that influence this relationship. These results are comparable with earlier meta-analysis findings in Table 6.9. (see Table-6.9)

Table. 6.9. **Comparison of current findings with past Meta-Analysis results**  
(User expectations and User Satisfaction relationship)

Meta-Analysis Study	Year	Studies included (K)	Total Sample (N)	Dependent Variable	Effect Size 'r' (weighted)
Gelderman	1997	3	912	User Satisfaction	$r = 0.228$
Mahmood et al.	2000	7	769	User satisfaction	$r = 0.458$
Current research	2001	18*	6690	User Satisfaction	$r = 0.332$

\* 17 studies comprising of 18 effect sizes.

In the present study, user expectations correlation with user satisfaction (i.e.  $r = 0.332$ ) is found to be greater as compared to user participation and user satisfaction correlation (i.e.  $r = 0.249$ ). The results of current studies regarding effect of user expectations differs from Mahmood et al. (2000) findings in a sense that the latter found user involvement and user satisfaction correlation strong as compared to user expectation and user satisfaction whereas the current study found negligible difference. The confidence interval found to be between 0.197923 to 0.466795 and does not contain zero, so one may be more positive about this relationship. Therefore the management of user expectations during IS development may lead user to be satisfied with the system.

### **6.3.3. Effect of User-Developer Effective Communication**

The role of effective communication in IS development has already been discussed in Chap-2. From the existing research it is clear that reliable and effective communication is an important factor towards achieving user satisfaction and system success (see Edstrom, 1977; Rees, 1993; Srivihok, 1999). Meta-analysis of ten studies which discussed the effect of user-developer communication on user satisfaction lead to the findings that there exists a positive correlation ( $r = 0.243$ ) between user-developer effective communication and user satisfaction. The effect size also falls within a range considered as 'medium'. The value of residual standard deviation is found to be greater than 25% of effect size, so this relationship may be affected by moderating variables. The 95% confidence interval lies between -0.1864 and 0.6722. It might be speculated that moderating variables such as communication skills, and users and developers' rapport might be considered. The effect of user-developer communication apparently appears to be less strong than effect of user expectations on user satisfaction, but the significance test ( $z = 1.1682$ ,  $p=0.123$ ) does not show any significance.

### **6.3.4. System Usage and User Satisfaction**

As already discussed that both of the variables are mostly used as surrogate measures of success. The past research unable to reach any conclusion regarding

their relationship because of controversies among studies. Meta-analytical finding of current research leads to the findings after analysing 55 studies (comprising of 58 effect sizes) that both are positively correlated (effect size  $r = 0.2555$ ). The strength of the relationship is 'medium'. The heterogeneity regarding this relationship reveals that variations among studies are not due to only sampling error but other artifacts (see Table-6.6). Different factors such as user characteristics, management support, user training, system quality, ease of use may affect the usage of a system (see Davis, 1989; Welsch, 1986; Thompson, et al., 1994; Igarria, et al., 1995, 1995a). O'Reilly (1982) found user characteristics, task uncertainty positively correlated with use of information resources. Some argue that the mixed findings concerning user satisfaction may be due to inconsistency in theoretical definitions, variation in satisfaction measurement instruments, and poor operationalization of user satisfaction construct (Swanson, 1974; Treacy, 1985; Goodhue, 1988). The 95% confidence interval lies between -0.016253 and 0.527264 and contains zero. As the residual standard deviation is greater than 25% of effect size, so it may be argued that there exist moderator variables that may affect this relationship.

### **6.3.5. User Unrealistic Expectation Emergence Reasons**

User unrealistic expectation is an old problem that still persists. People/users within an organization may hold expectations about the new system's performance even before its implementation. If these expectations are unrealistic then can hardly be met, so cause users' disappointment and dissatisfaction with the system. Various causes for this problem are explored after reviewing 34 studies (see Appendix-A1). The reasons for the emergence/formation/evolution of unrealistic expectations may be classified depending on the nature of the source and cause. These can be specified as exogenous (i.e. external to the organization) and endogenous (i.e. internal to the organization) broadly. Further, these reasons fall in to different domains related to technical/technological, management, IS department, individual characteristics and IS environment (Bokhari and Paul, 2000). The reasons for unrealistic expectations and its taxonomy are given in appendices A1, and A2.

The importance of managing user expectations has been advocated in the IS literature. User expectations are an important determinant of user satisfaction and systems success whereas unrealistic expectations lead to user dissatisfaction. So unrealistic expectations are argued as usually cause a low feeling of satisfaction. Bokhari and Paul (2000) made some suggestions to overcome this existing problem. Further a theoretical model for managing user expectations to be realistic is proposed in Chapter-7.

#### **6.4. Summary**

The results of effects of different independent variables mentioned in the model are explored. This research tried to draw some conclusions from the previous research. The meta-analysis findings may help to overcome the controversies that exist among research studies, to explore conflicts and to reach some definitive conclusions. The findings may also be useful for the practitioners in their decision making regarding IS development and ultimately system success. This research indicates that user participation in IS development is useful in achieving user satisfaction. User satisfaction has been considered a multi-dimensional construct as mentioned in the research model. The user participation effects on each of the dependent variable leads to the conclusion that overall user participation has a positive impact on achieving user satisfaction. User participation may provide users a chance to give their opinions and feed back that might ultimately be fruitful for systems success. The effect of user participation/involvement, user expectations, user-developer effective communication is found to be positive towards achieving user satisfaction. It may be argued that user participation during IS development may provide an opportunity to be familiar with the new technology and the candidate system so that when it will be handed over to users they may feel sense of ownership and responsibility for its success. The management of user unrealistic expectations, and maintaining good rapport between users and developers may positively affect IS development. This study not only provides evidence about the relationships between variables under study but also clarified the controversies. The relationship between system usage and user satisfaction found to be positive. The

possible causes of variation among studies are also discussed in the light of homogeneity tests. The findings also indicate that the affect of user participation on system acceptance and ease of use needs more research. This research hardly found any studies in the past that considered the effect of user participation on user acceptance and ease of use. This study has contributed towards increasing our knowledge of the effect of user participation, user expectations and user-developer effective communication on user satisfaction and to reach some conclusion after sorting out the conflicts in past research on the subject.

In the next chapter some suggestions have been made for future research. A theoretical research model to avoid user unrealistic expectations emergence is also proposed.

## **7. Conclusions and Future Research**

### **7.1. Research Summary and Conclusions**

Generally the conclusions drawn from the current research show that the research objective have been achieved. This research also indicated some areas that need to be explored and are mentioned in future research recommendations. The summary including the problem area, conclusions based on this research, and future research directions are discussed as follows.

Organizations today spend significant portion of their resources for adoption and development of IS/IT in order to enhance their performance and productivity. Yet many of the systems are disappointing, and have failed to perform and deliver what they were developed for. A plethora of reasons mentioned in Chapter-2 are the main culprits for such IS disappointments/failures. Organizational and human factors are found to be more critical as compared to technical ones. Only technical excellence in designing IS do not guarantee a system to be successful (Baronas and Louis, 1988). How such IS disappoint/failure are to be avoided is questionable. The participation of the users during IS development was considered to be the panacea for tackling human related problems that may stem during IS development or after implementation.

Although the importance of user participation in IS development is well recognized but past empirical research on the relationship between user participation and user satisfaction provided inconsistent and contradictory results so leading to confusion. Traditional research reviews provide the evidence about contradictory findings regarding the effect of user participation on system success. The success of IS has been usually evaluated in terms of system usage and user satisfaction. Despite valuable contributions, such reviews hardly mentioned the strength of relationship between user participation and user satisfaction quantitatively but concluded how many studies are in favour, neutral, or not in favour about how user participation affect system success. Plenty of



arguments have been made by IS researchers about why past research is fragmented and unable to clarify the true nature of the effect of user participation on systems success. Chapter-1 introduced such arguments that support the fact that past research findings about the effect of user participation on user satisfaction/system success are inconclusive. The research frameworks and the measurement of the key concepts of user participation and success are argued to be inadequate. They are supposed to be cause of contradictory research findings and have been criticized in IS research. Further more, the research on user satisfaction with the system has also been criticized for inconsistent theoretical definition, its assessment measures and for its operationalization. Such aspects have been argued as an inability of the research findings to provide cumulative evidence across studies. It may be inferred from the facts mentioned that the past research concerning the effect of user participation on user satisfaction is unable to produce a clear view about the benefits that may be gained on user participation in IS development. The current research not only attempted to explore the strength of relationship between user participation and user satisfaction if it exists, but also contributed towards reaching some conclusions after sorting existing inconsistencies/controversies among studies about this relationship.

It has already been discussed that user satisfaction and system usage are widely used as surrogate measures of system success. It has been argued that how a system can contribute towards organizational performance and productivity unless it is used. So use of a system is necessary to achieve the purposes for which it has been developed. In addition to system quality, how the system is being used is also an important fact. It may also be speculated that if the system is able to provide necessary information required by its user and be helpful in performing his tasks easily, then user might prefer to use the system. It might contribute towards achieving user satisfaction with the system. The satisfied user may use the system more in order to accomplish his tasks. So system usage and user satisfaction appear to be interdependent. The relationship between these two aspects is also not clear and past research showed mixed findings. The current

research attempted to sort this ambiguity regarding relationship of system usage and user satisfaction and made some efforts to reach some conclusions.

Viewing dissatisfaction of user with the system and their lack of commitment, some suggestions are made by theorists to cope with the situation. Among those user participation in IS development was frequently advocated and was supposed to be useful in decreasing user resistance, system acceptance and achieving user commitment and satisfaction with the system. The concepts of user participation are more complex as understood and are multidimensional. Multidimensionality of user participation concepts and its effects on various factors contributing towards user satisfaction and consequently systems success are still not fully explained in existing research. Although potential benefits of user participation are described in Chapter-2, its full understanding about how and when participation might be more effective towards systems effectiveness needs more research for its implications.

The concept of user satisfaction is also a complex phenomenon. It is a multi-dimensional construct. Different dimensions of user satisfaction are considered in the current research after reviewing the IS literature. The effect of user participation on each dimension of user satisfaction is explained in the current research keeping in view that it might be useful in conceptualizing the real effect of user participation towards achieving user satisfaction. The determinants/dimensions that are considered in this research are very related to system aspects. These are explained in Chapter-3 before proposing a research model. The effect of user participation and user involvement in IS development on each dimension of user satisfaction have been considered as an integral part of research model. Further, the effect of user expectations, and of user-developer effective communication have also been explored in terms of their relationship with user satisfaction.

Considering the basic questions raised for this research (see Chapter-1) and the proposed research model (see Fig. 7.3), the findings of current research are presented. This research found some interesting results regarding relationship

between user participation and user satisfaction dimensions, and also of user expectations, user-developer effective communication with user satisfaction respectively. These are found to be useful in resolving existing controversies among researchers. It was also found that there is lack of empirical research regarding effect of user participation on system acceptance, and ease of use. Despite many efforts the author did not find empirical studies in this area, further research is suggested.

A global summary of research findings in the context of research model (Fig. 7.3) is presented in Table-7.1 on next page.

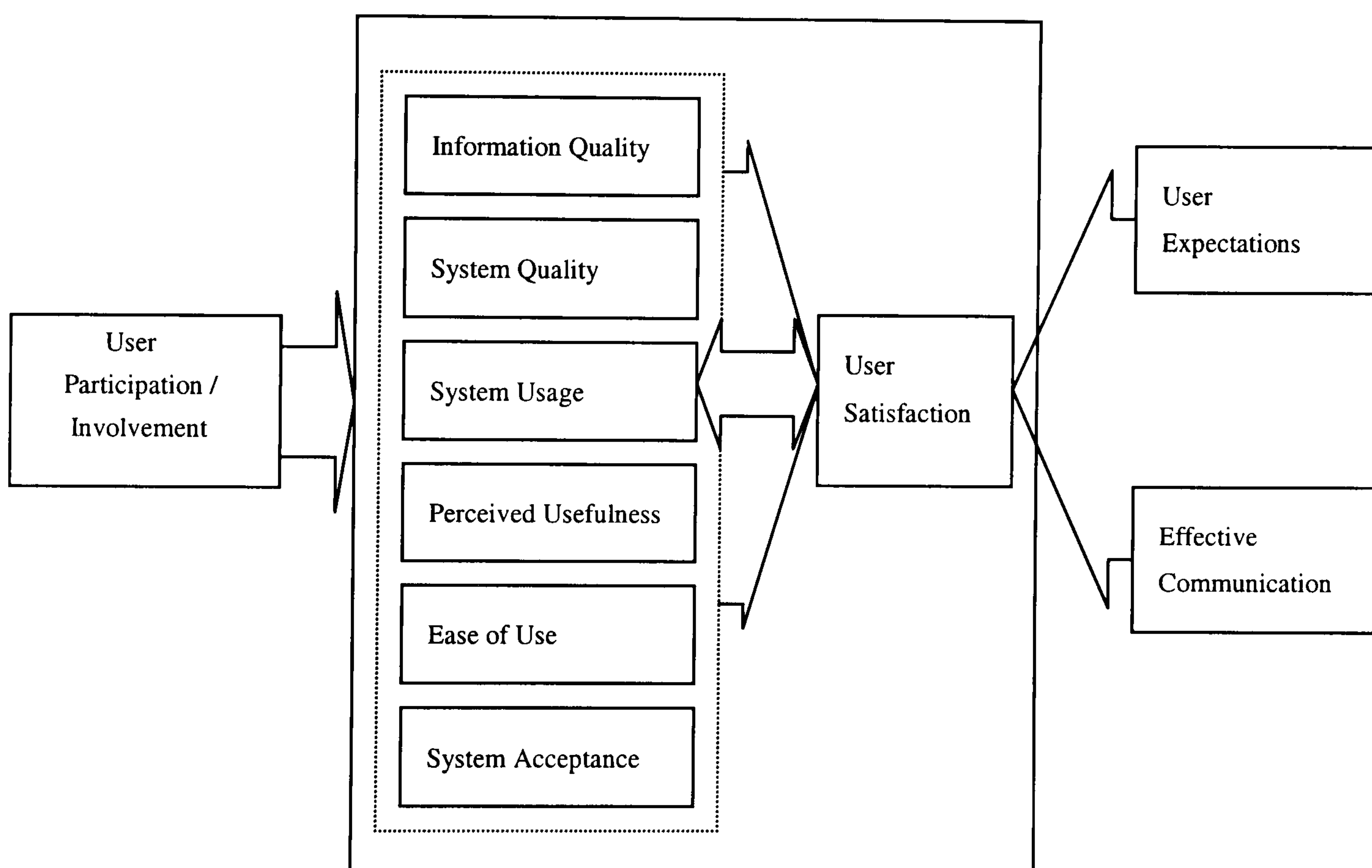


Fig.7.1. Proposed Research Framework (Chapter-3)

The effect size ( $r$ ) is the weighted correlation between independent variables and the dependent ones (i.e. user satisfaction construct). The relationship of user participation and user involvement on each dimension of user satisfaction has been mentioned in terms of its strength and direction (i.e. Effect size  $r$ ). The correlation of other variables such as user expectations, and user-developer effective communication with user satisfaction has also been described and is comparable with user participation and user involvement effects. The missing values for any relationship (see Table-7.1) show the non-availability of suitable

empirical studies about that relationship. Summary of research findings is presented here.

**Table. 7.1. Summary of Meta-Analysis findings**

<b>Relationship</b>	<b>Effect size 'r'</b>
User Participation and User [Information] Satisfaction	0.249
User Involvement and User [Information] Satisfaction	0.3186
User Participation and System Quality	0.235
User Involvement and System Quality	0.189
User Participation and Information Quality	0.193
User Involvement and Information Quality	0.385
User Participation and System Usage	0.191
User Involvement and System Usage	0.193
User Participation and Perceived Usefulness	0.25
User Involvement and Perceived Usefulness	0.415
User Participation and Ease of Use	-
User Involvement and Ease of Use	0.1677
User Participation and System Acceptance	-
User Involvement and System Acceptance	0.387
User Expectation and User Satisfaction	0.332
User-Developer Effective Communication and User Satisfaction	0.243
System Usage and User Satisfaction	0.2555

The above mentioned results show that user participation, user involvement, user expectations and user-developer communication are positively correlated with user satisfaction. The positive correlation of user participation in IS development with user satisfaction highlights its importance towards achieving successful systems. Although the pseudo-participation in which users merely found their influence in IS development might exist, but it could be speculated not too much beneficial and productive until participation with real influence. The correlation (i.e. effect size 'r') of user participation with each dimension of user satisfaction is found to be positive although 'medium'. It may be argued that users engaged in IS development may get the opportunity to convey their task requirements, provide feed back to the system developers, and feel the responsibility of ownership of the system. Therefore user participation is suggested in IS development for

successful development and user satisfaction. It is also believed that user participation be of assistance in reducing user resistance towards change. Such benefits gained from user participation may enforce user satisfaction towards the system. The involvement of user is found to be more influential towards achieving user satisfaction as compared to user participation. The meta-analysis results provides evidence that user involvement correlates with user [information] satisfaction, information quality, and perceived usefulness significantly higher than does user participation whereas user involvement effect on system quality and system usage do not appear to be different from user participation. It might be speculated that more the users involved with the system might get more acquaintance with it and also may perceive it useful towards their task accomplishments, so they might be more satisfied. User participation, and user involvement (i.e. psychological state) appeared as irrefutable contributing factors towards achieving user satisfaction with the system.

The heterogeneity analysis leads to the conclusion that the variation among studies about the effect of user participation and user involvement on user satisfaction is not only due to sampling errors but moderating variables. Various factors mentioned in Chapter-6 might be considered as moderating variables and require further exploration. The variations among studies regarding the effect of user participation on user [information] satisfaction, systems quality, information quality, and system usage respectively are found to be due to other related artifacts but not only sampling error.

The research findings about the effect of user participation/involvement lead to the suggestion that user participation in IS development may provide useful contribution towards achieving user satisfaction and ultimately system success. User participation also provides the means of communication, provided the stakeholders pay attention to what is said and just not a physical presence. Therefore efforts to create environment that may motivate users to participate and get involved in IS development are suggested to be useful in achieving effective participation. Users are needed to be trained and educated, so they understand what is expected from them on their participation during IS development. In the

light of current research findings, user participation is proposed in IS development for achieving system success in terms of system usage and user satisfaction.

There exists homogeneity among the studies findings about the effect of user participation and user involvement on user perceived usefulness. Any variance among the studies may be attributed to sampling error only. Although no heterogeneity is found among the studies regarding the effect of user involvement on system acceptance and ease of use respectively but the results can not be interpreted and generalized fully due to very small sample size.

Research findings regarding the effect of user expectations on user satisfaction, there exist a positive correlation ( $r= 0.327$ , 'medium') between user expectations and user satisfaction. The variations among studies are found to be due to only sampling error. Although meta-analysis found homogeneity but it needs more exploration because various factors (Bokhari and Paul, 2000) have been found that may affect user expectations. It might be that variation in user satisfaction specified among studies is because of the varying nature of user expectations caused by different factors, but current study does not show variation due to moderating variables. More research is suggested in this area. Current research findings show that user expectations have substantial effect on user satisfaction. Therefore it is suggested that expectations of users always need to be managed to a realistic level keeping in view the technology and project resources limitations. The system-developer and management may play their roles in maintaining user expectations to be realistic. User participation and effective communication among stakeholders may also be effective as both facilitate the individuals to be aware of what is going on or being done, and the problems encountered during IS development. The system developers might also know what user actually want, so effective communication might be helpful. Such benefits may provide a basic strategy for managing user expectations to be realistic which may ultimately produce a sense of satisfaction with the system.

The importance of effective communication among the stakeholders as part of IS development is well recognized within IS research. Lack of communication among stakeholders may hinder their efforts towards achieving successful development of IS. The meta-analysis findings support the notion that effective communication among users and system developers during IS development may contribute towards user satisfaction. There exists a positive correlation ( $r = 0.243$ ) between effective communication and user satisfaction. It may be due to the fact that effective communication between user and system developers might be useful in clarifying user requirements and also in getting feedback from the users. It may also add towards user participation to be effective and ultimately useful towards achieving successful systems. It might be speculated in light of past research that the quality of user participation is very much concerned with their desire to participate, knowledge, skills, and their ability to communicate with other stakeholders particularly system developers.

The heterogeneity found across studies about the relationship between user-developer effective communication and user satisfaction may be argued not only due to sampling error but moderating variables. In light of current research findings, an emphasis should be made to develop better rapport and effective communication among the stakeholders, particularly between users and system developers for successful IS development and consequent user satisfaction with the system. Any hindrance causing communication to be ineffective among the stakeholders and particularly user and system developers ought to be overcome during IS development.

As discussed earlier, system usage and user satisfaction are usually considered as surrogate measures of system success. The relationship between these two variables in past studies is mixed and inconclusive. The current study found a positive correlation between system usage and user satisfaction after meta-analysis of 55 studies. The strength of relationship is positive but 'medium'. The heterogeneity trend among studies for this relationship may be argued as the effect of moderator variable that can influence this relationship. It can not be attributed only to a sampling error. The variation among study findings might

arise due to measuring instruments with different constructs used by IS researchers to measure both of these variables in their studies. Various questions regarding user satisfaction and system usage as surrogate measures of success may arise. The system success is observed as a very complex phenomenon. Consideration of either user satisfaction or system usage, or both as system success criteria may be one aspect but not the whole story. Might be a system easy to use, users are happy to use it and are satisfied, but up to what extent the system is effective in terms of achieving organizational goals and useful in producing what was required, is questionable. Might be a system not too helpful towards fulfilling users needs but users have no alternative, so are using it willingly or unwillingly irrespective its use is voluntary. The criteria for a system to be useful may vary from user to user and it may affect his satisfaction. These are the questions that need more clarification to be conceptualized properly.

## **7.2. Future Research Recommendations**

The IS development process consists of different phases commonly recognized as system development life cycle. The stakeholders' participation at different stages requires different tasks that are to be performed concerning IS development. These tasks may vary relative to their positions in the organization. At what stage the users are needed to be involved in IS development is crucial. Similarly, the type of the system being developed and up to what extent user participation is required is also important. Such aspects may influence user participation in IS development. So, there is a need for search of the moderating variables that may affect the relationship between user participation and variables considered as part of user satisfaction construct. The search for moderating variables affecting the relationship between user participation/involvement and user satisfaction, user participation/involvement and systems usage, and user-developer communication and user satisfaction are suggested. Future research in this area may help to identify the most crucial variables affecting these relationships.

The current research also found a positive correlation between user expectations and user satisfaction. Past research (see Szajna and Scamell, 1993; Marcolin,



1994; Ryker et al., 1997) shows that user satisfaction might be affected by user expectations. The expectations of user about a new (i.e. candidate) system require to be managed. There are various reasons that may play their role in producing unrealistic expectations. These reasons are grouped under different categories and some but not all are supposed to be controllable (see Bokhari and Paul, 2000). A theoretical research model (see appendix A3) for the study of causes of emergence of unrealistic expectations and reformation is proposed. Shirani (1994) speculated that user characteristics mostly influence expectation formation and suggested future research. The model requires further validation, and explanation about what reasons are more crucial as compared to others at first stage. A survey research might be useful in this regard. Further, the affect of user participation during IS development, effective communication among stakeholders and users pre-implementation training is proposed to be explored for its benefits in confining user expectations to be realistic. This argument is assumed keeping in view that such factors may help users to keep themselves acquainted with what is going on during IS development. The effect of user-developer effective communication and user participation towards achieving user satisfaction and consequently system success has already been explored in this research. Therefore, it is speculated that these factors may contribute towards managing user expectations. The pre-implementation training for users that might be formal or informal, in terms of seminars or discussion within organization in the context of new system development may be useful. Such training may help users to be familiar with the limitations of organizational resources, limitations of available technology, complexity of the system being developed, time and budget constraints etc. during IS development. Users' familiarity with such limitations may be assumed to be useful in mitigating the unrealistic expectations emergence and evolution. The benefits of user training towards user satisfaction and system usage are usually taken as post implementation. Different factors in the proposed model of future research are inferred and assumed after viewing their effects on user satisfaction in past research. These factors may be assumed to be useful in managing user expectations to be realistic. Such argument may only be validated after future research.

## References:

- Ackoff, R. L. (1967) Management Misinformation Systems, *Management Science*, 14 (4), pp. 147-156.
- Adams, C. R. (1975) How Management Users View Information Systems, *Decision Sciences*, 6 (2), pp. 337-345.
- Adams, D. A., Nelson, R. R., and Todd, P. A. (1992) Perceived Usefulness, Ease of Use, and Usage of Information Technology: A Replication, *MIS Quarterly*, 16 (2), pp. 227-247.
- Ahituv, N. and Neumann, S. (1987) Decision Making and Value of Information in Robert, G. (Ed.) *Information Analysis: Selected Readings*, Addison-Wesley, Singapore, pp. 19-43.
- Alavi, M. (1984) An Assessment of the Prototyping Approach to Information Systems Development, *Communication of the ACM*, 27 (6), pp. 556-561.
- Alavi, M. and Carlson, P. (1992) A Review of MIS Research and Disciplinary Development, *Journal of Management Information Systems*, 8 (4), pp. 45-62.
- Alavi, M. and Joachimsthaler, E. A. (1992) Revisiting DSS Implementation Research: A Meta-Analysis of the Literature and Suggestions for Researchers, *MIS Quarterly*, March, pp. 95-116.
- Al-Gahtani, S. S. and King, M. (1999) Attitudes, Satisfaction and Usage: Factors Contributing to Each in the Acceptance of Information Technology, *Behaviour & Information Technology*, 18 (4), pp. 277-297.
- Allingham, P. and O'Connor, M. (1992) MIS Success: Why Does it Vary Among Users?, *Journal of Information Technology*, 7, pp. 160-168.
- Alter, S. (1978) Development Patterns for Decision Support Systems, *MIS Quarterly*, September, pp. 33-42.

- Ambler, S. W. (1995) *The Object Primer: The Application Developer's Guide to Object Orientation*, SIGS Books & Multimedia, London.
- Amoako-Gyampah, K. and White, K. B. (1993) User Involvement and User Satisfaction: An Exploratory Contingency Model, *Information & Management*, 25, pp. 1-10.
- Amoroso, D. L. and Cheney, P. H. (1991) Testing a Causal Model of End-User Application Effectiveness, *Journal of Management Information Systems*, 8 (1), pp. 63-89.
- Amoroso, D. L. and Cheney, P. H. (1992) Quality End User-Developed Applications: Some Essential Ingredients, *Data Base*, 23 (1), Winter, pp. 1-11.
- Anderson, E. E. (1989) The Implementation of Information Systems for Workers: A Structural Equation Model, *Information & Management*, 16, pp. 171-186.
- Anderson, J. G. (1997) Clearing the Way for Physicians' Use of Clinical Information Systems, *Communications of the ACM*, 40 (4), pp. 83-90.
- Anderson, W. S. (1978) The Expectation Gap, *Journal of Systems Management*, 29 (6), pp. 6-10.
- Ang, J. and Soh, P. H. (1997) User Information Satisfaction, Job Satisfaction and Computer Background: An Exploratory Study, *Information & Management*, 32, pp. 255-266.
- Angell, I .O. and Smithson, S. (1991) *Information System Management, Opportunities and Risks*, Macmillan Education Ltd., London.
- Averweg, U. R. and Erwin, G. J. (1999) Critical Success Factors For the Implementation of DSS at a Selection of Organizations in KwaZULU-NATAL, South Africa, *South African Computer Journal*, 24, pp. 95-104.

- Avison, D. (1997) The 'Discipline' of Information Systems: Teaching, Research, and Practice, in Mingers, J. and Stowell, F. (Ed.) *Information Systems: An Emerging Discipline?*, McGraw-Hill, London, pp. 113-136.
- Avison, D. and Shah H. U. (1997) *The Information Systems Development Life Cycle: A First Course in Information Systems*, McGraw-Hill, London.
- Avison, D. E. and Fitzgerald, G. (1988) *Information Systems Development: Methodologies, Techniques and Tools*, Oxford Blackwell Scientific Publications, London.
- Avison, D. E. and Fitzgerald, G. (1995) *Information Systems Development: Methodologies, Techniques and Tools*, 2<sup>nd</sup> Ed., McGraw-Hill, London.
- Avison, D., Lau, F., Myers, M. and Nielsen, P. A. (1999) Action Research, *Communications of the ACM*, 42 (1), pp. 94-97.
- Axtell, C. M., Waterson, P. E. and Clegg, C. W. (1995) User Participation in System Development: The Importance of Organizational Factors, *Contemporary Ergonomics, 1995, Proceedings of the Annual Conference of the Ergonomics Society*, University of Kent at Canterbury, 4-6 April, 1995, pp. 31-36.
- Badiru, A. B. (1988) Successful Initiation of Expert Systems Projects, *IEEE Transactions on Engineering Management*, 35 (3), pp. 186-190.
- Bailey, J. (1993) *Managing People and Technological Change*, Pitman Publishing, London.
- Bailey, J. E. and Pearson, S. W. (1983) Development of a Tool for Measuring and Analysing Computer User Satisfaction, *Management Science*, 29 (5), pp. 530-545.
- Bajaj, A. and Nidumolu, S. R. (1998) A Feedback Model to Understand Information System Usage, *Information & Management*, 33, pp. 213-224.

- Bajwa, D. S. and Rai, A. (1994) An Empirical Investigation of the Relationship Between Top Management Support, Information System Management Support, Vendor/Consultant Support and Executive Information Systems Success, *Proceedings of the 27<sup>th</sup> Annual International HAWAII Conference on System Sciences*, Jan 4-7, Wailea, pp. 145-154.
- Bajwa, D. S., Rai, A. and Brennan, I. (1998) Key Antecedents of Executive Information System Success: A Path Analytical Approach, *Decision Support Systems*, 22, pp. 31-43.
- Ballantine, J., Bonner, M., Levy, M., Munro, I., and Powell, P. L. (1998) Developing a 3-D Model of Information Systems Success, in Garrity, E. J. and Sanders, G. L. (Ed.) *Information Systems Success Measurement*, Idea Group Publishing, London, pp. 46-59.
- Bangert-Drowns, R. L. (1986) Review of Development in Meta-Analytic Method, *Psychological Bulletin*, 99 (3), pp. 388-399.
- Banville, C. and Landry, M. (1989) Can the Field of MIS be Disciplined?, *Communications of the ACM*, 32 (1), pp. 48-60.
- Barki, H. (1990) Determinants of User Satisfaction Judgement in Information Systems, *Proceedings of the 23rd Annual Hawaii International Conference on System Sciences*, Kailua-Kona, Hawaii, January 2-5, Vol. IV, pp. 408-417.
- Barki, H. and Hartwick, J. (1989) Rethinking the Concept of User Involvement, *MIS Quarterly*, March, pp. 53-63.
- Barki, H. and Hartwick, J. (1994) Measuring User Participation, User Involvement, and User Attitude, *MIS Quarterly*, March, pp. 59-82.
- Barki, H. and Huff, S. L. (1985) Change, Attitude to Change, and Decision Support System Success, *Information & Management*, 9, pp. 261-268.

- Barki, H. and Huff, S. L. (1990) Implementing Decision Support Systems: Correlates of User Satisfaction and System Usage, *INFOR*, 28 (2), pp. 89-101.
- Baronas, A. K. and Louis, M. R. (1988) Restoring a Sense of Control During Implementation: How User Involvement Leads to System Acceptance, *MIS Quarterly*, 12 (1), March, pp. 111-126.
- Baroudi, J. J. and Orlikowski, W. J. (1988) A Short-Form Measure of User Information Satisfaction, *Journal of Management Information Systems*, 4 (4), pp. 44-59.
- Baroudi, J. J., Olson, M. H. and Ives, B. (1986) An Empirical Study of the Impact of User Involvement on System Usage and Information Satisfaction, *Communications of the ACM*, 29 (3), pp. 232-238.
- Barrett, G. V., Thornton, C. L. and Cabe, P. A. (1968) Human Factors Evaluation of a Computer Based Information Storage and Retrieval System, *Human Factors*, 10 (4), pp. 431-436.
- Bass, M. B. (1965) *Organizational Psychology*, Allyn and Bacon, Inc., Boston.
- Begg, C. B. (1994) Publication Bias, in Cooper, H. and Hedges, L. V. (Ed.) *The Handbook of Research Synthesis*, Russell Sage Foundation, New York, pp. 399-409.
- Bell, S. and Wood-Harper, T. (1992) *Rapid Information Systems Development: A Non-Specialist's Guide to Analysis and Design in an Imperfect World*, McGraw-Hill, London.
- Benbasat, I. (1984) An Analysis of Research Methodologies, in McFarlan, F.W. (Ed.) *Proceedings of the Information Systems Research Challenge*, Harvard Business School Research Colloquium, Harvard Business School Press, Boston, Massachusetts, pp. 47-85.

- Benbasat, I. and Weber, R. (1996) Research Commentary: Rethinking “Diversity” in Information Systems Research, *Information Systems Research*, 7 (4), pp. 389-399.
- Benbasat, I. and Zmud, R. W. (1999) Empirical Research in Information Systems: The Practice of Relevance, *MIS Quarterly*, 23 (1), March, pp. 3-16.
- Benrad, R. and Satir, A. (1993) User Satisfaction With EISs: Meeting the Needs of Executive Users, *Information Systems Management*, 10 (4), Fall, pp. 21-29.
- Bergeron, F. and Raymond, L. (1992) Evaluation of EIS from a Managerial Perspective, *Journal of Information Systems*, 2, pp. 45-60.
- Beynon-Davies, P. (1995) Information Systems ‘Failure’: The Case Of The London Ambulance Service’s Computer Aided Despatch Project, *European Journal of Information Systems*, 4, pp. 171-184.
- Bicknell, D. (1995) The Politics of Failure, *Computer Weekly*, July, pp. 28-31.
- Bikson, T. K. and Gutek, B. A. (1983) Advanced Office Systems: An Empirical Look at Use and Satisfaction, *AFIPS Conference Proceedings, National Computer Conference*, May 16-19, Anaheim, California, pp. 319-328.
- Bignell, V. and Fortune, J. (1984) *Understanding Systems Failure*, Manchester University Press, Manchester.
- Bjørn-Anderson N. and Hedberg B. L. T. (1977) Designing Information System in an Organizational Perspective, *TIMS Studies in the Management Sciences*, 5, pp. 125-142.
- Black, T. R. (1999) *Doing Quantitative Research in the Social Sciences: An Integrated Approach to Research Design, Measurement and Statistics*, Sage Publications, London.

- Blackler, F. and Brown, C. (1986) Alternative Models to Guide the Design and Introduction of the New Information Technologies into Work Organizations, *Journal of Occupational Psychology*, 59, pp. 287-313.
- Blili, S., Raymond, L., and Rivard, S. (1998) Impact of Task Uncertainty, End-User Involvement, and Competence on the Success of End-User Computing, *Information and Management*, 33, pp. 137-153.
- Bokhari, R. H. and Paul, R. J. (2000) Users's Unrealistic Expectations: Emergence Causes and Effects, Proceedings of the 11<sup>th</sup> Australasian Conference on Information Systems, 6-8 December, Brisbane, Australia.
- Boland, R. J. (1978) The Process and Product of System Design, *Management Science*, 24 (9), pp. 887-898.
- Bonnor, M. (1995) DeLone and McLean's Model for Judging Information system Success - A Retrospective Application in Manufacturing, *Proceedings of the Second European conference on Information Technology Investment Evaluation*, Henley Management College, UK., July 11-12, pp. 218-226.
- Borovits, I., Ellis, S. and Yeheskel, O. (1990) Group Process and the Development of Information Systems: A Social Psychological Perspective, *Information & Management*, 19, pp. 65-72.
- Bostrom, R. P. and Heinen, J. S. (1977) MIS Problems and Failures: A Socio-Technical Perspective Part 1: The Causes, *MIS Quarterly*, 1 (3), September, pp. 17-32.
- Bostrom, R. P. (1989) Successful Application of Communication Techniques to Improve the Systems Development Process, *Information & Management*, 16, pp. 279-295.
- Britton, C. and Doake, J. (1997) *Software System Development: A Gentle Introduction*, 2<sup>nd</sup> Ed., McGraw-Hill, London.



- Brooks, F. P. (1995) *The Mythical Man-Month: Essays on Software Engineering*, Addison-Wesley, Reading, Mass., USA.
- Bryman, A. (1989) *Research Methods and Organization Studies*, Unwin Hyman Ltd., London.
- Brynjolfsson, E. (1993) The Productivity Paradox of Information Technology, *Communications of the ACM*, 36 (12), pp. 67-77.
- Butler, T. and Fitzgerald, B. (1999) The Institutionalization of User Participation for Systems Development in Telecom Éirann, in Khosrowpour, M (Ed.) *Success and Pitfalls of Information Technology Management*, Idea group Publishing, Hershey, USA, pp. 68-86.
- Byrd, T. A. and Marshal, T. E. (1997) Relating Information Technology Investment to Organizational Performance: A Casual Model Analysis, *Omega, Int. J. Mgmt Sci.*, 25 (1), pp. 43-56.
- Cale, E. G and Curley, K. F. (1987) Measuring Implementation Outcome: Beyond Success and Failure, *Information & management*, 13 (5), pp. 245-253.
- Callaway, E. (1996) What To Do With Users' Great Expectations, *PC WEEK*, April 1, pp. E4.
- Cavaye, A. L. M. (1995) User Participation in Systems Development Revisited, *Information & Management*, 28, pp. 311-323.
- Cerullo, M. J. (1980) Information Systems Success Factors, *Journal of Systems Management*, 31 (12), December, pp. 10-19.
- Checkland, P. B. (1981) *Systems Thinking, Systems Practice*, John Wiley & Sons, Great Britain.
- Checkland, P. and Holwell, S. (1998) *Information, Systems and Information Systems: Making Sense of Field*, John Wiley and Sons, New York.

- Checkland, P. and Scholes, J. (1990) *Soft Systems Methodology in Action*, John Wiley & Sons, New York.
- Cheney, P. H. and Dickson, G. W. (1982) Organizational Characteristics and Information Systems: An Exploratory Investigation, *Academy of Management Journal*, 25 (1), pp. 170-184.
- Choe, J. (1998) The Effects of User Participation on the Design of Accounting Information Systems, *Information & Management*, 34, pp. 185-198.
- Christensen, D. M. (1991) The Gap Between Systems Developers and Users, *Information Systems Management*, 8 (4), Fall, pp. 73-75.
- Christiaanse, E. (1994) Information As a Strategic Asset in Interfirm Relationship: "IT and the Informed Boundary Spanner", *Proceedings of the 27<sup>th</sup> Annual Hawaii International Conference on System Sciences*, pp. 610-620.
- Churchman, C. W. and Schainblatt, A. H. (1965) The Researcher and The Manager: Dialectic of Implementation, *Management Science*, 11 (4), pp. B69-B87.
- Clare, C. and Stuteley, G. (1995) *Information Systems Strategy to Design*, International Thomson Computer Press, London.
- Clarke, S. and Lehaney, B. (1999) Human-Centered Research and Practice in Information Systems, *Journal of End User Computing*, 11 (4), pp. 3-4.
- Claver, E., Gonzalez, R. and Liopis, J. (2000) An Analysis of Research in Information systems (1981-1997), *Information & Management*, 37, pp. 181-195.
- Clement, A. and Van den Besselaar, P. (1993) A Retrospective Look at PD Projects, *Communications of the ACM*, 36 (4), pp. 29-37.

Cohen, J. (1969) *Statistical Power Analysis for the Behavioral Sciences*, Academic Press, London.

Compeau, D. R. and Higgins, C. A. (1995) Application of Social Cognitive Theory to Training for Computer Skills, *Information Systems Research*, 6 (2), pp. 118-143.

*Computer Weekly*, 19<sup>th</sup> November, 1998, pp. 27.

Conrath, D. W. and Mignen, O. P. (1990) What is Being Done to Measure Satisfaction with EDP/MIS, *Information and Management*, 19, pp. 7-19.

Conrath, D. W. and Sharma, R. S. (1993) Evaluation Measures For Computer-Based Information Systems, *Computers in Industry*, 21, pp. 267-271.

Cook, T. D. and Leviton, L. C. (1980) Reviewing the Literature: A Comparison of Traditional Methods with Meta-Analysis, *Journal of Personality*, 48 (4), pp. 449-472.

Cook, T. D., Cooper, H., Cordray, D. S., Hartmann, H., Hedges, L. V., Light, R. J., Louis T. A. and Mosteller, F. (1994) *Meta-Analysis For Explanation: A Case Book*, Russell Sage Foundation, New York.

Cooper, A. (1998) Managing Expectations: Aligning Perception and Reality, in Avison, D. and Edgar-Nevill, D. (Ed.) *Matching Technology With Organisational Needs, Proceedings of the 3<sup>rd</sup> UKAIS Conference*, Lincoln University Campus, University of Lincolnshire & Humberside, 15-17 April, pp. 183-193.

Cooper, H. (1997) Some Finer Points in Meta-Analysis, in Hunt, M. (Ed.) *How Science Takes Stock: The Story of Meta-Analysis*, Russell Sage Foundation, New York, pp. 169-181.

Cooper, H. and Hedges, L. V. (1994) Research Synthesis as a Scientific Enterprise, in Cooper, H. and Hedges, L. V. (Ed.) *The Handbook of Research Synthesis*, Russell Sage Foundation, New York, pp. 3-13.

- Cooper, H. M. (1979) Statistically Combining Independent Studies: A Meta-Analysis of Sex Differences in Conformity Research, *Journal of Personality and Social Psychology*, 37 (1), pp. 131-146.
- Cooper, H. M. (1989) *Integrating Research: A Guide for Literature Reviews*, 2<sup>nd</sup> Ed., Sage Publications, Newbury Park, CA.
- Cooper, H. M. (1998) *Synthesizing Research: A Guide for Literature Reviews*, 3<sup>rd</sup> Ed., Sage Publications, London.
- Cooper, R. B. (1988) Review of Management Information Systems Research: A Management Support Emphasis, *Information Processing & Management*, 24 (1), pp. 73-102.
- Cornford, T. and Smithson, S. (1996) *Project Research in Information Systems: A Student's Guide*, Macmillan, London.
- Cox, J. F., Zmud, R. W. and Clark, S. J. (1981) Auditing an MRP System, *Academy of Management Journal*, 24 (2), pp. 386-402.
- Cronan, T. P. and Means, T. L. (1984) System Development: An Empirical Study of User Communication, *Data Base*, (Spring), pp. 25-33.
- Culnan, M. J. (1986) The Intellectual Development of Management Information Systems, 1972-1982: A Co-Citation Analysis, *Management Science*, 32 (2), pp. 156-172.
- Culnan, M. J. and Swanson, E. B. (1986) Research in Management Information Systems, 1980-1984: Points of Work and Reference, *MIS Quarterly*, 10 (3), September, pp. 289-302.
- Curtis, B., Krasner, H. and Iscoe, N. (1988) A Field study of the Software Design Process for Large Systems, *Communications of the ACM*, 31 (11), pp. 1267-1287.

- Cushing, B. E. (1990) Frameworks, Paradigms, and Scientific Research in Management Information Systems, *Journal of Information Systems*, 4, Spring, pp. 38-59.
- Cyert, R. M. and March, J. G. (1963) *A Behavioral Theory of the Firm*, Prentice-Hall, Englewood Cliffs, New Jersey.
- Damodaran, L. (1996) User Involvement in the Systems Design Process - A Practical Guide for Users, *Behaviour & Information Technology*, 15 (6), pp. 363-377.
- Dane, F. C. (1990) *Research Methods*, Brook/Cole Publishing Company, Pacific Grove, California, USA.
- Dagwell, R. and Weber, R. (1983) Systems Designers' User Model: A Comparative Study and Methodological Critique, *Communications of the ACM*, 26 (11), pp. 987-997.
- Darke, P. and Shanks, G. (1997) User Viewpoint Modelling: Understanding and Representing User Viewpoint During Requirements Definition, *Information System Journal*, 7, pp. 213-239.
- Davis, F. D. (1989) Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology, *MIS Quarterly*, September, pp. 319-340.
- Davis, F. D. (1993) User Acceptance of Information Technology: System Characteristics, User Perceptions and Behavioral Impacts, *International Journal of Man-Machine Studies*, 38, pp. 475-487.
- Davis, F. D., Bagozzi, R. P. and Warshaw, P. R. (1989) User Acceptance of Computer Technology: A Comparison of Two Theoretical Models, *Management Science*, 35 (8), pp. 982-1003.
- Davis, G. B. (1974) *Management Information Systems: Conceptual Foundation, Structure, and Development*, McGraw-Hill, London.

- Davis, G. B. (1982) Strategies for Information Requirements Determination, *IBM Systems Journal*, 21 (1), pp. 4-30.
- Davis, G. B. and Olson, M. H. (1985) *Management Information Systems: Conceptual Foundations, Structure, and Development*, 2<sup>nd</sup> Ed., McGraw-Hill, New York.
- Davis, G. B., Lee, A. S., Nickles, K. R., Chatterjee, S., Hartung, R. and Wu, Y. (1992) Diagnosis of an Information System Failure: A Framework and Interpretive Process, *Information & Management*, 23, pp. 293-318.
- Davis, J. G. (1985) A Topology of Management Information Systems Users and its Implication For User Information Satisfaction Research, *Proceedings of the Twenty-First Annual Conference on Computer Personal Research*, May 2-3, Minneapolis MN USA, pp. 152-164.
- Davis, J. G. and Srinivasan, A. (1988) Incorporating User Diversity into Information Systems Assessment, in Bjørn-Andersen, N. and Davis, G. B. (Ed.) *Information Systems Assessment: Issues and Challenges, Proceedings of the IFIP WG 8.2 Working Conference on Information Systems Assessment*, Noordwijkerhout, The Netherlands, 27-29 August, pp. 83-98.
- de Abreu, A. F. and Conrath, D. W. (1993) The Role of Stakeholder's Expectations in Predicting Information Systems Implementation Outcome, SIGCPR'93, *Proceedings of the Conference On Computer Personnel Research*, April, 1-3, St. Louis, MO, [on Line] <http://www.acm.org/pubs/contents/Proceedings/cpr/15180/index.html>, pp. 408-415.
- De Brabander, B. and Edstrom, A. (1977) Successful System Development Projects, *Management Science*, 24(2), pp. 191-199.
- De Brabander, B. and Thiers, G. (1984) Successful Information System Development in Relation to Situational Factors Which Affect Effective

- Communication Between MIS-Users and EDP-Specialists, *Management Science*, 30 (2), pp. 137-155.
- Deborah, C., Higgins, C. A. and Huff, S. (1999) Social Cognitive Theory and Individual Reactions to Computing Technology: A Longitudinal Study, *MIS Quarterly*, 23 (2), pp. 145-158.
- DeLone, W. H. (1988) Determinants of Success for Computer Usage in Small Business, *MIS Quarterly*, March, pp. 51-61.
- DeLone, W. H. and McLean, E. R. (1992) Information Systems Success: The Quest for the Dependent Variable, *Information Systems Research*, 3 (1), pp. 60-95.
- DeSanctis, G. and Courtney, J. F. (1983) Toward Friendly User MIS Implementation, *Communications of the ACM*, 26 (10), pp. 732-738.
- Dickson, G. W. and Simmons, J. K. (1970) The Behavioral Side of MIS: Some Aspects of the "People Problem" in Dock, V. T., Luchsinger, V. P. and Cornette, W. R. (1977) *MIS: A Managerial Perspective*, SRA, Chicago, pp. 288-299.
- Dickson, G. W. and Simmons, J. K. (1970) The Behavioral Side of MIS: Some Aspects of the "People Problem", *Business Horizons*, 13 (4), August, pp. 1-13.
- Doherty, N. and King, M. (1997) The Treatment of Organizational Issues in IS Development Projects, *Proceedings of the United Kingdom Academy of Information Systems 2<sup>nd</sup> Annual Conference, 'Key Issues in Information Systems'*, University of Southampton, School of Management, 2-4 April, pp. 363-375.
- Doherty, N., Banerjee, S. and Parry, M. (2000) Factors Affecting the Successful Outcome of Systems Development Projects, *Proceedings of the 5<sup>th</sup> UKAIS Conference*, University of Wales Institute, Cardiff, 26-28 April, pp. 375-383.

- Doll, W. J. and Ahmed, M. U. (1983) Managing User Expectations, *Journal of Systems Management*, 34 (6), pp. 6-11.
- Doll, W. J. and Torkzadeh, G. (1988) The Measurement of End-User Computing Satisfaction, *MIS Quarterly*, June, pp. 259-274.
- Doll, W. J. and Torkzadeh, G. (1989) A Discrepancy Model of End-User Computing Involvement, *Management Science*, 35 (10), pp. 1151-1171.
- Doll, W. J. and Torkzadeh, G. (1990) The Measurement of End-User Software Involvement, *Omega, Int. J. Mgmt Sci.*, 18 (4), pp. 399-406.
- Doll, W. J. and Torkzadeh, G. (1991) The Measurement of End-User Computing Satisfaction: Theoretical and Methodological Issues, *MIS Quarterly*, March, pp. 5-10.
- Dretske, F. I. (1981) *Knowledge and The Flow of Information*, Basil Blackwell, Oxford, USA.
- Durlak, J. A. (1995) Understanding Meta-Analysis, in Grimm, L. G. and Yarnold, P. R. (Ed.) *Reading and Understanding Multivariate Statistics*, American Psychological Association, Washington, USA, pp. 319-352.
- Dutton, W. H. and Kraemer, K. L. (1978) Management Utilization of Computers in American Local Governments, *Communications of the ACM*, 21 (3), pp. 206-218.
- Earl, M. J. (1992) Putting IT in its Place: A Polimic for the Nineties, *Journal of Information Technology*, 7, pp. 100-108.
- Ebadi, Y. M. and Utterback, J. M. (1984) The Effects of Communication on Technological Innovation, *Management Science*, 30 (5), pp. 572-585.
- Edstrom, A. (1977) User Influence and the Success of MIS Projects: A Contingency Approach, *Human Relations*, 30 (7), pp. 589-607.



- Ein-Dor, P. and Segev, E. (1978) Organizational Context and the Success of Management Information Systems, *Management Science*, 24 (10), pp. 1064-1077.
- Ein-Dor, P. and Segev, E. (1986) Attitudes, Association and Success of MIS: Some Empirical Results from Research in the Context of a Business Game, *The Computer Journal*, 29 (3), pp. 212-221.
- Ein-Dor, P. and Segev, E. (1993) A Classification of Information Systems: Analysis and Interpretation, *Information Systems Research*, 4 (2), pp. 166-204.
- Epstein, B. J. and King, W. R. (1982) An Experimental Study of the Value of Information, *Omega, Int. J. of Mgmt Sci.*, 10 (3), pp. 249-258.
- Etezadi-Amoli, J. and Farhoomand, A. F. (1996) A Structural Model of End User Computing Satisfaction and User Performance, *Information & Management*, 30, pp. 65-73.
- Ewusi-Mensah, K. and Przasnyski, Z. (1994) Factors Contributing to the Abandonment of Information Systems Development Projects, *Journal of Information Technology*, 9, pp. 185-201.
- Ewusi-Mensah, K. (1997) Critical Issues in Abandoned Information Systems Development Projects, *Communication of the ACM*, 40 (4), pp. 74-80.
- Ewusi-Mensah, K. (1998) *Why Information Systems Development Projects are Abandoned: A Diagnosis from User Perspectives*, Working Paper, College of Business Administration, Loyola Marymount University, California, USA.
- Faerber, L. G. and Ratliff, R. L. (1980) People Problems Behind MIS Failures, *Financial Executive*, 84 (4), pp. 18-24.

- Falconer, D. J. and Mackay, D. R. (2000) The Myth of Multiple Methods, *Proceedings of the 2000 Americas Conference on Information Systems, (AMCIS 2000)*, Long Beach, California, August 10-13, pp. 1467-1473.
- Farhoomand, A. F. (1987) Scientific Progress of Management Information Systems, *Data Base*, 18 (4), Summer, pp. 48-56.
- Feldman, K. A. (1971) Using the Work of Others: Some Observations on Reviewing and Integrating, *Sociology of Education*, 44 (1), Winter, pp. 86-102.
- Flynn, D. J. (1992) *Information Systems Requirement: Determination and Analysis*, McGraw-Hill, London.
- Flynn, D. J. and Jazi, M. D. (1998) Constructing User Requirements: A Social Process for a Social Context, *Information Systems Journal*, 8, pp. 53-83.
- Forcht, K. A., Teer, F. P. and Jacobi, F. (1994) MIS Implementation and User Acceptance: An Exploratory Survey of Human Aspect Consideration, *1994 Proceedings Decision Sciences Institute. 1994 Annual Meeting*, November, 20-22, Honolulu, Hawaii, Vol.2, pp.1046-1048.
- Forza, C. and Nuzzo, F. D. (1998) Meta-Analysis Applied to Operations Management: Summarizing the Results of Empirical Research, *International Journal of Production Research*, 36 (3), pp. 575-601.
- Fowler, A. and Walsh, M. (1999) Conflicting Perceptions of Success in an Information Systems Project, *International Journal of Project Management*, 17 (1), pp. 1-10.
- Franz, C. R. and Robey, D. (1984) An Investigation of User Led Design and Political Perspective, *Communications of the ACM*, 27 (12), pp. 1202-1209.

- Franz, C. R. and Robey, D. (1986) Organizational Context, User Involvement, and the Usefulness of Information Systems, *Decision Sciences*, 17, pp. 329-356.
- Friedman A. L. and Cornford, D. S. (1989) *Computer Systems Development: History, Organization and Implementation*, John Wiley & Sons, UK.
- Fuerst, W. L. and Cheney, P. H. (1982) Factors Affecting the Perceived Utilization of Compute-Based Decision Support Systems in the Oil Industry, *Decision Sciences*, 13 (4) , pp. 554-569.
- Gallagher, C. A. (1974) Perceptions of the Value of a Management Information System, *Academy of Management Journal*, 17 (1), pp. 46-55.
- Galletta, D. F. and Lederer, A. L. (1989) Some Cautions on the Measurement of User Information Satisfaction, *Decision Sciences*, 20, pp. 419-438.
- Galliers, R. (1987) *Information Analysis: Selected Readings*, Addison-Wesley, Singapore.
- Galliers, R. (1997) Reflections on Information Systems Research: Twelve Points of Debate, in Mingers, J. and Stowell, F. (Ed.) *Information Systems: An Emerging Discipline?*, McGraw-Hill, London, pp. 141- 157.
- Galliers, R. D. (1985) In Search of a Paradigm for Information Systems Research, in Mumford, E., Hirschheim, R., Fitzgerald, G. and Wood-Harper, T. (Ed.) *Research Methods in Information Systems*, Elsevier Science Publishers B.V., Amsterdam, pp. 281-297.
- Galliers, R. D. (1991) Choosing Appropriate Information Systems Research Approaches: A Revised Taxonomy, in Nissen, H.E., Klein, H. K. and Hirschheim, R. (Ed.) *Information Systems Research: Contemporary Approaches and Emergent Traditions*, IFIP, North-Holland, pp. 327-345.

- Galliers, R. D. (1992) Choosing Information Systems Research Approaches, in Galliers, R. D. (Ed.) *Information Systems Research: Issues, Methods, and Practice Guidelines*, Blackwell Scientific, UK, pp. 144-162.
- Galliers, R. D. and Land, F. F. (1987) Choosing Appropriate Information Systems Research Methodologies, *Communications of the ACM*, 30 (11), pp. 900-902.
- Garrity, E. J. (1994) User Participation, Management Support and System Types, *Information Resources Management Journal*, Summer, pp. 34-43.
- Garrity, E. J. and Sanders, G. L. (1998) *Information Systems Success Measurement*, Idea group Publishing, London.
- Garrity, E. J. and Sanders, G. L. (1998) Introduction to Information Systems Success Measurement, in Garrity, E. J. and Sanders, G. L. (Ed.) *Information Systems Success Measurement*, Idea Group Publishing, London, pp. 1-12.
- Garrity, E. J., Cervený, R. P. and Sanders, G. L. (1995) User participation and Problem-Solving in Systems Development, *Journal of Management Systems*, 7 (2), 61-78.
- Gatian, A. W. (1994) Is User Satisfaction a Valid Measure of System Effectiveness? *Information & Management*, 26, pp. 119-131.
- Gelderman, M. (1997) *Success of Management Support Systems: A Literature Review and Empirical Investigation*, Unpublished PhD Dissertation, Vrije Universiteit Amsterdam, Tinbergen Institute Research Series, Thesis Publishers Amsterdam.
- Gelderman, M. (1998) The Relation Between User Satisfaction, Usage of Information Systems and Performance, *Information & Management*, 34, pp. 11-18.
- Gibson, H. L. (1977) Determining User Involvement, *Journal of Systems Management*, 28 (8), pp. 20-22.

- Gillard, S. (1992) Toward Effective Communication in Information Systems Development , *Proceedings of International Association for Computer Information Systems*, 27-29 August, Thibadaux, La, USA. pp. 267-274.
- Ginzberg, M. J. (1981) Early Diagnosis of MIS Implementation Failure: Promising Results and Unanswered Questions, *Management Science*, 27 (4), pp. 459-469.
- Gladden, G. R. (1982) Stop the Life Cycle, I Want to Get Off, *ACM SIGSOFT Software Engineering Notes*, 7 (2), pp. 35-39.
- Glass, G. V. (1976) Primary, Secondary, and Meta-Analysis of Research, *Educational Researcher*, 5 (10), pp. 3-8.
- Glass, G., V., McGaw, B. and Smith, M. L. (1981) *Meta-Analysis in Social Research*, Sage, Beverly Hills, California, USA.
- Godbout, A. (1988/89) The Katangan Syndrome: User Involvement in OA Implementation, *Optimum*, 19 (4), pp. 69-97.
- Goodhue, D. (1986) IS Attitudes: Toward Theoretical and Definition Clarity, *Proceedings of the 7<sup>th</sup> International Conference on Information Systems*, San Diego, California, pp. 181-194.
- Goodhue, D. (1988) IS Attitudes: Towards Theoretical and Definitional Clarity, *Data Base*, Fall/Winter, pp. 6-15.
- Goodwin, N. C. (1987) Functionality and Usability, *Communications of the ACM*, 30 (3), pp. 229-233.
- Green, B. and Hall, J. (1984) Quantitative Methods for Literature Reviews, *Annual Review of Psychology*, 35, pp. 37-53.
- Green, P. (1992) Encouraging User Involvement, *Software Management*, 29, March, pp. 10.

- Greenhouse, J. B. and Iyengar, S. (1994) Sensitivity Analysis and Diagnostics, in Cooper, H. and Hedges, L. V. (Ed.) *The Handbook of Research Synthesis*, Russell Sage Foundation, New York, pp. 383-398.
- Greenwald, A. G. (1975) Consequences of Prejudice Against the Null Hypothesis, *Psychological Bulletin*, 82 (1), pp. 1-20.
- Grindley, K. (1992) The Culture Gap, in Brown, A. (Ed.) *Creating a Business-Based IT Strategy*, Chapman & Hall, London, pp. 91-96.
- Grover, V. and Sabherwal, R. (1989) An Analysis of Research in Information Systems From the IS Executive's Perspective, *Information & Management*, 16, pp. 233-246.
- Grover, V. and Teng, T. C. (1994) Facilitating the Implementation of Customer-Based Inter-Organizational Systems: An Empirical Analysis of Innovation and Support Factors, *Information Systems Journal*, 4, pp. 61-89.
- Guimaraes, T. (1993) Exploring the Determinants of Imaging Systems Success, *Proceedings of the 26<sup>th</sup> Hawaii International Conference on System Sciences*, Wailea Hawaii, Jan. 5-8, pp. 558-567.
- Guimaraes, T. and McKeen, J. D. (1995) Successful Strategies For User Participation In Systems Development, *Proceedings of the 3<sup>rd</sup> European Conference on Information Systems*, Athens, Greece, June, 1-3, pp. 879-899.
- Guimaraes, T., Igarria, M. and Lu, M. (1992) The Determinants of DSS Success: An Integrated Model, *Decision Sciences*, 23, pp. 409-430.
- Guimaraes, T., Yoon, Y. and Clevenson, A. (1996) Testing the Success Factors for ES Using Business Process Innovation, *Proceedings of the 4<sup>th</sup> European Conference on Information Systems*, Lisbon/Portugal, July 2-4, pp. 749-766.

- Guimaraes, T., Yoon, Y. and Cleveson, A. (1996a) Factors Important to Expert Systems Success: A Field Test, *Information & Management*, 30, pp. 119-130.
- Guimaraes, T., Yoon, Y. and Cleveson, A. (1997) Empirically Testing ES Success Factors in Business Process Reengineering, *International Journal of Production Economics*, 50, pp. 245-259.
- Guthrie, A. (1974) Attitudes of the User-Managers Towards Management Information Systems, *Management Informatics*, 3 (5), pp. 221-232.
- Hamilton, S. and Chervany, N. (1981) Evaluating Information Systems Effectiveness Part I: Comparing Evaluation Approaches, *MIS Quarterly*, September, pp. 55-69.
- Hamilton, S. and Ives, B. (1982) MIS Research Strategies, *Information & Management*, 5, pp. 339-347.
- Hamilton, S. and Ives, B. (1992) MIS Research Strategies, in Galliers, R. (Ed.) *Information Systems Research: Issues, Methods and Practical Guidelines*, Blackwell Scientific Publications, London.
- Hardgrave, B. C. and Walstrom, K. A. (1997) Forums for MIS Scholars, *Communications of the ACM*, 40 (11), pp. 119-124.
- Harris, R. W. (1999) Attitudes Towards End-User Computing: A Structural Equation Model, *Behaviour & Information Technology*, 18 (2), pp. 109-125.
- Harrison, A. W. and Rainer, R. K. (1996) A General Measure of User Computing Satisfaction, *Computers in Human Behavior*, 12 (1), pp. 79-92.
- Hartwick, J and Barki, H. (1994) Explaining the Role of User Participation in Information System Use, *Management Science*, 40 (4), pp. 440-465.

- Hartzel, K. S. and Flor, P. R. (1997) Expectation Formation in the Information Systems Development Process, [On-Line] available: <http://hsb.baylor.edu/ramsower/acis/papers/hartzel.htm>
- Hawk, S. R. (1993) The Effect of User Involvement: Some Personality Determinants, *International Journal of Man-Machine Studies*, 38, pp. 839-855.
- Hawk, S. R. and Aldag, R. J. (1990) Measurement Biases in User Involvement Research, *Omega, Int. J. Mgmt Sci.*, 18 (6), pp. 605-613.
- Hawk, S. R. and Dos Santos, B. L. (1991) Successful System Development: The Effect of Situational Factors on Alternate User Roles, *IEEE Transactions on Engineering Management*, 38 (4), pp. 316-327.
- Hawk, S. R. and Raju, N.S. (1991) Test-Retest Reliability of User Information Satisfaction: A Comment on Galletta and Lederer's Paper, *Decision Sciences*, 22 (5), pp. 1165-1170.
- Hayen, R. L., Cook, W. F., and Jecker, G. H. (1990) End User Training in Office Automation: Matching Expectations, *Journal of Systems Management*, 41 (3), pp. 7-12.
- Hedges, L. V. and Olkin, I. (1982) Vote-Counting Methods in Research Synthesis, *Psychological Bulletin*, 88 (2), pp. 359-369.
- Hedges, L. V. and Olkin, I. (1985) *Statistical Methods for Meta-Analysis*, Academic Press, New York.
- Henry, J. W. and Martinko, M. J. (1997) An Attributional Analysis of the Rejection of Information Technology, *Journal of End User Computing*, 9 (4), pp. 3-17.
- Hicks Jr., J. O. (1993) *Management Information Systems: A User Perspective*, West Publishing Company, New York.



- Hirschheim, R. A. (1983) Assessing Participative Systems Design: Some Conclusions from an Exploratory Study, *Information & Management*, 6, pp. 317-327.
- Hirschheim, R. A. (1985) User Experience with and Assessment of Participative Systems Design, *MIS Quarterly*, 9 (4), December, pp. 295-304.
- Hirschheim, R. A. (1989) User Participation in Practice: Experiences With Participative System Design, in Knight, K. (Ed.) *Participation in Systems Development*, GP Publishing, Inc., Columbia, Maryland, pp.194-204.
- Hirschheim, R. A. and Newman, M. (1988) Information Systems and User Resistance: Theory and Practice, *The Computer Journal*, 31(5), pp. 398-408.
- Hirschheim, R. and Klein, H. (1994) Realising Emancipatory of User Information Satisfaction: The Case of ETHICS, *MIS Quarterly*, 18 (1), pp. 83-109.
- Hirschheim, R. and Shafer, G. (1988) Requirement Analysis: A New Look at an Old Topic, *Journal of Applied Systems Analysis*, 15, pp. 101-118.
- Hirschheim, R. A. and Smithson, S. (1986) A Critical Analysis of Information Systems Evaluation, in Davis, G. B. and Bjorn-Andersen, N. (Ed.) *Information Systems Assessment: Issues and Challenges*, North-Holland, Amsterdam, pp.17-37 .
- Hirschheim, R. and Smithson, S. (1987) Information Systems Evaluation: Myth and Reality, in Galliers, R. (Ed.) *Information Analysis: Selected Readings*, Addison-Wesley, Singapore, pp. 367-380.
- Hirschheim, R. and Smithson, S. (1988) A Critical Analysis of Information Systems Evaluation, in Bjørn-Anderson, N. and Davis, G. B. (Ed.) *Information Systems Assessment: Issues and Challenges*, "Proceedings of the IFIP WG 8.2 Working Conference on Information Systems

- Assessment, Noordwijkerhout, The Netherlands, 27-29 August, 1986", Elsevier Science Publishers B. V. (North-Holland), IFIP, pp. 17-37.
- Hochstrasser, B. and Griffiths, C. (1991) *Controlling IT Investments: Strategy and Management*, Chapman & Hall, London.
- Hoplin, H. P. and Suresh, B. A. (1989) Measurement of Computer System/Information System Performance, *Data Base*, 20 (2), pp. 27-30
- Howard, K. and Sharp, J. A. (1983) *The Management of a Student Research Project*, Gower Publishing, Great Britain.
- Hufnagel, E. M. (1990) User Satisfaction - Are We Really Measuring System Effectiveness? *Proceedings of the 23<sup>rd</sup> Annual HAWAII International Conference on System Sciences*, Vol. IV, held in Kailua-Kona, Hawaii, January, 2-5, pp. 437-446.
- Hunt, M. (1997) *How Science Takes Stock: The Story of Meta-Analysis*, Russell Sage Foundation, New York.
- Hunter, J. E. and Schmidt (1990) *Methods of Meta-Analysis: Correcting Error and Bias in Research Findings*, Sage Publications, Newbury Park, CA.
- Hunter, J. E., Schmidt, F. L. and Jackson, G. B. (1982) *Meta-Analysis: Cumulating Research Findings Across Studies*, Sage Publications, Beverly Hills, CA.
- Hwang, M. I. (1996) The Use of Meta-Analysis in MIS Research: Promises and Problems, *Data Base*, 27 (3), pp. 35-48.
- Hwang, M. I. and Thorn, R. G. (1999) The Effect of User Engagement on System Success: A Meta-Analytical Integration of Research Findings, *Information & Management*, 35, pp. 229-236.

- Hwang, M. I. and Wu, B. J. P. (1990) The Effectiveness of Computer Graphics for Decision Support: A Meta-Analytical Integration of Research Findings. *Data Base*, (Fall), pp. 11-20.
- I/S Analyzer*, TQM in IS: Defining User Expectations, 31 (5), 1993.
- Igbaria M. and Tan, M. (1997) The Consequences of Information Technology Acceptance on Subsequent Individual Performance, *Information & Management*, 32, pp. 113-121.
- Igbaria, M. (1990) End-User Computing Effectiveness: A Structural Equation Model. *Omega Int. J. of Mgmt Sci.*, 18 (6), pp. 637-652.
- Igbaria, M. (1993) User Acceptance of Microcomputer Technology: An Empirical Test, *Omega, Int. J. Mgmt Sci.*, 21 (1), pp. 73-90.
- Igbaria, M. and Guimaraes, T. (1994) Empirically Testing the Outcome of User Involvement in DSS Development, *Omega, Int. J. of Mgmt Sci.*, 22 (2), pp. 157-172.
- Igberia, M. and Iivari, J. (1995a) The Effects of Self-efficacy on Computer Usage, *Omega, Int. J. of Mgmt Sci.*, 23, pp. 587-605.
- Igbaria, M. and Iivari, J. (1995b) Determinants of User Participation, *Proceedings of the 3<sup>rd</sup> European Conference on Information Systems*, Athens/ Greece, June 1-3, pp. 487-500.
- Igbaria, M. and Nachman, S. A. (1990) Correlates of User Satisfaction With End User Computing, *Information & Management*, 19, pp. 73-82.
- Igbaria, M. and Zviran, M. (1991) End-User Effectiveness: A Cross-Cultural Examination, *Omega, Int. J. of Mgmt Sci.*, 19 (5), pp. 369-379.
- Igbaria, M., Guimaraes, and Davis, G. B. (1995) Testing the Determinants of Microcomputer Usage via a Structural Equation Model, *Journal of Management Information systems*, 11 (4), Spring, pp. 87-114.

- Igbaria, M., Iivari, J. and Maragahh, H. (1995a) Why Do Individuals Use Computer Technology? A Finnish Case Study, *Information & Management*, 29, pp. 227-238.
- Igbaria, M., Parvi, F. N., and Huff, S. L. (1989) Micro Computer Applications: an Empirical Look at Usage, *Information and Management*, 16 (4), pp. 187-196.
- Igbaria, M., Schiffman, S. J. and Wieckowski, T. J. (1994) The Respective Roles of Perceived Usefulness and Perceived Fun in the Acceptance of Micro Computer Technology, *Behaviour & Information Technology*, 13 (6), pp. 349-361.
- Igbaria, M., Zinatelli, N., Cragg, P, and Cavaye, A. L. M. (1997) Personal Computing Acceptance Factors in Small Firms: A Structural Equation Model, *MIS Quarterly*, September, pp. 279-305.
- Igbaria, M. and Zviran, M. (1991) End-User Effectiveness: A Cross-Cultural Examination, *Omega, Int. J. of Mgmt Sci.*, 19 (5), pp. 369-379.
- Igersheim, R. H. (1976) Managerial Response to an Information System, *Proceedings of the AFIPS Conference, National Computer Conference*, June 7-10, New York City, pp. 877-822.
- Iivari, J. (1987) User Information Satisfaction (UIS) Reconsidered: An Information System as the Antecedent of UIS, *Proceedings of the 8<sup>th</sup> International conference on Information systems*, Pittsburgh, Pennsylvania, December 6-9, pp. 57-73.
- Iivari, J. and Karjalainen, M. (1989) Impact of Prototyping on User information Satisfaction During the IS specification Phase, *Information & Management*, 17 (1), pp. 31-45.
- Iivari, J. (1992) The Organizational Fit of Information Systems, *Journal of Information Systems*, 2, pp.3-29.

- Iivari, J. (1997) User Information Satisfaction: A Critical Review, *Encyclopedia of Library and Information Science*, Vol. 60, Supplement 23, pp. 341-364.
- Iivari, J. and Ervasti, I. (1994) User Information Satisfaction: IS Implementability and Effectiveness, *Information & Management*, 27, pp. 205-220.
- Ishman, M. (1998) Measuring Information Success at the Individual Level in Cross-Cultural Environment in Garrity, E. J. and Sanders, G. L. (Ed.) *Information Systems Success Measurement*, Idea Group Publishing, London, pp. 60-78.
- Ives, B., Hamilton, S. and Davis, G. B. (1980) A Framework for Research in Computer-Based Management Information Systems, *Management Science*, 26 (9), pp. 910-934.
- Ives, B., Olson, M. H. and Baroudi, J. (1983) The Measurement of User Information Satisfaction, *Communications of the ACM*, 26 (10), pp.785-793.
- Ives, B. and Olson, M. H. (1984) User Involvement and MIS Success: A Review of Research, *Management Science*, 30 (5), pp. 586-603.
- Jackson, P. (1997) Information Systems as Metaphor: The Three Rs of Representation in McLoughlin, I. and Harris, M. (Ed.) *Innovation, Organizational Change and Technology*, International Thomson Business Press, London.
- Jarvenpaa, S. L. (1991) Panning for Gold in Information Systems Research: 'Second-Hand' Data, in Nissen, H.E., Klein, H. K. and Hirschheim, R. (Ed.) *Information Systems Research: Contemporary Approaches and Emergent Traditions*, IFIP, North-Holland, pp. 63-80.
- Jarvenpaa, S. L. and Ives, B. (1991) Executive Involvement and Participation in the Management of Information Technology, *MIS Quarterly*, June, pp. 205-227.

- Jeffery, D. R. and Lawrence, M. J. (1986) Current Research Directions in Information Systems, *The Australian Computer Journal*, 18 (4) November, pp. 157-158.
- Jenkins, M. and Ricketts, J. (1979) Development of An Instrument to Measure User Satisfaction With Management Information Systems, *National AIDS Meeting*, New Orleans, Louisiana, pp. 205.
- Jenkins, A. M. and Ricketts, J. (1985) *The Development of an MIS Satisfaction Questionnaire: An Instrument for Evaluating User Satisfaction with Turnkey Decision Support Systems*, Working Paper, Indiana University.
- Jenkins, A. M. (1985) Research Methodologies and MIS Research, in Mumford, E., Hirschheim, R., Fitzgerald, G. and Wood-Harper, T. (Ed.) *Research Methods in Information Systems*, Elsevier Science Publishers B.V., Amsterdam, pp. 103-117.
- Jiang, J. J., Klein, G. and Balloun, J. (1998) Perception of System Development Failures, *Information and Software Technology*, 39, pp. 933-937.
- Jiang, J. J., Muhanna, W. A. and Klein, G. (2000) User Resistance and Strategies for Promoting Acceptance Across System Types, *Information & Management*, 37, pp. 25-36.
- Jones, M. (1997) IT All Depends What You Mean By Discipline ..., in Mingers, J. and Stowell, F. (Ed.) *Information Systems: An Emerging Discipline?*, McGraw-Hill, London, pp. 97-112.
- Jönsson, S. (1991) Action Research, in Nissen, H.E., Klein, H. K. and Hirschheim, R. (Ed.) *Information Systems Research: Contemporary Approaches and Emergent Traditions*, IFIP, North-Holland, pp. 371-396.
- Joshi, K. (1990) An Investigation of Equity as a Determinant of User Information Satisfaction, *Decision Sciences*, 21 (4), pp. 786-807.

- Joshi, K. (1992) A Causal Path Model of the Overall User Attitudes Toward the MIS Function: The Case of User Information Satisfaction, *Information & Management*, 22, pp. 77-88.
- Kaderbhai, T. (1998) Overcoming Inertia Within a Large Organization, in Trenner, L. and Bawa, J. (Ed.) *The Politics of Usability: A Practical Guide to Designing Usable Systems in Industry*, Springer, London, pp. 35-48.
- Kahai, S. S., Avolio, B. J. and Sosik, J. J. (1995) Meeting Impacts of Two Types of EMS Anonymity and Initial Difference in Opinions, *Proceedings of the 16<sup>th</sup> International Conference on Information Systems*, December 10-13, Amsterdam, The Netherlands, pp. 81-91.
- Kaiser, K. M. and Srinivasan, A. (1980) The Relationship of User Attitudes Toward Design Criteria and Information Systems Success, *12<sup>th</sup> Annual Meeting AIDS, Proceedings of the National AIDS Conference*, pp. 201-203.
- Kaiser, K. and Srinivasan, A. (1982) User-Analyst Differences: An Empirical Investigation of Attitudes Related to System Development, *Academy of Management Journal*, 25 (3), pp. 630-646.
- Kaplan, A. (1964) *The Conduct of Enquiry: Methodology for Behavioral Science*, Chandler Publishing Company, San Francisco, California, USA.
- Kappelman, L. A. and McLean, E. R. (1991) The Respective Roles of User Participation and User Involvement in Information System Implementation Success, *Proceedings of the 12<sup>th</sup> International Conference on Information Systems*, December 16-18, New York, pp. 339-349.
- Kappelman, L. A. (1995) Managing User Involvement: A Diffusion of Innovation Perspective, *Data Base*, 26 (2&3) May/August, pp. 65-83.
- Karten, N. (1991) Integrating IS Disciplines into End-User Training, *Journal of Information Systems Management*, 8 (1), pp. 75-78.

- Kaye, G. R. (1990) Information Systems Success and Failure: Research Findings From the Compounding Industry, *Journal of Information Technology*, 5, pp. 73-83.
- Keen, P. (1991) Keynotes Address: Relevance and Rigor in Information Systems Research, in Nissen, H. E., Klein, H. K. and Hirschheim, R. (Ed.) *Information Systems Research: Contemporary Approaches and Emergent Traditions*, IFIP, North-Holland, pp. 371-396.
- Keen, P. G. W. (1980) MIS Research: Reference Disciplines and a Cumulative Tradition, *Proceedings of the First International Conference on Information Systems*, Philadelphia, December 8-10, pp. 9-18.
- Keen, P. G. W. (1981) Information Systems and Organizational Change, *Communications of the ACM*, 24 (1), pp. 24-33.
- Keen, P. G. W. (1991) *Shaping the Future: Business Through Information Technology*, Harvard Business School Press, Boston, Mass, USA.
- Keider, S. P. (1984) Why Systems Development Projects Fail, *Journal of Information Systems Management*, 1 (3), pp. 33-38.
- Keil, M. (1995) Pulling the Plug: Software Projects Management and the Problem of Project Escalation, *MIS Quarterly*, December, pp. 421-443.
- Keil, M. and Carmel, E. (1995) Customer-Developer Links in Software Development, *Communications of the ACM*, 38 (5), pp. 33-44.
- Khalil, O. E. M. and Elkordy, M. M. (1996) The Relationship Between Some Decision and Task Environment Characteristics and Information Systems Effectiveness: Empirical Evidence from Egypt, *Proceedings 1996 Conference on ACM SIGCPR/SIGMIS Conference*, April 11-13, Denver, Colorado, pp. 125-137.



- Khalil, O. E. M. and Elkordy, M. M. (1997) The Relationship of Some Personal and Situational Factors to IS Effectiveness: Empirical Evidence from Egypt, *Journal of Global Information Management*, 5 (2), pp. 22-34.
- Kim, C., Suh, K., and Lee, J. (1998) Utilization and User satisfaction in End-User Computing: A Task Contingent Model, *Information Resources Management Journal*, 11 (4), pp. 11-24.
- Kim, E. and Lee, J. (1986) An Exploratory Contingency Model of User Participation and MIS Use, *Information & Management*, 11, pp. 87-97.
- Kim, J. U. (1997) A Classification Structure of Information Systems Failures: An Empirical Investigation, *Proceedings of the First Asia-Pacific Decision Sciences Institute Conference*, Hon Kong University Science & Technology, 1, pp. 457-465.
- Kim, K. K. (1989) User Satisfaction: A Synthesis of Three Different Perspectives, *Journal of Information Systems*, 12, Fall, pp. 1-12.
- Kim, K. K. (1990) User Information Satisfaction: Toward Conceptual Clarity, *Proceedings of the Eleventh International Conference on Information Systems*, December 16-19, Copenhagen, Denmark, pp. 183-191.
- King, W. R. and Lee, T. (1991) The Effect of User Participation on System Success: Toward Contingency Theory of User Satisfaction, *Proceedings of the 12<sup>th</sup> International Conference on Information Systems*, December 16-18, New York, pp. 327-338.
- King, W. R. and Rodriguez, J. I. (1981) Participative Design of Strategic Decision Support Systems: An Empirical Assessment, *Management Science*, 27 (6), pp. 717-726.
- Kivijarvi, H. and Zmud, R. W. (1993) DSS Implementation Activities, Problem Domain Characteristics and DSS Success, *European Journal of Information Systems*, 2 (3), pp. 159-168.

- Klein, H. K., Hirschheim, R. and Nissen, H. E. (1991) A Pluralist Perspective of the Information Systems Research Arena, in Nissen, H. E., Klein, H. K. and Hirschheim, R. (Ed.) *Information Systems Research: Contemporary Approaches and Emergent Traditions*, IFIP, North-Holland, pp. 1-20.
- Klenke, K. (1992) Construct Measurement in Management Information Systems: A Review and Critique of User Satisfaction and User Involvement Instruments, *INFOR*, 30 (4), pp. 325-348.
- Kling, R. and Scacci, W. (1982) The Web of Computing: Computer Technology as Social Organization, in Yovits, M. C. (Ed.) *Advances in Computers*, 21, Academic Press, New York.
- Kling, R. and Iacono, S. (1984) The Control of Information Systems Development After Implementation, *Communications of the ACM*, 27 (12), pp. 1218-1226.
- Ko, D. (1999) Information Requirements Analysis and Multiknowledge Elicitation Techniques: Experience with the Pricing Scenario System, *Proceedings of the 32<sup>nd</sup> Hawaii International Conference on System Sciences*, Hawaii, USA.
- Koopmans, L. H. (1981) *An Introduction to Contemporary Statistics*, PWS Publishers, Duxbury Press, Boston, Mass, USA.
- Kraemer, H. C. and Andrews, G. (1982) A Nonparameteric Technique for Meta-Analysis Effect Size Calculation, *Psychological Bulletin*, 91 (2), pp. 404-412.
- Kraemer, K. L., Danzinger, D. E., Dunkle, D. E. and King, J. L. (1993) The Usefulness of Computer-Based Information to Public Managers, *MIS Quarterly*, June, pp. 129-148.
- Kraft, P. (1979) Challenging the Mumford Democrats at Derby Works, *Computing Europe*, August, pp. 17

- Kulik, J. A. and Kulik, C. C. (1989) Meta-Analysis in Education, *International Journal of Educational Research*, 13, pp. 221-340.
- Kumar, K. (1990) Post Implementation Evaluation of Computer-Based Information Systems: Current Practices, *Communications of the ACM*, 33 (2), pp. 203-212.
- Lai, V. S. and Mahapatra, R. K. (1997) Exploring the Research in Information Technology Implementation, *Information & Management*, 32, pp. 187-201.
- Land, F. (1982) Notes on Participation, *The Computer Journal*, 25 (2), pp. 283-285.
- Land, F. (1985) Is an Information Theory Enough?, *The Computer Journal*, 28 (3), pp. 211-215.
- Land, F. and Kennedy-McGregor (1987) Information and Information Systems: Concepts and Perspectives, in Galliers, R. (Ed.) *Information Analysis: Selected Readings*, Addison-Wesley, Singapore, pp. 63-91.
- Land, F. (1992) The Information Systems Domain, in Galliers, R. (Ed.) *Information Systems Research: Issues, Methods and Practical Guidelines*, Blackwell Scientific Publications, London.
- Land, F. (1992a) The Management of Change: Guidelines for the Successful Implementation of Information Systems, in Brown, A. (Ed.) *Creating a Business-Based IT Strategy*, Chapman & Hall, pp.145-157.
- Lane, P. L., Palko, J. and Cronan, T. P. (1994) Key Issues in the MIS Implementation Process: An Update Using End User Computing Satisfaction, *Journal of End User Computing*, 6 (4), pp. 3-13.
- Larcker, D. F. and Lessig, V. P. (1980) Perceived Usefulness of Information: A Psychometric Examination, *Decision Sciences*, 11 (1), Winter, pp. 121-134.

- Laudon, K. C. and Laudon J. P. (1996) *Management Information Systems: Organization and Technology*, 4th Ed. Prentice-Hall, London.
- Lawrence, M. and Low, G. (1993) Exploring Individual User Satisfaction Within User-Led Development, *MIS Quarterly*, June, pp. 195-208.
- Lederer, A. L. and Mendelow, A. L. (1989) Coordination of Information Systems Plans With Business Plans, *Journal of Management Information Systems*, 6 (2), pp. 5-19.
- Lederer, A. L. and Mendelow, A. L. (1990) The Impact of the Environment on the Management of Information System, *Information Systems Research*, 1(2), pp. 205-222.
- Lee, A. S. (1999) Researching MIS, in Currie, W. and Galliers, B. (Ed.) *Rethinking Management Information Systems: An Interdisciplinary Perspective*, Oxford University Press, New York.
- Lee, D. M. (1986) Usage Patterns and Sources of Assistance for Personal Computer Users, *MIS Quarterly*, 10 (4), pp. 313-325.
- Lee, S. M., Kim. Y, R. and Lee, J. (1995) An Empirical Study of the Relationships Among End-User Information Systems Acceptance, Training, and Effectiveness, *Journal of Management Information Systems*, 12 (2), pp. 189-202.
- Lee, Z., Gosain, S., and Im, I. (1999) Topics of Interest in IS: Evolution of Themes and Differences between Research and Practice, *Information & Management*, 36, pp. 233-246.
- Leedy, P. D. (1989) *Practical Research: Planning and Design*, 4<sup>th</sup> Ed. Macmillan Publishing Company, New York.
- Lees, J. D. (1987) Successful Development of Small Business Information Systems, *Journal of Systems Management*, September, pp. 32-39.

- Lehaney, B., Clarke, S. and Kimberlee, V. (1999) The Human Side of Information Development: A Case of an Intervention at a British Visitor Attraction, *Journal of End User Computing*, 11 (4), pp. 33-39.
- Lending, D. and Wetherbe, J. C. (1992) Update on MIS Research: A Profile of Leading Journals and U.S. Universities, *Data Base*, 23 (3), Summer, pp. 5-10.
- Leonard-Barton, D. and Sinha, D. K. (1993) Developer-User Interaction and User Satisfaction in Internal Technology Transfer, *Academy of Management Journal*, 36 (5), pp. 1125-1139.
- Lewis, P. (1994) *Information-Systems Development: System Thinking in the Field of Information-Systems*, Pitman Publishing, London.
- Li, E. Y. (1997) Perceived Importance of Information System Success Factors: A Meta Analysis of Group Differences, *Information & Management*, 32, pp. 15-28.
- Libenau, J. and Smithson, S. (1993) Information Systems Failures, *European Journal of Information Systems*, 2 (3), pp. 157-158.
- Light, R. J. and Smith, P. V. (1971) Accumulating Evidence: Procedures for Resolving Contradictions Among Different Research Studies, *Harvard Educational Review*, 41, pp. 429-471.
- Light, R. J. and Pillemer, D. B. (1984) *Summing Up: The Science of Reviewing Research*, Harvard University Press, Cambridge, USA.
- Light, R. J., Singer, J. D. and Willett, J. B. (1994) The Visual Presentation and Interpretation of Meta-Analysis, in Cooper, H. and Hedges, L. V. (Ed.) *The Handbook of Research Synthesis*, Russell Sage Foundation, New York, pp. 439-453.

- Lin, W. T., and Shao, B. B. M. (2000) The Relationship Between User Participation and System Success: A Simultaneous Contingency Approach, *Information & Management*, 37, pp. 283-295.
- Lipsey, M. W. and Wilson, D. B. (1993) The Efficacy of Psychological, Educational, and Behavioral Treatment: Confirmation from Meta-Analysis, *American Psychologist*, 48 (12), pp. 1181-1209.
- Lipsey, M. W. and Wilson, D. B. (2001) *Practical Meta-analysis*, Sage Publications, California, USA.
- Locke, E. A. and Schweiger, D. M. (1979) Participation in Decision Making: One More Look, *Research in Organizational Behaviour*, 1, pp. 265-339.
- Loh, L. and Ong, Y. (1998) The Adoption of Internet-Based Stock Trading: A Conceptual Framework and Empirical Results, *Journal of Information Technology*, 13, pp. 81-94.
- Long, R. J. (1987) *New Office Information Technology: Human and Managerial Implications*, Croom Helm, London.
- Lucas, H. C. (1973) User Reactions and the Management of Information Services, *Management Informatics*, 2 (4), pp. 165-172.
- Lucas, H. C. (1974) Measuring Employee Reaction to Computer Operations, *Sloan Management Review*, Spring, pp. 59-67.
- Lucas, H. C. (1974a) *Toward Creative Systems Design*, Columbia University Press, New York.
- Lucas, H. C. (1975) *Why Information Systems Fail*, Columbia University Press, New York.
- Lucas, H. C. (1975a) Performance and the Use of an Information System, *Management Science*, 21 (8), pp. 908-919.

- Lucas, H. C. (1978) *Information Systems Concepts for Management*, McGraw-Hill, New York.
- Lucas, H. C. (1978a) Empirical Evidence for a Descriptive Model of Implementation, *MIS Quarterly*, 2 (2), pp. 27-42.
- Lucas, H. C. (1978b) The Use of an Interactive Information Storage and Retrieval System in Medical Research, *Communications of the ACM*, 21(3), pp. 197-205.
- Lucas, H. C. (1982) *Information Systems Concepts for Management*, 2<sup>nd</sup> Ed., McGraw-Hill, New York.
- Lucas, H. C. (1994) *Information Systems Concepts for Management*, 5<sup>th</sup> Ed. McGraw-Hill, New York.
- Lucas, H. C., Ginzberg, M. J. and Schultz, R. L. (1990) *Information Systems Implementation: Testing a Structural Model*, Albex Publishing Corporation, Norwood, New Jersey.
- Ludlow, R. and Panton, F. (1992) *The Essence of Effective Communication*, Prentice Hall, London.
- Lukes, S. (1974) *Power: A Radical View*, Macmillan, London.
- Lyons, L. C. (1998) Meta-Analysis: Methods of Accumulating Results Across Research Domains, [on line <http://www.monumental.com/solomon/MetaAnalysis.html>]
- Lyytinen, K. (1987) A Taxonomic Perspective of Information Systems Development: Theoretical Constructs and Recommendations in Boland Jr, R. J. and Hirschheim, R. (Ed.) *Critical Issues in Information Systems Research*, John Wiley & Sons, New York, pp. 3-41.

- Lyytinen, K. (1988a) Expectation Failure Concepts and Systems Analyst's View of Information Systems Failure: Results of an Exploratory Study, *Information & Management*, 14, pp. 45-56.
- Lyytinen, K. (1988b) Stakeholders, Information System Failures and Soft Systems Methodology: An Assessment, *Journal of Applied Systems Analysis*, 15, pp. 61-81.
- Lyytinen, K. and Hirschheim, R. (1987) Information Systems Failures – A Survey and Classification of the Empirical Literature, *Oxford Surveys in Information Technology*, 4, pp. 257-309.
- Lyytinen, K. and Robey, D. (1999) Learning Failure in Information Systems Development, *Information Systems Journal*, 9, pp. 85-101.
- Madigan, R., Tickner, S. and Milner, M. (1998) Expectations and Realities in Developing Computer-Assisted Learning: The Example of Graph IT! In Henry, H. (Ed.) *Using IT Effectively: A Guide to Technology in Social Sciences*, UCL Press, London.
- Madon, S. (1993) Computer-Based Information Systems for Development Planning: Managing Human Resources, *European Journal Of Information Systems*, 2 (1), pp. 49-55.
- Magal, S. R., Carr, H. H. and Watson, H. J. (1988) Critical Success Factors for Information Center Managers, *MIS Quarterly*, September, pp. 413-425.
- Mahaney, R. C. and Lederer, A. L. (1999) Runaway Information Systems Projects and Escalating Commitment, *Proceedings of the ACM SIGCPR Conference on Computer Personal Research*, April 8 – 10, New Orleans, LA USA, pp. 291-296.
- Mahmood, M. A. (1995) End User Computing Productivity: A New Approach to Help Resolve Information Technology Productivity Paradox, *Journal of End User Computing*, 7 (2), pp. 24-25.



- Mahmood, M. A. and Medewitz, J. N. (1985) Impact of Design Methods on Decision Support Systems Success: An Empirical Assessment, *Information & Management*, 9, pp. 137-151.
- Mahmood, M. A. and Sniezek, J. A. (1989) Defining Decision Support Systems: An Empirical Assessment of End-User Satisfaction, *INFOR*, 27 (3), pp.253-271.
- Mahmood, M. A., Burn, J. M., Gemoets, L. and Jacquez, C. (2000) Variables Affecting Information Technology End-User Satisfaction: A Meta-Analysis of the Empirical Literature, *International Journal of Human-Computer Studies*, 52, pp. 751-771.
- Maish, A. M. (1979) A User's Behavior Toward His MIS, *MIS Quarterly*, 3 (1), March, pp. 39-52.
- Mandell, S. L. (1987) *Computers and Information Processing: Concepts and Applications*, West Publishing Company, New York.
- Manson, R. O. and Mitroff, I. I. (1973) A Program for Research on Management Information Systems, *Management Science*, 19 (5), pp. 475-486.
- Manson, R. O. and Mitroff, I. I. (1981) *Challenging Strategic Planning Assumptions: Theory, Cases and Techniques*, John Wiley & Sons, New York.
- Marcolin, B. L. (1994) *The Impact of Users' Expectations on the Success of Information Technology Implementation*, Unpublished PhD Dissertation, The University of Western Ontario, London, Ontario.
- Marcus, L. (1997) Towards a Paradigm of Information System, in Winder, R. L., Probert, S. K. and Beeson, I. A. (Ed.) *Philosophical Aspects of Information Systems*, Taylor & Francis Ltd., London, pp. 151-155.
- Markus, M. L. (1983) Power, Politics, and MIS Implementation, *Communications of the ACM*, 26 (6), June, pp. 430-444.

- Markus, M. L. and Keil, M. (1994) If We Build It, They Will Come: Designing Information Systems That People Want to Use, *Sloan Management Review*, Summer, pp. 11-25.
- Martin, C. and Powell, P. (1992) *Information Systems: A Management Perspective*, McGraw-Hill, London.
- Martin, E. W., DeHayses, D. W., Hoffer, J. A., and Perkins, W. C. (1994) *Managing Information Technology: What Managers Need to Know*, 2<sup>nd</sup> Ed., Macmillan, New York.
- Martinsons, M. G. and Chong, P. K. C. (1999) The Influence of Human Factors and Specialist Involvement on Information Systems Success, *Human Relations*, 52 (1), pp. 123-152.
- Mathieson, K. and Ryan, T. (1994) The Effect of Definitional Variations on User's Evaluations of Information Systems, *Data Base*, May, pp. 37-48.
- Mawhinney, C. H. (1990) A Study of Computer Use by Knowledge Workers: User Satisfaction Versus System Use, *Proceedings of the Annual Meeting of Decision Sciences Institute*, San Diego, CA, pp. 954-956.
- Mawhinney, C. H. and Lederer, A. L. (1990) A Study of Personal Computer Utilization by Managers, *Information & Management*, 18, pp. 243-253.
- McBride, N. (1997) The Rise and Fall of an Executive Information system: A Case Study, *Information Systems Journal*, 7, pp. 277-287.
- McCosh, A. M. , Rahaman, M. and Earl, M. J. (1981) *Developing Managerial Information Systems*, The Macmillan Press Limited, London.
- McGill, T. J., Hobbs, V. H. and Klobas, J. E. (2000) Testing the DeLone and McLean Model of IS Success in the User Developed Application Domain, *Proceedings of the 11<sup>th</sup> Australasian Conference on Information Systems*, Brisbane, 6-8 December, 2000, pp. 56 (Abstract, Full paper on CD).

- McGolpin, P. and Ward, J. (1997) Factors Influencing the Success of Strategic Information Systems, in Mingers, J. and Stowell, F. (Ed.) *Information Systems: An Emerging Discipline?*, McGraw-Hill, London, pp. 287-327.
- McHaney, R., Hightower, R. and White, D. (1999) EUCS Test-Retest Reliability in Representational Model Decision Support Systems, *Information & Management*, 36, pp. 109-119.
- McKeen, J. D. (1983) Successful Development Strategies for Business Application Systems, *MIS Quarterly*, September, pp. 47-65.
- McKeen, J. D., Guimaraes, T. and Wetherbe, J. C. (1993) *Contingency Factors Affecting User Participation and User Satisfaction: Task Complexity, System Complexity, User Influence, and User-Developer Communication*, Working Paper 93-07, School of Business, Queen's University, Kingston, Ontario, Canada.
- McKeen, J. D., Guimaraes, T. and Wetherbe, J. C. (1994) The Relationship Between User Participation and User satisfaction: An Investigation of Four Contingency Factors, *MIS Quarterly*, 18 (4), December, pp. 427-451.
- McNemar, Q. (1960) At Random: Sense and Nonsense, *American Psychologist*, 15, pp. 295-300.
- Melone, N. P. (1990) A Theoretical Assessment of the User Satisfaction Construct in Information Systems Research, *Management Science*, 36 (1), pp. 76-91.
- Metcalfe, M. and Powell, P. (1995) Information: A Perceiver-Concerns Perspective, *European Journal of Information Systems*, 4, pp. 121-129.
- Miller, J. (1989) Information Systems Effectiveness: The Fit Between Business Needs and System Capabilities, *Proceedings of the 10<sup>th</sup> International Conference on Information Systems*, Boston, Dec 4-6, pp. 273-314.

- Miller, J. and Doyle, B. A. (1987) Measuring the Effectiveness of Computer-Based Information Systems in the Financial Service Sector, *MIS Quarterly*, March, pp. 107-124.
- Mingers, J. (1995) Using Soft Systems Methodology in the Design of Information Systems, in Stowell, F. (Ed.) *Information Systems Provision: The Contribution of Soft Systems Methodology*, McGraw-Hill Book Company, London, pp. 18-50.
- Mingers, J. (1997) The Nature of Information and its Relationship to Meaning, in Winder, R. L. , Probert, S. K. and Beeson, I. A. (Ed.) *Philosophical Aspects of Information Systems*, Taylor & Francis, London, pp. 73-84.
- Mingers, J. and Stowell, F. (1997) *Information Systems: An Emerging Discipline?*, McGraw-Hill, London.
- Mintzberg, H. (1973) *The Nature of Managerial Work*, Harper and Row Publishers Inc., New York.
- Mitchell, T. R. (1973) Motivation and Participation: An Integration, *Academy of Management Journal*, 16 (4), pp. 670-679.
- Mitroff, I. and Linstone, H. (1993) *The Unbounded Mind, Breaking the Chains of Traditional Business Thinking*, Oxford University Press, New York.
- Mittermeir, R. T., Hsia, P., and Yeh, R.T. (1987) Alternative to Overcome the Communication Problem of Formal Requirements Analysis, in Galliers, R. (Ed.), *Information Analysis: Selected Readings*, Addison-Wesley, Singapore, pp. 153-165.
- Moad, J. (1998) IT: It Isn't All Fun and Games, *PC Week*, January, 12, pp. 80.
- Montazemi, A. R. (1988) Factors Affecting Information Satisfaction in the Context of the Small Business Environment, *MIS Quarterly*, June, pp. 239-256.

- Morgan, H. L. and Soden, J. V. (1973) Understanding MIS Failures, *Database*, 5 (1), pp. 157-171.
- Mumford, E. and Henshall, D. (1979) *A Participative Approach to Computer System Design: A Case Study of the Introduction of a New Computer System*, Associated Business Press, London.
- Mumford, E. (1983) *Designing Human Systems - The Ethics Method*, Manchester Business School, Manchester.
- Murdick, R. G. (1980) *MIS Concepts and Design*, Prentice-Hall, Inc., Englewood Cliffs, New Jersey.
- Murray, F. and Willmott, H. (1991) The Communication Problem in Information Systems Development: Toward a Relational Approach, *Proceedings on the 12<sup>th</sup> International Conference on Information Systems*, December 16-18, New York, pp. 83-92.
- Myers, B. L., Kappelman, L. A. and Prybutok, V. R. (1998) A Comprehensive Model for Assessing the Quality and Productivity of Information Systems Function: Toward a Theory for Information Systems Assessment, in Garrity, E. J. and Sanders, G. L. (Ed.) *Information Systems Success Measurement*, Idea Group Publishing, London, pp. 94-121.
- Naylor, J. B. and Williams, J. (1994) The Successful Use of IT in SMEs on Merseyside, *European Journal of Information Systems*, 3 (1), pp. 48-56.
- Newman, M. and Noble, F. (1990) User Involvement as an Interaction Process: A Case Study, *Information Systems Research*, 1 (1), pp. 89-113.
- Newman, M. and Rosenberg, D. (1985) Systems Analyst and the Politics of Organizational Control, *Omega, Int. J. of Mgmt Sci.*, 13, pp. 393-406.
- Nicholas, J. M. (1985) User Involvement: What Kind, How Much, and When? *Journal of Systems Management*, 36 (3), pp. 23-27.

- Nicholas, P. and O'Connor, M. (1990) Variations in User Satisfaction With MIS, *Proceedings of the 23<sup>rd</sup> HAWAII International Conference on System Science*, IEEE, Los Alamitos, CA, January, pp. 479-487.
- Nichols, G. E. (1977) On the Nature of Management Information, in Dock, V. T., Luchsinger, V. P., and Cornette, W. R. (Ed.) *MIS: A Managerial Perspective*, Science Research Associates, Inc., Chicago, pp. 71-79.
- Nickerson, R. S. (1981) Why Interactive Computer Systems Are Sometimes not Used By People Who Might Benefit from Them, *International Journal of Man-Machine Studies*, 15, pp. 469-483.
- Nickerson, R. S., Elkind, J. I., and Carbonell, J. R. (1968) Human Factors and the Design of Time Sharing Computer Systems, *Human Factors*, 10 (2), pp. 127-134.
- Nolan, R. L. and Seward (1974) Measuring User Satisfaction to Evaluate Information Systems, in Nolan, R. L. (Ed.) *Managing the Data Resource Function*, West Publishing Company, New York, pp. 253-275.
- O' Connel, F. (1994) Why the Domino Effect Should not be Ignored, *Computer Weekly*, 14 April, pp. 24.
- OASIG (1996) Why Do IT Projects So Often Fail?, *OR Newsletter*, September, pp. 12-16.
- Odedra-Straub, M. (1993) Critical Factors Affecting Success of CBIS: Cases from Africa, *Journal of Global Information Management*, 1 (3), Summer, pp. 16-31.
- Oliver, I. and Langford, H. (1987) Myths of Demons and Users: Evidence and Analysis of Negative Perceptions of Users, in Gallier, R. (Ed.) *Information Analysis: Selected Readings*, Addison-Wesley, Singapore, pp. 113-123.

- Oliver, R. L. (1980) A Cognitive Model of the Antecedents and Consequence of Satisfaction Decision, *Journal of Marketing Research*, 17, pp. 460-469.
- O'Reilly, C. A. (1982) Variations in Decision Makers' Use of Information Resources: The Impact of Quality and Accessibility of Information, *Academy of Management Journal*, 25 (4), December, pp. 756-771.
- Orlikowski, W. J. and Baroudi, J. J. (1991) Studying Information Technology in Organizations: Research Approaches and Assumptions, *Information Systems Research*, 2 (1), pp. 1-28.
- Orwin, R. G. (1983) A Fail-Safe N for Effect Size in Meta-Analysis, *Journal of Educational Statistics*, 8(2), pp. 157-159.
- Oz, E. (1994) When Professional Standards are Lax: The CONFIRM Failure and its Lessons, *Communications of the ACM*, 37 (10), pp. 29-36.
- Palvia, P. C. (1996) A Model and Instrument for Measuring Small Business User Satisfaction With Information Technology, *Information & Management*, 31, pp. 151-163.
- Paul. R. J. (1994) Why Users Cannot ' Get What They Want', *International Journal of Manufacturing Systems Design*, 1 (4), pp. 389-394.
- Pearson, K. (1904) Report on Certain Enteric Fever Inoculation Statistics, *The British Medical Journal*, 2, pp. 1243-1246.
- Pearson, S. W. and Bailey, J. E. (1979) Measurement of Computer User Satisfaction, *Installation Management Review*, 8 (3), pp. 1-8.
- Pearson, S. W. and Bailey, J. E. (1980) Measurement of Computer User Satisfaction, *Performance Evaluation Review*, 9 (1), pp. 59-68.
- Peppard, J. (1993) *I.T. Strategy for Business*, Pitman Publishing, London.

- Perring, I. (1992) Bridging the Culture Gap From IT to IS: A Practitioner's Approach, in Brown, A. (Ed.) *Creating a Business-Based IT Strategy*, Chapman & Hall, London, pp.97-104.
- Pervan, G. P. (1994) The Measurement of GSS Effectiveness: A Meta-Analysis of the Literature and Recommendations for Future GSS Research, *Proceedings of the Twenty-Seventh Annual Hawaii International Conference on System Sciences*, pp. 562-571.
- Pettingell, K., Marshal, T. and Remington, W. (1988) A Review of the Influence of User Involvement on System Success, *Proceedings of the 9<sup>th</sup> International Conference on Information Systems*, Minneapolis, Nov-December, pp. 227-236.
- Piercy, N. (1984) *The Management Implication of New Information Technology*, Nichols Publishing Company, New York.
- Pigott, T. D. (1994) Methods for Handling Missing Data in Research Synthesis, in Cooper, H. and Hedges, L. V. (Ed.) *The Handbook of Research Synthesis*, Russell Sage Foundation, New York, pp. 163-175.
- Pitt, L. F., Watson, R. T. and Kavan, C. B. (1995) Service Quality: A Measure of Information Systems Effectiveness, *MIS Quarterly*, 19 (2), June, pp. 173-187.
- Poulymenakou, A. and Holmes, A. (1996) A Contingency Framework for the Investigation of Information Systems Failure, *European Journal of Information Systems*, 5, pp. 34-46.
- Powers, R. F. and Dickson, G. W. (1973) MIS Project Management: Myths, Opinions, and Reality, *California Management Review*, XV (3), Spring, pp. 147-156.
- Rademacher, R. A. (1989) Critical Factors for Systems Success, *Journal of Systems Management*, June, pp. 15-17.



- Raghunathan, T. S. and King, W. R. (1988) The Impact of Information Systems Planning on the Organization, *Omega, Int. J. Mgmt Sci.*, 16 (2), pp. 85-93.
- Ramamurthy, K., King, W. R. and Premkumar, G. (1992) User Characteristics-DSS Effectiveness Linkage: An Empirical Assessment, *International Journal of Man-Machine Studies*, 36, pp. 469-505.
- Ravichandran, T. and Rai, A. (1999/2000) Total Quality Management in Information Systems Development: Key Construct and Relationships, *Journal of Management Information Systems*, 16 (3), pp. 119-155.
- Raymond, L. (1985) Organizational Characteristics and MIS Success in the Context of Small Business, *MIS Quarterly*, March, pp. 37-52.
- Raymond, L. (1987) Validating and Applying User Satisfaction as A Measure of MIS Success in Small Organisations, *Information & Management*, 12, pp. 173-179.
- Raynor, R. J. and Speckmann, L. D. (1983) Maintaining User Participation Throughout the Systems Development Cycle, *AFIPS Conference Proceedings, National Computer Conference*, May 16-19, Anaheim, California, pp. 173-180.
- Rainer, R. K. and Watson, H. J. (1995) The Key to Executive Information System Success, *Journal of Management Information Systems*, 12 (2), pp. 83-98.
- Rees, P. L. (1993) User Participation in Expert Systems, *Industrial Management & Data Systems*, 93 (6), pp. 3-7.
- Reijonen, P. and Heikkilä, J. (1999) The Planned and Materialized Implementation of an Information System, in Khosrowpour, M (Ed.) *Success and Pitfalls of Information Technology Management*, Idea Group Publishing, Hershey, USA, pp. 48-59.

- Remenyi, D. and Money, A. (1991) A User-Satisfaction Approach to IS Effectiveness Measurement, *Journal of Information Technology*, 6, pp. 162-175.
- Remenyi, D. and Money, A. (1993) Service Quality and Corresponding Analysis in Determining Problems With the Effective Use of Computer Services, *Proceedings of the First European Conference on Information Systems*, March 29<sup>th</sup>-30<sup>th</sup>, Henley-on-Thames, UK.
- Remenyi, D. and Schambreel, T. (1997) IT Failure: A Major Challenge for the South African Management in the Late 1990s, *Proceedings of the Fourth European Conference on the Evaluation of Information Technology*, October 30-31, Delft, Delft University Press, The Netherlands, pp. 13-22.
- Remenyi, D., White, T. and Sherwood-Smith, M. (1997) Information Systems Management: The Need for a Post-Modern Approach, *International Journal of Information Management*, 17 (6), pp. 421-437.
- Ridley, G. and Keen, C. (1998) Epistemologies for Information Systems Research: A Study of Change, *Proceedings of the 9<sup>th</sup> Australasian Conference on Information Systems*, Sydney, The University of NSW, pp. 520-532.
- Rivard, S. and Huff, S. L. (1988) Factors of Success for End-User Computing, *Communications of the ACM*, 31 (5), pp. 552-561.
- Robb, F. F. (1997) Some Philosophical and Logical Aspects of Information Systems, in Winder, R. L., Probert, S. K. and Beeson, I. A. (Ed.) *Philosophical Aspects of Information Systems*, Taylor & Francis Ltd., London, pp. 7-21.
- Robey, D. and Zeller, R. L. (1978) Factors Affecting the Success and Failure of an Information System for Product Quality, *Interface*, 8 (2), pp. 70-75.
- Robey, D. (1979) User Attitudes and Management Information System Use, *Academy of Management Journal*, 22 (3), pp. 527-538.

- Robey, D. (1996) Research Commentary: Diversity in Information Systems Research: Threat, Promise, and Responsibility, *Information Systems Research*, 7 (4), pp. 400-408.
- Robey, D. and Farrow, D. L. (1982) User Involvement in Information System Development: A Conflict Model and Empirical Test, *Management Science*, 28 (1), pp. 73-85.
- Robey, D., Farrow, D. L. and Franz, C. R. (1989) Group Process and Conflict in System Development, *Management Science*, 35 (10), pp. 1172-1191.
- Rosenthal, R. (1979) The "File Drawer Problem" and Tolerance for Null Results, *Psychological Bulletin*, 86 (3), 638-641.
- Rosenthal, R. (1984) *Meta-Analytic Procedures for Social Research*, Sage Publications, Beverly Hills, USA.
- Rosenthal, R. (1991) *Meta-Analytic Procedures for Social Research*, Sage Publications, Beverly Hills, USA.
- Roth, L. and Bartholome, L. (1994) The Relationship Between User Participation in Systems Development and User Satisfaction, *Journal of Computer Information Systems*, 35 (1), Fall, pp. 7-12.
- Rushinek, A. and Rushinek, S. F. (1986a) What Makes User Happy?, *Communications of the ACM*, 29 (7), pp. 594-598.
- Rushinek, A. and Rushinek, S. F. (1986b) The Influence of Troubleshooting, Education, and Documentation on Computer User Satisfaction, *IEEE Transactions on Systems, Man, and Cybernetics*, Vol. SMC-16, No. 1, January/February, pp. 165-168.
- Rushinek, A. Rushinek, S. F. (1986c) The Effects of Communication Monitors on User Satisfaction, *Information Processing & Management*, 22 (4), pp. 345-351.

- Ryker, R., Nath, R. and Henson, J. (1997) Determinants of Computer User Expectations and Their Relationships with User Satisfaction: An Empirical Study, *Information Processing & Management*, 33 (4), pp. 529-537.
- Saarinen, T. and Sääksjärvi, M. (1990) The Missing Concepts of User Participation: An Empirical Assessment of User Participation and Information System Success, *Scandinavian Journal of Information Systems*, 2, pp. 25-42.
- Saarinen, T. (1996) An Expanded Instrument for Evaluating Information System Success, *Information & Management*, 31, pp. 103-118.
- Sabbagh, D. (1997) IT Budgets Set to Rise, *Computing*, June, pp. 3.
- Saleem, N. (1996) An Empirical Test of the Contingency Approach to User Participation in Information Systems Development, *Journal of Management Information Systems*, 13 (1), pp. 145-166.
- Sanders, G. L. and Courtney, J. F. (1985) A Field Study of Organizational Factors Influencing DSS Success, *MIS Quarterly*, March, pp. 77-93.
- Sauer, C. (1993) *Why Information Systems Fail: A Case Study Approach*, Alfred Waller, Henley-On-Thames, Oxfordshire.
- Sauer, C. (1999) Deciding the Future for IS Failures: Not the Choice You Might Think, in Currie, W. and Galliers, B. (Ed.) *Rethinking Management Information Systems: An Interdisciplinary Perspective*, Oxford University Press, New York, pp. 279-309.
- Saunders, C. S. and Jones, J. W. (1992) Measuring Performance of the Information Systems Function, *Journal of Management Information Systems*, 8 (4), pp. 63-82.
- Scarrott, G. G. (1989) The Nature of Information, *The Computer Journal*, 32 (3), pp. 262-266.

- Schewe, C. D. (1976) The Management Information System User: An Exploratory Behavioral Analysis, *Academy of Management Journal*, 19 (4), pp. 577-590.
- Schmitt, J. and Kozar, K. (1978) Management' Role in Information Systems Development Failures: A Case Study, *MIS Quarterly*, 2 (2), June, pp. 7-16.
- Schwarzer, R. (1998) *Meta-Analysis Programs*, [On-Line]: available <http://www.yorku.ca/faculty/academic/schwarze/meta.htm>
- Seddon, P. and Kiew, M. (1994) A Partial Test and Development of the DeLone and McLean Model of IS Success, *Proceedings of the 15<sup>th</sup> International Conference on Information Systems*, December 14-17, Canada, pp. 99-110.
- Seddon, P. and Yip, S. (1992) An Empirical Evaluation of User Information Satisfaction (UIS) Measures for Use with General Ledger Accounting Software, *Journal of Information Systems*, Spring, pp.75-91.
- Seddon, P. B. and Kiew, M. (1996) A Partial Test and Development of DeLone and McLean's Model of IS Success, *The Australian Journal of Information Systems*, 4 (1), pp. 90-109.
- Seddon, P. B. (1997) A Respecification and Extension of the DeLone and McLean Model of IS Success, *Information Systems Research*, 8 (3), pp. 240-253.
- Senn, J. A. (1978) Essential Principles of Information Systems Development, *MIS Quarterly*, 2 (2), June, pp. 17-26.
- Senn, J. A. (1991) User Involvement as a Factor in Information Systems Success: Key Questions for Research, *Journal of Management Systems*, 3 (1), pp. 31-40.

- Serafeimidis, V. and Poulymenakou, A. (1996) Exploring the Role of Evaluation in Information Systems Failure, *Proceedings of the Third European Conference on the Evaluation of Information Technology*, 29<sup>th</sup> November, Bath University School of Management, Claverton Down, Bath, UK, pp. 155-165.
- Seward, H. H. (1975) Evaluating Information Systems, in McFarlan, F. W. and Nolan, R. L. (Ed.) *The Information Systems Handbook*, Dow Jones-Irwin, Inc., Homewood, Illinois, USA, pp. 132-153.
- Sharma, S., Durand, R. M. and Gur-Arie, O. (1981) Identification and Analysis of Moderator Variables, *Journal of Marketing Research*, XVIII, August, pp. 291-300.
- Shaw, G. J. (1998) User Satisfaction in Group Support Systems Research: A Meta-Analysis of Experimental Results, *Proceedings of the 31<sup>st</sup> Hawaii International Conference on System Sciences (HICSS'98)*, Published by the IEEE Computer Society, pp. 360-369.
- Shirani, A., Aiken, M. and Reithel, B. (1994) A Model Of User Information Satisfaction, *Data Base*, 25 (4), pp. 17-23.
- Shorrocks, W. B. (1990) End User Computing – Fad or Future, *Computerdata*, 15 (9), September, pp. 22, 26, 33.
- Slavin, R. E. (1986) Best-Evidence Synthesis: An Alternative to Meta-Analysis and Traditional Reviews, *Educational Researcher*, 15, pp. 5-11.
- Smith, A. (1997) *Human-Computer Factors: A Study of Users and Information Systems*, McGraw-Hill, London.
- Smith, D. (1988) Implementing Real World Expert Systems, *AI Expert*, December, pp. 51-57.
- Smith, M. L. (1980) Publication Bias and Meta-Analysis, *Evaluation in Education*, 4, pp. 22-24.

- Sprague, R. H. and McNurlin, B. C. (1993) *Information Systems Management in Practice*, 3<sup>rd</sup> Ed., Prentice-Hall, New Jersey, USA.
- Srinivasan, A. (1985) Alternative Measures of System Effectiveness: Association and Implications, *MIS Quarterly*, 9 (3), September, pp. 243-253.
- Srinivasan, A. and Davis, J. G. (1987) A Reassessment of Implementation Process, *Interface*, 17 (3), pp. 64-71.
- Srivihok, A. (1999) Understanding Executive Information Systems Implementation: An Empirical Study of EIS Success Factors, *Proceedings of the 32<sup>nd</sup> HAWAII International Conference on System Sciences*, January 5-8, Maui, Hawaii, (Abstract available on page 259), (Full text, 'osmt01.pdf', Available on CD).
- Stamper, R. (1973) *Information in Business and Administrative Systems*, B.T. Batsford, London.
- Stewart, D. W. (1984) *Secondary Research: Information Sources and Methods*, SAGE Publications, Beverly Hills, California, USA.
- Stoffelmayr, B. E., Dillavou, D. and Hunter, J. E. (1983) Premorbid Functioning and Outcome in Schizophrenia: A Cumulative Analysis, *Journal of Consulting and Clinical Psychology*, 51, pp. 338-352.
- Straub, D. W. and Carlson, C. L. (1989) Validating Instruments in MIS Research, *MIS Quarterly*, June, pp. 147-170.
- Straub, D. W. and Trower, J. K. (1988) *The Importance of User Involvement in Successful Systems: A Meta-Analytical Reappraisal*, Working Paper (MISRC-WP-89-01), Management Information Systems Research Center, Curtis L. Carison School of Management, University of Minnesota, Minneapolis, Minnesota 55455.

- Straub, D. W., Soo, S. and Roberto, E. (1994) Normative Standards for MIS Research, *Data Base*, 25 (1), February, pp. 21-34.
- Suh, K., Kim, S. and Lee, J. (1994) End-User's Disconfirmed Expectations and the Success of Information Systems, *Information Resources Management Journal*, 7 (4), pp. 30-39.
- Swanson, E. B. (1974) Management Information Systems: Appreciation and Involvement, *Management Science*, 21 (2), pp. 178-188.
- Swanson, E. B. (1982) Measuring User Attitudes in MIS Research: A Review, *Omega, Int. J. of Mgmt Sci.* 10 (2), pp. 157-165.
- Szajna, B. (1993) Determining Information System Usage: Some Issues and Examples, *Information and Management*, 25, pp. 147-154.
- Szajna, B. and Scamell, R. W. (1993) The Effects of Information System User Expectations on Their Performance and Perceptions, *MIS Quarterly*, 17 (4), pp. 493-516.
- Szajna, B. (1996) Empirical Evaluation of the Revised Technology Acceptance Model, *Management Science*, 42 (1), pp. 85-92.
- Tafi, A. H. A. and Shirani, A. I. (1997) Hierarchy of End User Computing Needs: An empirical Investigation, *Journal of End User Computing*, 9 (4), pp. 29-35.
- Tait, P. and Vessey, I. (1988) The Effect of User Involvement on System Success: A Contingency Approach, *MIS Quarterly*, 12 (1), March, pp. 91-108.
- Tan, B. and Low, T. (1990) Validation of a User Satisfaction Instrument for Office Automation Success, *Information & Management*, 18, pp. 178-188.



- Tashakkori, A. and Teddlie, C. (1998) *Mixed Methodology: Combining Qualitative and Quantitative Approaches*, Sage Publications, Thousand Oaks, USA.
- Teng, J.T. C. and Galletta, D. F. (1991) MIS Research Directions: A Survey of Researchers' View, *Data Base*, 22 (1/2), Winter/Spring, pp. 53-62.
- Teo, T. S. H., Lim, V. K. G. and Lai, R. Y. C. (1999) Intrinsic and Extrinsic Motivation in Internet Usage, *Omega, Int. J. Mgmt Sci.*, 27, pp. 25-37.
- Teo, T. S. H. and Ang, J. S. K. (2000) How Useful are Strategic Plans for Information Systems? *Behaviour & Information Technology*, 19 (4), pp. 275-282.
- Thompson, R. L., Higgins, C. A. and Howell, J. M. (1991) Personal Computing: Toward a Conceptual Model of Utilization, *MIS Quarterly*, March, pp. 125-143.
- Thompson, R. L., Higgins, C. A., and Howell, J. M. (1994) Influence of Experience on Personal Computer Utilization: Testing a Conceptual Model, *Journal of Management Information Systems*, 11(1), pp. 167-187.
- Thong, J. Y. L., Yap, C. and Raman, K. S. (1993) Top Management Support in Small Business Information Systems Implementation: How Important Is It? *Proceedings of the SIGCPR Annual Conference on Computer Personnel Research*, April 1-3, St Louis, MO USA, pp. 416-425.
- Thong, J. Y. L. and Yap, C. (1996) Information Systems Effectiveness: A User Satisfaction Approach, *Information Processing & Management*, 32 (5), pp. 601-610.
- Thorndike, R. L. (1933) The Effect of the Interval Between Test and Retest on the Constancy of the IQ, *Journal of Educational Psychology*, 24, pp. 543-549.

- Torkdzedah, G. and Doll, W. J. (1999) The Development of a tool for Measuring the Perceived Impact of Information Technology on Work, *Omega, Int. J. Mgmt Sci.*, 27, pp. 327-339.
- Torkzadeh, G. and Dwyer, D. J. (1994) A Path Analytic Study of Determinants of Information System Usage, *Omega, Int. J. Mgmt Sci.*, 22 (4), pp. 339-348.
- Toubkin, A. and Simis, P. (1980) User Expectations of Attributes in the Design of Productive Information Systems, *Proceedings of the 13<sup>th</sup> HAWAII International Conference on System Sciences*, Honolulu, pp. 169-174.
- Trauth, E. M., Farwell, D. W., and Lee, D. (1993) The IS Expectation Gap: Industry Expectations Versus Academic Preparation, *MIS Quarterly*, September, pp. 293-303.
- Treacy, M. E. (1985) *An Empirical Examination of a Casual Model of User Information Satisfaction*, Working Paper, Center for Information Systems Research, Sloan School of Management, Massachusetts Institute for Technology, pp. 1-39.
- Treacy, M. E. (1985a) An Empirical Examination of a Causal Model of User Information Satisfaction, *Proceedings of the 6<sup>th</sup> International Conference on Information Systems*, Indianapolis, December, pp. 285-287.
- Trice, A. W. and Treacy, M. E. (1986) Utilization as a Dependent Variable in MIS Research, *Proceedings of the 7<sup>th</sup> International Conference on Information Systems*, San Diego, California, December, pp. 227-239.
- Trice, A. W. and Treacy, M. E. (1988) Utilization as a Dependent Variable in MIS Research, *Data Base*, 19 (3/4), Fall/Winter, pp. 33-41.
- Trotman, K. T. and Wood, R. (1991) A Meta-Analysis of Studies on Internal Control Judgements, *Journal of Accounting Research*, 29 (1), pp. 180-192.

- Tubbs, S. L. and Moss, S. (1994) *Human Communication*, 7<sup>th</sup> Ed. McGraw-Hill, New York.
- Turner, J. A. (1987) Understanding the Elements of System Design, in Boland Jr., R. J. and Hirschheim, R. A. (Ed.) *Critical Issues in Information Systems Research*, John Wiley & Sons, UK.
- Udo, G. J. and Davis, J. S. (1992) A Comparative Analysis of DSS User-Friendliness and Effectiveness, *International Journal of Information Management*, 12, pp. 209-223.
- Udo, G. J. and Guimaraes, T. (1994) Empirically Assessing Factors Related to DSS Benefits, *European Journal of Information Systems*, 3 (3), pp. 218-227.
- Urquhart, C. (1997) Exploring Analyst-Client Communications: Using Grounded Theory Techniques to Investigate Interaction in *Informal Requirement gathering*, in *Information systems and Qualitative Research, Proceedings of the IFIP TC8 WG 8.2, International Conference on Information Systems and Qualitative Research*, 31<sup>st</sup> May-3<sup>rd</sup> June, Philadelphia, Pennsylvania, USA, pp. 149-181.
- Valusek, J. R. and Fryback, D. G. (1987) Information Requirements Determination: Obstacles Within, Among and Between Participants, in Galliers, R. D. (Ed.) *Information Analysis: Selected Readings*, Addison-Wesley, Singapore, pp. 139-151.
- Van Horn, R. L. (1973) Empirical Studies of Management Information Systems, *Data Base*, 5 (2,3,4), Winter, pp. 172-180.
- Venkatesh, V. and Davis, F. D. (2000) A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies, *Management Science*, 46 (2), pp. 186-204.
- Verrijn-Stuart, A. (1987) Themes and Trends in Information Systems: TC8, 1975-1987, *The Computer Journal*, 30(2), pp. 97-109.

- Verrijn-Stuart, A. A. and Anzenhofer, K. (1988) Information Systems User-Designer Communication Problems, *Information & Management*, 14, pp. 133-142.
- Visala, S. (1991) Broadening the Empirical Framework of Information Systems Research, in Nissen, H.E., Klein, H. K. and Hirschheim, R. (Ed.) *Information Systems Research: Contemporary Approaches and Emergent Traditions*, IFIP, North-Holland, pp. 347-364.
- Vogel, F. G. (1989) Gebruikersparticipatie En Acceptatie, *Informatie Jaargang*, 31 (11), pp. 856-861.
- Vroom, V. H. (1964) *Work and Motivation*, Wiley, New York.
- Wan, T. B. and Wah, L. T. (1990) Validation of a User satisfaction Instrument for Office Automation Success, *Information & Management*, 18, pp. 203-208.
- Wateridge, J. (1995) IT Projects: A Basis for Success, *International Journal of Project Management*, 13 (3), pp. 169-172.
- Watson, R. T., Pitt, L. F., Cunningham, C. J. and Nel, D. (1993) User Satisfaction and Service Quality of the IS Department: Closing the Gaps, *Proceedings of the First European Conference on Information Systems*, March, 29-30, Henley-on-Thames, UK, pp. 341-351.
- Watson, R. T., Pitt, L. F., Cunningham, C. J. and Nel, D. (1993a) User Satisfaction and Service Quality of the IS Department: Closing the Gaps, *Journal of Information Technology*, 8, pp. 257-265.
- Weick, K. E. (1984) Theoretical Assumptions and Research Methodology Selection, in McFarlan, W. F. (Ed.) *The Information Systems Research Challenge, Proceedings Harvard Business School Research Colloquium*, Harvard Business School Press, Boston, Massachusetts, pp. 111-134.

- Welsch, G. M. (1986) The Information Transfer Specialist in Successful Implementation of Decision Support Systems, *Data Base*, Fall, pp. 32-40.
- White, H. D. (1994) Scientific Communication and Literature Retrieval, in Cooper, H. and Hedges, L. V. (Ed.) *The Handbook of Research Synthesis*, Russell Sage Foundation, New York, pp. 41-55.
- White, S. D. and Cronan, T. P. (1993) User Information Satisfaction for Maintained Accounting Systems: The Validity and Reliability of the Short-Form Measure, *Journal of Computer Information Systems*, XXXIII (3), Spring, pp. 2-10.
- Wilcox, D. (1994) Writing out Changes, *Computing*, 7 July, pp. 16.
- Wilkin, C., Hewett, B. and Carr, R. (1999) Towards a Hierarchical Definition of Delivered IS Quality, *Proceedings of the 6<sup>th</sup> European Conference on Information Technology Evaluation*, St. John's House, Brunel University, UK, 4-5 November, pp. 289-298.
- Wilkins, M. (1996) Determinants of Microcomputer Usage in the Republic of Ireland, *Journal of End User Computing*, 8 (4), pp. 3-9.
- Willcocks, L. and Lester, S. (1993) *Evaluating the Feasibility of Information Technology Investments*, RDP93/1, Research and Discussion papers, Oxford Institute of Information Management, Templeton College, Oxford.
- Willcocks, L. and Mason, D. (1987) *Computerising Work: People Systems Design and Workplace Relations*, Paradigm, UK.
- Willcocks, L. (1994) *Information Management: The Evaluation of Information Systems Investments*, Chapman & Hall, London.
- Williams, A. (1993) Making Projects Fail-Safe, *Computer Weekly*, 5 August, pp. 18.

- Wilson, D. A. (1993) *Managing Information: For Continual Improvement*, Butterworth-Heinemann, Oxford, Great Britain.
- Wolf, F. M. (1986) *Meta-Analysis: Quantitative Methods for Research Synthesis*, Sage Publications, Newbury Park, USA.
- Wood-Harper, A. T., Antill, L. and Avison, D. E. (1985) *Information Systems Definition: The Multiview Approach*, Blackwell Scientific Publications, London.
- Wrigley, C. D., Drury, D. H. and Farhooman, A. F. (1997) Structure and Extensions of the User Information Satisfaction Construct, *Australian Journal of Information Systems*, 4 (2), pp. 114-124.
- Yap, C. S., Soh, C.P.P. and Raman, K.S. (1992) Information Systems Success Factors in Small Business, *Omega, Int. J. Mgmt Sci.*, 20 (5/6) pp. 597-609.
- Yaverbaum, G. J. (1988) Critical Factors in the User Environment: An Experimental Study of Users, Organizations and Tasks, *MIS Quarterly*, March, pp. 75-88.
- Yaverbaum, G. J. and Nosek, J. (1992) Effects of Information System Education and Training on User Satisfaction, *Information & Management*, 22, pp. 217-225.
- Yeates, D. and Cadle, J (1996) *Project Management for Information Systems*, 2nd Ed., Pitman Publishing, London.
- Yin, R. K. (1989) *Case Study Research: Design and Methods*, Sage Publications, London.
- Yin, R. K. (1994) *Case Study Research: Design and Methods*, Applied Social Research Methods Series, Sage, USA.

Yoon, Y. and Guimaraes, T. (1995) Assessing Expert Systems Impact on Users' Jobs, *Journal of Management Information Systems*, 12 (1), Summer, pp. 225-249.

Young, D. and Watson, H. J. (1995) Determinates of EIS Acceptance, *Information & Management*, 29, pp. 153-164.

Zmud, R. (1979) Individual Differences and MIS Success: A Review of the Empirical Literature, *Management Science*, 25 (10), pp. 966-979.

Zuboff, S. (1988) *In The Age Of The Smart Machine*, Basic Books , New York.

## Appendix-A

### Common Types of Information System Failures

Information System failure may occur during development or after implementation. There is normally no single cause of IS failures but numerous. Smith (1997) mentioned that systems both technically correct and also meet utility requirements but hardly successful due to lack of acceptance of users. Different studies in IS showed that systems unable to achieve their success faced a particular set of circumstances appeared over with the time and cause of those failures. Commonly it may be the result of poor development process, use problems, and lack of user acceptance. Keeping in view such problems, failures are indicated in terms of further failure categories (Lyytinen and Hirschheim, 1987). Lyytinen (1988a) analysed different cases available and attributed those as 'Development failure' and 'Use failure'. The former concerned to the systems abandoned before completion, over budget and behind schedule, delivered but not maintained. It also deals with stakeholders inability to stating unambiguous goals, choosing and implementing suitable technology, predicting organizational and behavioural impact of IS and to participate in development process. The later concerns to system performance, stakeholders' expectations problems in IS use and maintenance and non-use of the system. Mainly it concerns to align the IS with the stakeholder's going concerns (Lyytinen, 1988a). Lyytinen (1988a) divided failure reasons concerned to both development and use failures classes such as IS, IS environment, IS Development and IS Development environment. The system may have performance problems or lack of functionality. There might be such cases that systems are implemented but not used by their users. The problems with IS are widespread and pervasive and no single feature can be considered sufficient to describe IS failure phenomena entirely. Keeping in view numerous failure consequences it seems to be important to understand failure reasons in a comprehensive way. The research outlined by (Lyytinen and Hirschheim, 1987; Sauer, 1993) identified failures such as *correspondence*



*failure, process failure, interaction failure, expectation failure and termination failure.*

- **Correspondence Failure:** It's a matter of failure to meet predefined design objectives. It deals with managerial view of IS failure and is based on the idea that design objectives stated in advance are not in correspondence to those which appears when the system is evaluated in terms of those objectives. In other words we may say that IS does not correspond what was required. Such mismatch may be due to any of reasons, regard the system as failure so named as correspondence failure. It provides the ultimate rational ideal of how failure may be viewed that is always problematic. When we consider system objectives it usually concerns to system quality and its performance. Management objectives may be ambiguous, conflicting due to bias in requirement specifications and their interpretation may also be context driven. How we may expect that these objectives should be fulfilled when original requirements are ambiguous. At the same time it is difficult but not impossible to measure the performance of IS accurately because of problems in verifying and validating measuring instruments (Hirschheim and Smithson, 1986).
- **Process Failure:** Process failure concerned to unsatisfactory development process performance. This failure refer two aspects, either IS development process fails to produce a workable system, or the other way produced system may face cost overruns and schedule delays (see Beynon-Davies, 1995; Oz, 1994; Sauer, 1993; Ewusi-Mensah, 1997). Both situations are embarrassing and may lead systems to failure. The IS that face the problems of over budget in terms of cost or time may limit the global benefits those are required to be achieved. Process failure signals management inability to achieve predicted resource allocation to develop proper and appropriate costing and budgeting schemes for system design, or to

predict implementation difficulties of IT (Lyytinen and Hirschheim, 1987 p. 265-266). Its one aspects advocates what Morgan and Soden (1973 p. 159) said “the failure to actually complete an MIS development project on time and within budget epitomize the MIS executive’s lack of ability to control, organize, and plan” and termed it as ‘development failure’. So design and implementation problems that are hardly resolvable and lack of management control procedures may lead IS development out of control. These are the reasons behind process failure. This failure deals with time, over cost and other technical obstacles causing such undesired situations.

- **Interaction Failure:** Here the emphasis is upon whether system is being used or not by users. Low level of system use predicts tendency of a system towards its failure (Lucas, 1975). The argument is that intensively usage of system implies that users are satisfied and it constitutes a success. It may not be true always, so controversial among researchers. But the other way, hardly used systems may be disappointing. Lucas (1975) considered such situation as a warning of system failure. It also may happen that a system on implementation fails to satisfy the users. So as a result it may be left totally unused, some times only partially used (Sauer, 1993). That means that Sauer considered it in terms of level of use and user satisfaction. On the other way, systems under heavy use are not necessarily supposed to be successful ones (Markus, 1983; Kling and Iacono, 1984) unless those meet the objective for which that were developed. Primary attention is given to user’s interaction so the failure is termed as ‘interaction failure’. Generally it encompasses low level of IS usage, user dissatisfaction and negative attitudes towards the system. Lyytinen and Hirschheim (1987) mentioned that high interaction is not an indicator of improved task performance but to what extent stakeholders employ the IS to sustain or increase their bargaining position.

The failures described above are strongly related to each other. Process failure correlates with correspondence failure as high development costs undermine organizational benefits and overrun costs and schedule delay may cause of user negative attitudes that may decrease system usage. So it may be perceived that despite of their surface differences these are related to each other. (Fig.1)

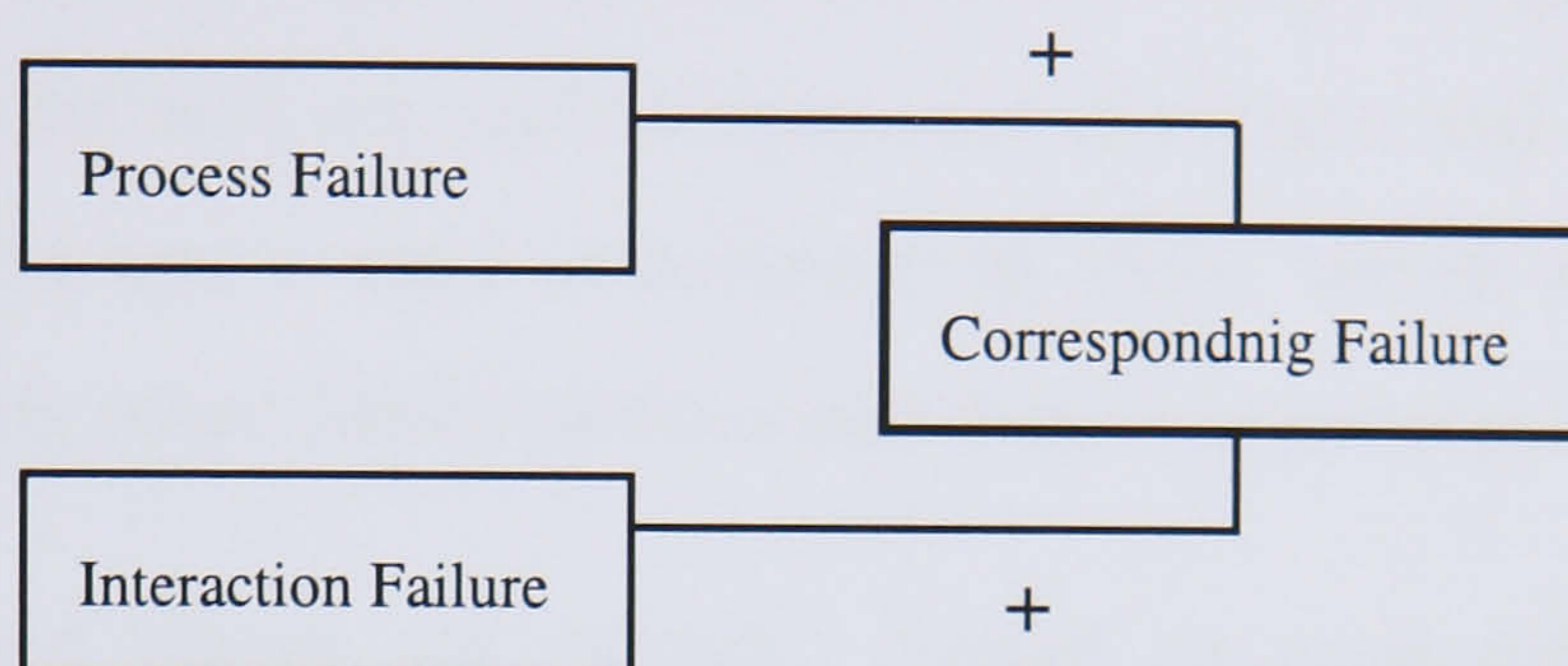


Fig.1 Relationship among three Failures.(Adapted from Lyytinen & Hirschheim, 1987)

- **Expectation Failure:** The main theme of success or failure in this context is related to stakeholders' expectation about system objectives, budget, time schedule and performance. IS imperfections can appear with low expectation amongst system developers about its success (Willcocks and Manson, 1987). IS failure indicates a gap between existing and desired situations for stakeholders. (Lyytinen and Hirschheim, 1987) considered expectations as "the beliefs and desires concerning how the IS will serve the group's interests". Expectation failure is defined as the inability of an IS to meet specific stakeholder group's expectations (Lyytinen and Hirschheim, 1987; Lyytinen, 1988a; 1988b). It may happen that expectations are vaguely expressed due to great number of stakeholders, lack of time or interest and ambiguous contents of expectations. Considering different group of stakeholders those sharing a pool of values, it seems to be that one group may benefit from the system while other group may be disadvantageous (for example because of loss of organizational power or system unable to deliver required needs of that group). For example, Markus' (1983) study reveals that some users resisted where

other supported the system development. The ways in which failure come about are that IS design may clash with stakeholders interests or stakeholders' expectation level may change as a result of organizational learning, persuasion and political campaigning. The situations those may fail to meet stakeholders' expectations may involve technical, behavioral, economic and psychological aspects. Expectation failures are multidimensional (Lyytinen and Hirschheim, 1987). It conveys a more encompassing view, which may help in understanding other failure notions and their relationships.

The failures described above are strongly related to each other whereas expectation failure has broad meanings and a superset of other three failures. It encompasses and covers the other three failure types in its nature.

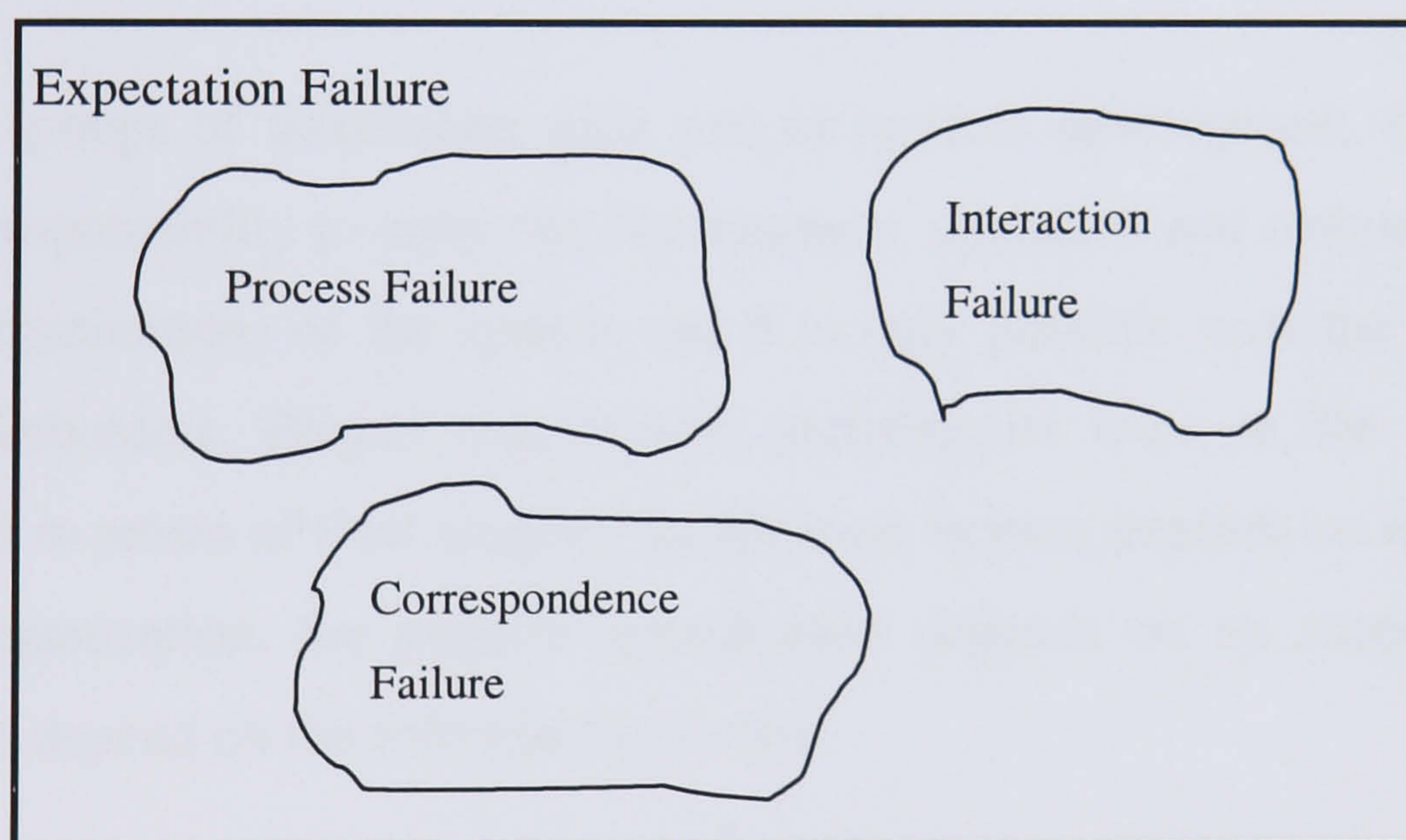


Fig. 2. Expectation Failure

As correspondence failure looks how the objectives have been achieved, process failure emphasis on budget control and time schedule and interaction focus on level of users interaction. However expectation failure deals with stakeholder's interests, whether fulfilled or not where these interests may differ among them. It shows that failure is an evaluation rather than description. However IS failure research still has limitations to explore and to provide fully detailed views about them. Sauer (1993) criticised expectation failure on the basis that some expectations are more reasonable than others, it ignores intention and some

stakeholders have greater capacities than others. Expectation failure may not discriminate among more or less problematic situations, may be related to any group. It is also difficult to distinguish between the situations where the system is terminated and serve no body and the situation when it serve one group of stakeholders.

- **Termination Failure:** Sauer's (1993) model of IS failure posits a definition of failure as the system only be considered as failure when development or operation ceases, leaving supporters dissatisfied with the extent to which the system has served their interests. He considered IS as an innovation process (i.e. discovering answers to questions such as what exactly system will do, how it will do it, and what its effects will be). The Suer's model focus on three components such as: project organization, Information System and its supporters.

Different groups of stakeholder took part in systems development. One of that take the responsibility to carry out development, operation and maintenance (i.e. project organization) of the system and it is only possible with the support of other stakeholders. Project organization performs its work in the interest of supporters in return of their support. Information System depends on efforts from project organization, the projects organization depends on its supporters, and supporters depend on the Information System.

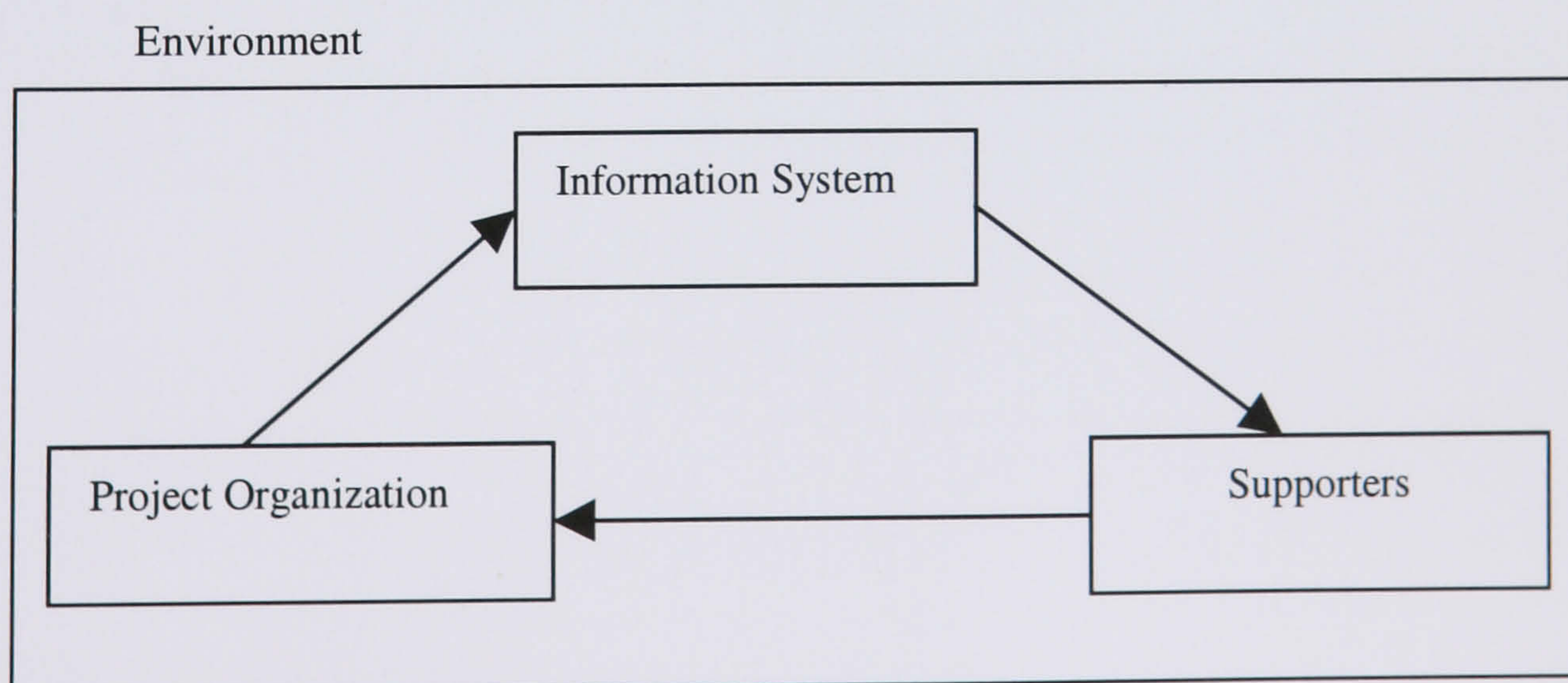


Fig. 3 Sauer's Model of IS Development (Adapted from Sauer, 1993)

If the dissatisfaction with the system is such as that there is no enough support for development, operation and maintenance, so means termination of work whatsoever on the system. It is termed as failure as termination (Sauer, 1993). Sauer introduced concept of 'flaws' whereas "flaws are sub-optimal decisions that create consequential problems" (p. 5). Flaws are different from failure and may be corrected within innovation process but at cost or accepted at a cost. Flaws may be related to hardware performance, organizational change and program bugs. Unless the flaws are not to be removed, it results in further problems that may confine Information Systems to serve the supporters and only be tackled with the availability of support. If there is no sufficient support to sustain the efforts of project organization, the Information System may fail.

Sauer (1993) suggests stakeholder's dissatisfaction as a better measure of its success or failure. Keeping in view the dissatisfaction of stakeholder with the system, it may be speculated that possibly the system may not be able to fulfil their expectations. Fulfilment of stakeholder's expectations is very related to satisfaction achieved. The expectation gap may be cause of their dissatisfaction. So in termination failure the aspect of stakeholder's expectations can not be waved out.

# Appendix-A1

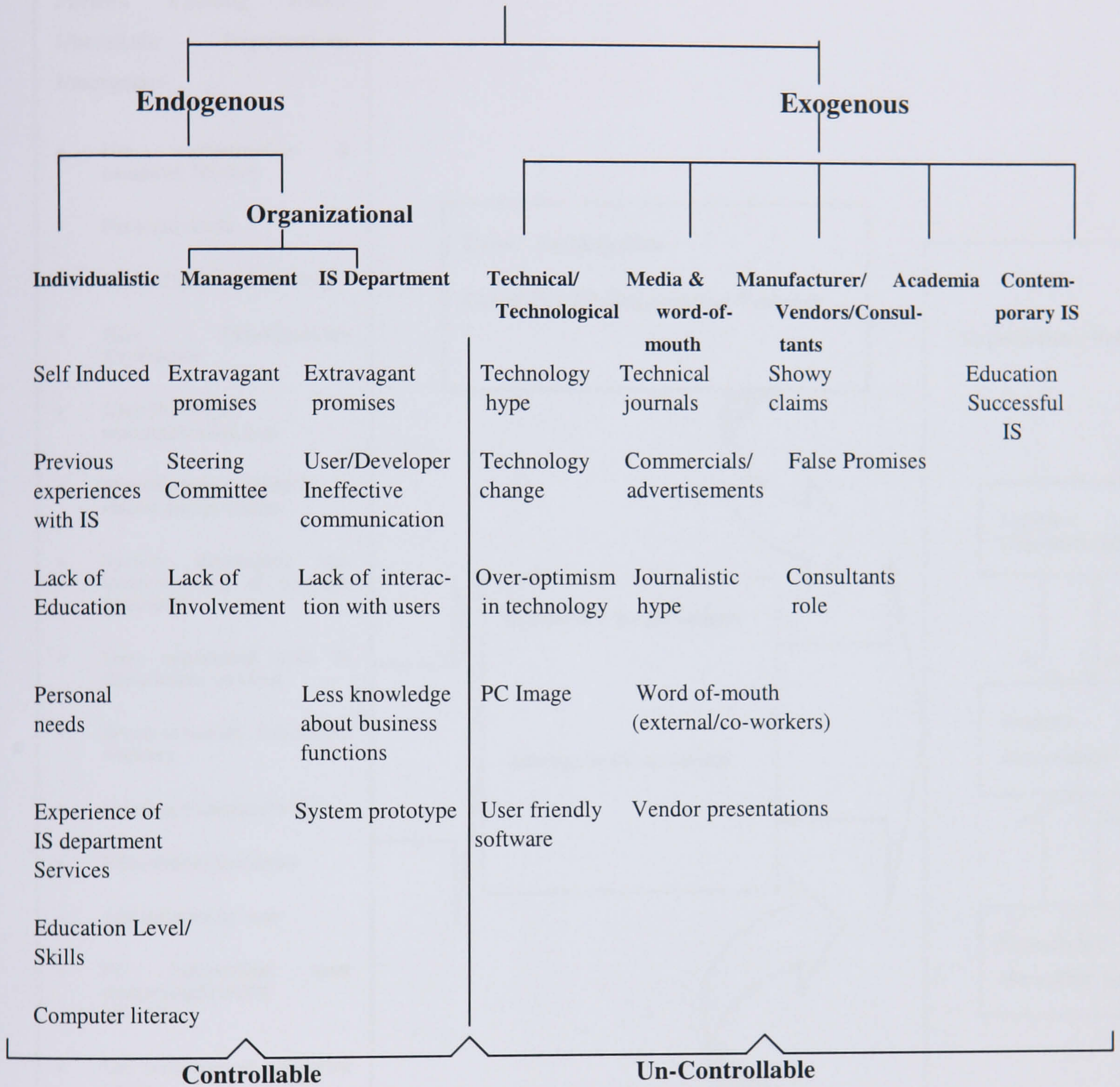
(For references, see appendix-F)

Authors	Unrealistic Expectations Reasons																				
	User Sophistication & Computer Literacy	Personal Needs	Lack of system knowledge	User Experience/In-Experience	User-developer Communication Gap & Lack of Interaction	Manufacturer/Vendor/Representative claims & promises	Developers Un-Understanding about Business Functions	User Experience with IS Department Services	Developers/IS department Promises	Word-of-Mouth Friends/Co-Workers	Steering Committee's Role	Educational Institutes	Self Induced by Users	PC Impact/EUC/User friendly software	User Lack/Level of Education & Skill	Lack of Management Involvement	Media/Journals/Journalistic Hype	Consultants' Role	Technology Hype	IS Environment	System Prototyping
Ginzberb (1981)				✓																	
Lyytinen (1988a)			✓										✓								
Ein-Dor & Segev (1978)						✓						✓									
Ramamurthy et al. (1992)			✓																		
Marcolin (1994)	✓		✓												✓		✓				
Kaye (1990)			✓																		
Alter (1980)												✓									
Lederer & Mendelow (1989,1990)												✓									
Land (1982)												✓									
Ang & Soh (1997)													✓								
Ryker et al. (1997)		✓		✓		✓	✓		✓			✓		✓		✓					
Lucas (1974)						✓										✓					
Doll & Ahmed (1983)									✓			✓					✓	✓			
Anderson (1978)						✓	✓						✓								
Szajna & Scamell (1993)													✓								
Oz (1994)							✓														
Kim (1990)							✓														
Rushinek & Rushinek (1986a,1986b)				✓																	
Teichroew (1971)																			✓		
McBride (1997)																			✓		
Iivari & Karjalainen (1989)																					✓
Alavi (1984)																					✓
Pitt et al. (1995)	✓		✓			✓	✓								✓						
Benrad & Satir (1993)																✓					
Spreng & Olshavsky (1993)				✓																	
Morell (1988)													✓								
Kador (1991)															✓						
Suh et al. (1994)				✓																	
Watson et al. (1993)				✓																	
Hartzel & Flor (1997)		✓																			
Karten (1988)													✓								
Shorrock (1990)						✓						✓									
Bozman (1990)												✓			✓						
Bikson & Gutek (1983)			✓																		

User Unrealistic Expectations Emergence Reasons (Source: Bokhari and Paul, 2000)

**Appendix-A2**

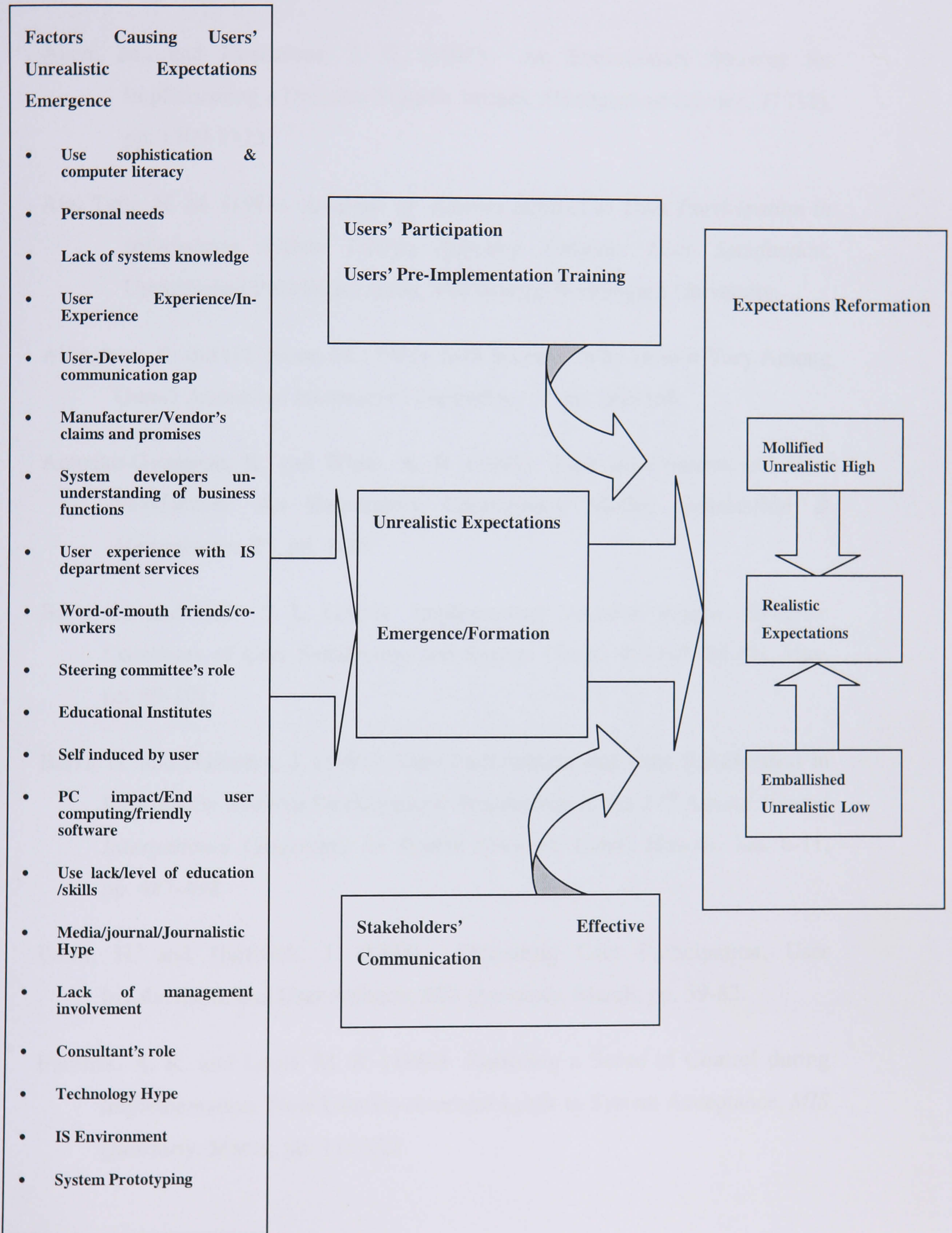
**User Unrealistic Expectation Emergence Sources**



**Taxonomy of Users Unrealistic Expectations Emergence Causes (Source: Bokhari and Paul, 2000)**



## Appendix-A3



Users' Realistic Expectation Formation Research Model

**Appendix-B.** Studies included in Meta-Analysis (The relationship between User Participation and User Satisfaction)

Alavi, M., and Henderson, J. C. (1981) An Evolutionary Strategy for Implementing a Decision Support System, *Management Science*, 27 (11), pp. 1309-1323.

Alai Tafti, H. M. (1984) *Analysis of Factors Related to User Participation in Information System Design Affecting Ultimate User Satisfaction*, Unpublished PhD Dissertation, The George Washington University.

Allingham, P. and O'Connor, M. (1992) MIS Success: Why Does it Vary Among Users? *Journal of Information Technology*, 7, pp. 160-168.

Amoako-Gyampah, K. and White, K. B. (1993) User Involvement and User Satisfaction: An Exploratory Contingency Model, *Information & Management*, 25, pp. 1-10.

Barki, H. and Huff, S. L. (1990) Implementing Decision Support Systems: Correlates of User Satisfaction and System Usage, *INFOR*, 28 (2), May, pp. 89-101.

Barki, H. and Hartwick, J. (1991) User Participation and User Involvement in Information Systems Development, *Proceedings of the 24<sup>th</sup> Annual Hawaii International Conference on System Sciences*, Kauai, Hawaii, Jan. 8-11, pp. 487-492.

Barki, H. and Hartwick, J. (1994) Measuring User Participation, User Involvement, and User Attitude, *MIS Quarterly*, March, pp. 59-82.

Baronas, A. K. and Louis, M. R. (1988) Restoring a Sense of Control during Implementation: How User Involvement Leads to System Acceptance, *MIS Quarterly*, March, pp. 111-123.

- Baroudi, J. J., Olson, M. H. and Ives, B. (1986) An Empirical Study of the Impact of User Involvement on System Usage and Information Satisfaction, *Communications of the ACM*, 29 (3), March, pp. 232-238.
- Benard, R. and Satir, A. (1993) User Satisfaction With EISs: Meeting the Needs of Executive Users, *Information Systems Management*, 10 (4), Fall, pp. 21-29.
- Blili, S., Raymond, L. and Rivard, S. (1998) Impact of Task Uncertainty, End-User Involvement, and Competence on the Success of End-User Computing, *Information & Management*, 33, pp. 137-153.
- Bruwer, P. J. S. (1984) A Descriptive Model of Success for Computer-Based Information systems, *Information & Management*, 7, pp. 63-67.
- Choe, J. (1996) The Relationship Among Performance of Accounting Information Systems, Influence Factors, and Evolution Level of Information Systems, *Journal of Management Information Systems*, 12 (4), pp. 215-239.
- Doll, W. J. and Torkzadeh, G. (1988) The Measurement of End-User Computing Satisfaction, *MIS Quarterly*, June, pp. 259-274.
- Doll, W. J. and Torkzadeh, G. (1989) A Discrepancy Model of End-User Computing Involvement, *Management Science*, 35 (10), pp. 1151-1171.
- Doll, W. J. and Torkzadeh, G. (1990) The Measurement of End-User Software Involvement, *Omega, Int. J. Mgmt Sci.*, 18 (4), pp. 399-406.
- Doll, W. J. and Torkzadeh, G. (1991) A Congruence Construct of User Involvement, *Decision Sciences*, 22 (4), pp. 443-453.
- Doll, W. J. and Deng, X. (1999) Should End-Users Participate as Much as They Want in The Development of Collaborative Applications?, *Proceedings of the 32<sup>nd</sup> Hawaii International Conference on System Sciences*, January 5-8,

Maui, Hawaii, (Abstract available on page 5), (Full text, 'cladc02.pdf', Available on CD).

Edstrom, A. (1977) User Influence and the Success of MIS Projects: A Contingency Approach, *Human Relations*, 30 (7), pp. 589-607.

Ein-Dor, P. and Segev, E. (1986) Attitudes, Association and Success of MIS: Some Empirical Results from Research in the Context of a Business Gam, *The Computer Journal*, 29 (3), pp. 212-221.

Farhoomand, A. F. and Drury, D. H. (1996) Factors Influencing Electronic Data Interchange Success, *Data Base*, 27 (1), pp. 45-57.

Foster, S. T. and Franz, C. R. (1999) User Involvement During Information Systems Development: A Comparison of Analyst and User Perceptions of System Acceptance, *Journal of Engineering and Technology management*, 16, pp. 329-348.

Franz, C. R. (1979) *Contingency Factors Affecting the User Involvement Role in the Design of Successful Information Systems*, Unpublished PhD Dissertation, The University of Nebraska, Lincoln.

Franz, C. R. and Robey, D. (1986) Organizational Context, User Involvement, and The Usefulness of Information Systems, *Decision Sciences*, 17, pp. 329-356.

Fuerst, W. L. and Cheney, P. H. (1982) Factors Affecting the Perceived Utilization of Computer-Based Decision Support Systems in the Oil Industry, *Decision Sciences*, 13 (4), pp. 554-569.

Gallagher, C. A. (1974) Perceptions of the Value of a Management Information Systems, *Academy of Management Journal*, 17 (1), pp. 46-55.

Garrity, E. J. (1994) User Participation, Management Support and System Types, *Information Resources Management Journal*, 7 (3), pp. 34-42.

- Garrity, E. J., Cerveney, R. P. and Sanders, G. L. (1995) User Participation and Problem-Solving in Systems Development, *Journal of Management Systems*, 7 (2), pp. 61-78.
- Ginzberg, M. J. (1981) Early Diagnosis of MIS Implementation Failure: Promising Results and Unanswered Questions, *Management Science*, 27 (4), pp. 459-478.
- Grover, V. and Teng, T. C. (1994) Facilitating the Implementation of Customer-Based inter-Organizational Systems: An Empirical Analysis of Innovation and Support Factors, *Information Systems Journal*, 4, pp. 61-89.
- Guimaraes, T. (1993) Exploring the Determinants of Imaging Systems Success, *Proceedings of the 26<sup>th</sup> Hawaii International Conference on System Sciences*, Wailea, Hawaii, January. 5-8, pp. 558-567.
- Guimaraes, T. and McKeen, J. D. (1993) User Participation in Information System Development: Moderation in All Things, *IFIP Transactions A: Computer Science & Technology, Human, Organizational, and Social Dimensions of Information Systems Development (A-24)*, IFIP WG8.2, Working Group, Noordwijkerhout, Neitherlands, May 17-19, pp. 171-192.
- Guimaraes, T. and McKeen, J. D. (1995) Successful Strategies for User Participation in Systems Development, *Proceedings of the 3<sup>rd</sup> European Conference on Information Systems*, June 1-3, Athens, Greece.
- Guimaraes, T. and Yoon, Y. (1996) Testing the Success Factors for ES Using Business Process Innovation, *Proceedings of the 4<sup>th</sup> European Conference on Information Systems*, Lisbon / Portugal, July 2-4, pp. 749-766.
- Guimaraes, T., Yoon, Y. and Clevenson, A. (1997) Empirically Testing ES Success Factors in Business Process Reengineering, *International Journal of Production Economics*, 50, pp. 245-259.
- Guimaraes, T., Igarria, M., and Lu, M. (1992) The Determinants of DSS Success: An Integrated Model, *Decision Sciences*, 23, pp. 409-430.

- Guimaraes, T., Yoon, Y. and Clevenson, A. (1996) Factors Important to Expert Systems Success: A Field Test, *Information & Management*, 30, pp. 119-130.
- Hardgrave, B. C., Wilson, R. K., and Eastman, K. (1999) Toward a Contingency Model for Selecting an Information System Prototyping Strategy, *Journal of Management Information Systems*, 16 (2), pp. 113-136.
- Hartwick, J. and Barki, H. (1994) Explaining the Role of User Participation in Information System Use, *Management Science*, 40 (4), pp. 440-465.
- Hawk, S. R. and Aldag, R. J. (1990) Measurement Biases in User Involvement Research, *Omega, Int. J. of Mgmt Sci.*, 18 (6), pp. 605-613.
- Hawk, S. R. and Dos Santos, B. L. (1991) Successful System Development: The Effect of Situational Factors on Alternate User Roles, *IEEE Transactions on Engineering Management*, 38 (4), November, pp. 316-327.
- Hawk, S. R. (1993) The Effects of User Involvement: Some Personality Determinants, *International Journal of Man-Machine Studies*, 38, pp. 839-855.
- Hunton, J. E. and Price, K. H. (1997) Effects of User Participation Process and Task Meaningfulness on Key Information System Outcome, *Management Science*, 43 (6), pp.797-812.
- Igbaria, M. and Nachman, S. A. (1990) Correlates of User Satisfaction With End User Computing, *Information & Management*, 19, pp. 73-82.
- Igbaria, M. and Guimaraes, T. (1994) Empirically Testing the Outcome of User Involvement in DSS Development, *Omega, Int. J. Mgmt Sci.*, pp. 157-172.
- Igersheim, R. H. (1976) Managerial Response to an Information System, *Proceedings of the AFIPS, National Computer Conference*, June 7-10, New York, pp. 877-882.

- Iivari, J. (1995) Factors Affecting Perceptions of CASE Effectiveness, *European Journal of Information Systems*, 4, pp. 143-158.
- Jackson, C. M. (1992) *The Influence of User Involvement and Other Variables on Behavioral Intention to Use An Information Systems*, Unpublished PhD Dissertation, College of Business Administration, University of South Carolina.
- Jackson, C. M., Simeon, C. and Leitch, R. A. (1997) Toward an Understanding of the Behavioral Intention to Use an Information System, *Decision Sciences*, 28 (2), pp. 357-389.
- Jiang, J. J., Muhanna, W. A. and Klein, G. (2000) User Resistance and Strategies for Promoting Acceptance Across System Types, *Information & Management*, 37, pp. 25-36.
- Jarvenpaa, S. L. and Ives, B. (1991) Executive Involvement and Participation in the Management of Information technology, *MIS Quarterly*, June, pp. 205-227.
- Joshi, K., Bostrom, R. P. and Perkins, R. P. (1986) Some New Factors Influencing User Information Satisfaction: Implications for Systems Professionals, *Proceedings of the 22<sup>nd</sup> Annual Computer Personnel Research Conference on Computer Personnel Research Conference*, October 16-17, pp. 27-42.
- Joshi, K. (1990) An Investigation of Equity as a Determinant of User Information Satisfaction, *Decision Sciences*, 21 (4), pp. 786-807.
- Joshi, K. (1992) A Causal Path Model of the Overall User attitudes Toward the MIS Function: The Case of User Information Satisfaction, *Information & Management*, 22, pp. 77-88.
- Kaiser, K. M. and Srinivasan, A. (1980) The Relationship of User Attitudes Toward Design Criteria and Information Systems Success. *12<sup>th</sup> Annual Meeting AIDS Proceedings, National AIDS Conference*, pp. 201-203.

- Kappelman, L. A. and McLean, E. R. (1991) The Respective Roles of User Participation and User Involvement in Information System Implementation Success, *Proceedings of the 12<sup>th</sup> International Conference on Information Systems*, December 16-18, New York, pp. 339-349.
- Kappelman, L. A. (1995) Measuring User Involvement: A diffusion of Innovation Perspective, *Data Base*, 26 (2 & 3), May/August, pp. 65-83.
- Khalil, O. E. M. and Elkordy, M. M. (1997) The Relationship of Some Personal and Situational Factors to IS Effectiveness: Empirical Evidence From Egypt, *Journal of Global Information Management*, 5 (2), pp. 22-34.
- Kim, E. and Lee, J. (1986) An Exploratory Contingency Model of User Participation and MIS Use, *Information & Management*, 11, pp. 87-97.
- Kim, K. K. (1990) Task Characteristics, Decentralization, and the Success of Hospital Information Systems, *Information & Management*, 19, pp. 83-93.
- King, W. R. and Rodriguez, J. I. (1981) Participative Design of Strategic Decision Support Systems: An Empirical Assessment, *Management Science*, 27 (6), pp. 717-726.
- King, W. R. and Lee, T. (1991) The Effects of User Participation on System Success: Toward a Contingency Theory of User Satisfaction, *Proceedings of the 12<sup>th</sup> International Conference on Information Systems*, December 16-18, New York, pp. 327-338.
- Kivijarvi, H. and Zmud, R. W. (1993) DSS Implementation Activities, Problem Domain Characteristics and DSS Success, *European Journal of Information Systems*, 2 (3), pp. 159-168.
- Koh, H. L. and Lawrence, M. J. (1988) Effects of User Involvement and Top Management Support on MIS success, *Proceedings of the Australian Computer Conference*, Australian Computer Society, Sydney, September 21-23, pp. 419-343.



- Lawrence, M. and Low, G. (1993) Exploring Individual User Satisfaction within User-Led Development, *MIS Quarterly*, June, pp. 195-208.
- Leonard-Barton, D. and Sinha, D. K. (1993) Developer-User Interaction and User Satisfaction in Internal Technology Transfer, *Academy of Management Journal*, 36 (5), pp. 1125-1139.
- Lin, W. T., and Shao, B. B. M. (2000) The Relationship Between User Participation and System Success: A Simultaneous Contingency Approach, *Information & Management*, 37, pp. 283-295.
- Lu, H. and Wang, J. (1997) The Relationship Between Management Styles, User Participation, and System Success Over MIS Growth Stages, *Information & Management*, pp. 203-213.
- Lucas, H. C. (1975) *Why Information Systems Fail*, Columbia University Press, New York.
- Magal, S. R. (1991) A Model for Evaluating Information Center Success, *Journal of Management Information Systems*, 8 (1), pp. 91-106.
- Mahmood, M. A. and Medewitz, J. N. (1985) Impact of Decision Methods on Decision Support Systems Success: An Empirical Assessment, *Information and Management*, 9, pp. 137-151.
- Maish, A. M. (1979) A User's Behavior Towards His MIS, *MIS Quarterly*, 3 (1), pp. 39-52.
- McKeen, J. d., Guimaraes, T. and Wetherbe, J. C. (1994) The Relationship Between User Participation and User satisfaction: An Investigation of Four Contingency Factors, *MIS Quarterly*, 18 (4), December, pp. 427-451.
- McKeen, J. D. and Guimaraes, T. (1997) Successful Strategies for User Participation in Systems Development, *Journal of Management Information Systems*, 14 (2), pp. 133-150.

- McQueen, T. J. (1995) *An Investigation of the Relationship Between End-User Involvement and End-User Satisfaction in the Design and Implementation of Computer-Based Information Systems*, Unpublished PhD Dissertation, Nova Southeastern University.
- Momcilovich, H. M. (1987) *The Relationship Between User Involvement and Decision Support System Success*, Unpublished PhD Dissertation, University of Georgia.
- Montazemi, A. R. (1988) Factors Affecting Information Satisfaction in the Context of the Small Business Environment, *MIS Quarterly*, June, pp. 239-256.
- Nath, R. (1989) Are Frequent Computer Users More Satisfied, *Information Processing & Management*, 25 (5), pp. 557-562.
- Nicholas, P. and O'Connor, M. (1990) Variations in User Satisfaction With MIS, *Proceedings of the 23<sup>rd</sup> Hawaii International Conference on System Sciences*, January, IEEE, Los Alamitos, CA, pp. 479-487.
- Olson, M. H. and Ives, B (1981) User Involvement in System Design: An Empirical Test of Alternative Approaches, *Information & Management*, 4, pp. 183-195.
- Page, S. M. (1998) *IT Impact: A Census of Leading UK Companies*, Unpublished Mphil Thesis, School of Management, Leeds, Metropolitan University, UK.
- Park, S. W., Jih, K. and Roy, A. (1993/1994) Success of Management Information Systems: An Empirical Investigation, *Journal of Computer Information Systems*, 34, Winter, pp. 33-37.
- Powers, R. F. and Dickson, G. W. (1973) MisProject Management: Myths, Opinions, and Reality, *California Management Review*, 15 (3), pp. 147-156.

- Ravichandran, T. and Rai, A. (1999) Total Quality Management in Information Systems Development: Key Construct and Relationships, *Journal of Management Information Systems*, 16 (3), Winter, pp. 119-155.
- Raymond, L. (1987) Validating and Applying User Satisfaction as a Measure of MIS Success in Small Organizations, *Information & Management*, 12, pp. 173-179.
- Roth, L. M. (1994) *The Relationship Between User Participation in the Development of An Information System and User Satisfaction*, Unpublished PhD Dissertation, Utah State University, Logan, Utah.
- Roth, L. and Bartholome, L. (1994) The Relationship Between User Participation in Systems Development and User Satisfaction, *Journal of Computer Information systems*, 35 (1), Fall, pp. 7-12.
- Ryker, R. E. (1994) *Measuring User Satisfaction as a Function of the Gap between Users' Perception of Information Systems' Performance and User Expectations*, Unpublished PhD Dissertation, University of Memphis.
- Ryker, R., Nath, R. and Henson, J. (1997) Determinants of Computer User Expectations and Their Relationships With User Satisfaction: An Empirical Study, *Information Processing & Management*, 33 (4), pp. 529-537.
- Saarinen, T. and Sääksjärvi, M. (1990) The Missing Concepts of User Participation: An Empirical Assessment of User Participation and Information System Success, *Scandinavian Journal of Information Systems*, 2, pp. 25-42.
- Saarinen, T. (1996) An Expanded Instrument for Evaluating Information System Success, *Information & Management*, 31, pp. 103-118.
- Saleem, N. (1996) An Empirical Test of the Contingency Approach to User Participation in Information systems Development, *Journal of Management Information Systems*, 13 (1), pp. 145-166.

- Sartore, A. (1976) *Implementing a Management Information System: The Relationship of Participation, Knowledge, Performance and Satisfaction in an Academic Environment*, Unpublished PhD Dissertation, University of California, Irvine.
- Schewe, C. D. (1976) The Management Information System User: An Exploratory Behavioral Analysis, *Academy of Management Journal*, 19 (5), pp. 577-590.
- Seddon, P. and Kiew, M. (1994) A Partial Test and Development of the DeLone and Mclean Model of IS Success, *Proceedings of the 15<sup>th</sup> International Conference on Information Systems*, December, 14-17, Canada, pp. 99-110.
- Sioukas, A. V. (1995) User Involvement for Effective Customization: An Empirical study on Voice Networks, *IEEE Transactions on Engineering Management*, 42 (1), February, pp. 39-49.
- Srivihok, A. (1999) Understanding Executive Information Systems Implementation: An Empirical Study of EIS Success Factors, *Proceedings of the 32<sup>nd</sup> Hawaii International Conference on System Sciences*, January 5-8, Maui, Hawaii, (Abstract available on page 259), (Full text, 'osmt01.pdf', Available on CD).
- Stefanou, C. J. (1999) User Information Satisfaction (UIS) and Accounting Information Systems (AIS): Findings from a Survey, *Proceedings of the 6<sup>th</sup> European Conference on Information Technology Evaluation*, November 4-5, St. John's House, Brunel University, UK, pp. 315-324.
- Swanson, E. B. (1974) Management Information Systems: Appreciation and Involvement, *Management Science*, 21 (2), pp. 178-188.
- Tait, P. and Vessey, I. (1988) The Effect of User Involvement on System Success: A Contingency Approach, *MIS Quarterly*, 12 (1), March, pp. 91-108.

- Torkzadeh, G. and Doll, W. J. (1999) The Development of a Tool for Measuring the Perceived Impact of Information Technology on Work, *Omega, Int. J. Mgmt Sci.*, pp. 327-339.
- Vanlommel, E. and De Brabander, B. (1975) The Organization of Electronic Data Processing (EDP) Activities and Computer Use, *Journal of Business*, 48 (2), pp. 391-410.
- Vogel, F. G. (1989) Gebruikersparticipatie En Acceptatie, *Informatie Jaargang*, 31 (11), pp. 856-861.
- Wilkins, M. (1996) Determinants of Microcomputer Usage in the Republic of Ireland, *Journal of End User Computing*, 8 (4), pp. 3-9.
- Wong, B. K. (1990) *The Moderating Influence of User Characteristics on the Relationship Between User Involvement and Perceived Usefulness of Information Systems*, Unpublished PhD Dissertation, Mississippi State University.
- Yap, C. S., Soh, C. P. P. and Raman, K. S. (1992) Information Systems Success Factors in Small Business, *Omega Int. J. of Mgmt Sci.*, 20 (5/6), pp. 597-609.
- Yoon, Y., Guimaraes, T. and O'Neal, Q. (1995) Exploring the Factors Associated With Expert Systems Success, *MIS Quarterly*, March, pp. 83-106.
- Yoon, Y. and Guimaraes, T. (1995) Assessing Expert Systems Impact on Users' jobs, *Journal of Management Information Systems*, 12 (1), pp. 225-249.
- Zinkhan, G. M., Joachimsthaler, E. A. and Kinnear, T. C. (1987) Individual Differences and Marketing Decision Support System Usage and Satisfaction, *Journal of Marketing Research*, XXIV, May, pp. 208-214.

**Appendix-C. Studies used in the Meta-Analysis (The relationship between User Expectations and User Satisfaction)**

Barki, H. and Huff, S. L. (1985) Change, Attitude to Change, and Decision Support Systems Success, *Information & Management*, 9, pp. 261-268.

Barki, H. (1990) Determinants of User Satisfaction Judgements in Information Systems, *Proceedings of the 23<sup>rd</sup> Hawaii International Conference on System Sciences*, Kailua-Kona, Hawaii, January 2-5, pp. 408-417.

Compeau, D., Higgins, C. A. and Huff, S. (1999) Social Cognitive Theory and Individual Reactions to Computing Technology: A Longitudinal Study, *MIS Quarterly*, 23 (2), June, pp. 145-158.

Galletta, D. F., Ahuja, M., Hartman, A., Teo, T. and Peace, A. G. (1995) Social Influence and End-User Training, *Communications of the ACM*, 38 (7), pp. 70-79.

Ginzberg, M. J. (1981) Early Diagnosis of MIS Implementation Failure: Promising Results and Unanswered Questions, *Management Science*, 27 (4), pp. 459-469.

Henry, J. W. and Martinko, M. J. (1997) An Attributional Analysis of the Rejection of Information Technology, *Journal of End User Computing*, 9 (4), pp. 3-17.

Kahai, S. S., Solieri, S. A. and Felo, A. J. (1998) Active Involvement, Familiarity, Framing, and the Illusion of Control During Decision Support System Use, *Decision Support Systems*, 23, pp. 133-148

Lawrence, M. and Low, G. (1993) Exploring Individual User Satisfaction Within User-Led Development, *MIS Quarterly*, June, pp. 195-208.

Loh, L. and Ong, Y. (1998) The Adoption of Internet-based Stock Trading: A Conceptual Framework and Empirical Results, *Journal of Information Technology*, 13, pp. 81-94.

- Marcolin, B. L. (1994) *The Impact of Users' Expectations on the Success of Information Technology Implementation*, Unpublished PhD Dissertation, The University of Western Ontario, London, Ontario.
- Palvia, P. C. (1996) A Model and Instrument for Measuring Small Business User Satisfaction With Information Technology, *Information & Management*, 31, pp. 151-163.
- Rushinek, A. and Rushinek, S. F. (1986) The Influence of Troubleshooting, Education, and Documentation on Computer User Satisfaction, *IEEE Transactions on Systems, Man, and Cybernetics*, Vol. SMC-16, No. 1, January/February, pp. 165-168.
- Ryker, R. and Nath, R. and Henson, J. (1997) Determinants of Computer User Expectations and Their Relationships With User Satisfaction: An Empirical Study, *Information Processing & Management*, 33 (4), pp. 529-537.
- Spreng, R. A., Mackenzie, and Olshavsky (1996) A Reexamination of the Determinants of Consumer Satisfaction, *Journal of Marketing*, 60, pp. 15-32.
- Szajna, B. and Scamell, R. W. (1993) The Effects of Information System User Expectations on Their Performance and Perceptions, *MIS Quarterly*, 17 (4), December, pp. 493-516.
- Udo, G. J., and Guimaraes, T. (1994) Empirically Assessing Factors Related to DSS Benefits, *European Journal of Information Systems*, 3 (3), pp. 218-227.
- Yoon, Y., Guimaraes, T. and O'Neal, Q. (1995) Exploring the Factors Associated with Expert Systems Success, *MIS Quarterly*, March, pp. 83-106.

**Appendix-D. Studies used in the Meta-Analysis (The relationship between Effective Communication and User Satisfaction)**

Ebadi, Y. M. and Utterback, J. M. (1984) The Effect of Communication on Technological Innovation, *Management Science*, 30 (5), pp. 572-585.

Edstrom, A. (1977) User Influence and the Success of MIS Projects: A Contingency Approach, *Human Relations*, 30 (7), pp. 589-607.

Guimaraes, T. and McKeen, J. D. (1993) User Participation in Information System Development: Moderation in All Things, *IFIP Transactions A; Computer Science & Technology*, Vol. A-24, pp. 171-192. (Human, Organizational, and Social Dimensions of Information Systems Development, IFIP WG8.2, Working Group, Neither Lands, 17-19 May, 1993).

McKeen, J. D., Guimaraes, T. and Wetherbe, J. C. (1993) Contingency Factors Affecting User Participation and User Satisfaction: Task Complexity, System Complexity, User Influence, and User Developer Communication, *Working Paper 93-07*, March, Carlson School of Management, University of Minnesota.

Palvia, P. C. (1996) A Model and Instrument for Measuring Small Business User Satisfaction With Information Technology, *Information & Management*, 31, pp. 151-163.

Pinto, J. K. and Mantel, S. J. (1990) The Causes of Project Failures, *IEEE Transactions on Engineering Management*, 37 (4), pp. 269-276.

Raymond, L. (1987) Validating and Applying User Satisfaction as a Measure of MIS Success in Small Organizations, *Information & Management*, 12, pp. 173-179.

Sartore, A. (1976) *Implementing A Management Information System: The Relationship of Participation, Knowledge, Performance and Satisfaction in*



*an Academic Environment*, Unpublished PhD Dissertation, University of California, Irvine.

Srivihok, A. (1999) Understanding Executive Information Systems Implementation: An Empirical study of EIS Success Factors, *Proceedings of the 32<sup>nd</sup> Annual Hawaii International Conference on Systems Sciences*, January 5-8, Maui, Hawaii, pp. 259. (Full Paper CD-ROM, "osmtd01.pdf")

Udo, G. (1992) Rethinking the Effectiveness Measures of Decision Support Systems, *Information & Management*, 22, pp. 123-135.

Young, D. and Watson, H. J. (1995) Determinates of EIS Acceptance, *Information & Management*, 29, pp. 153-164.

**Appendix-E.** Studies included in Meta-Analysis (The relationship between System Usage and User Satisfaction)

Amoroso, D. and Cheney, P. (1991) Testing the Casual Model of End-User Application Effectiveness, *Journal of Management Information Systems*, 8(1), pp. 63-89.

Ang, J. and Soh, P. H. (1997) User Information Satisfaction, Job Satisfaction and Computer Background: An Exploratory Study, *Information & Management*, 32, pp. 255-266.

Barki, H. and Huff, S. L. (1985) Change, Attitude to Change, and Decision Support Systems Success, *Information & Management*, 9, pp. 261-268.

Barki, H. and Huff, S. L. (1990) Implementing Decision Support Systems: Correlates of User Satisfaction and System Usage, *INFOR*, 28 (2), pp. 89-101.

Baroudi, J. J., Olson, M. H. and Ives, B. (1986) An Empirical Study of the Impact of User Involvement on System Usage and Information Satisfaction, *Communications of the ACM*, 29 (3), pp. 232-238.

Bergeron, F., Raymond, L., Rivard, S. and Gara, M. (1995) Determinants of EIS Use: Testing A Behavioral Model, *Decision Support Systems*, 14, pp. 131-146.

Bergeron, F. Raymond, L., Rivard, S. and Gara, M. (1995) Understanding EIS Use: An Empirical Test of a Behavioral Model, *Proceedings of the 25<sup>th</sup> Hawaii International Conference on System Sciences*, Kauai-Hawaii, Jan. 7-10, pp. 157-165.

Cheney, P. H., and Dickson, G. W. (1982) Organizational Characteristics and Information Systems: An Exploratory Investigation, *Academy of Management Journal*, 25 (1), pp. 170-184.

- Choe, J. (1998) The Effects of User Participation on the Design of Accounting Information Systems, *Information & Management*, 34, pp. 185-198.
- Conrath, D. W. and Sharma, R. S. (1993) Evaluation Measures for Computer-Based Information Systems, *Computers in Industry*, 21, pp. 267-271.
- Ein-Dor, P., Segev, E., and Steinfeld (1981) Use of Management Information Systems: An Empirical Study, *Proceedings of the 2<sup>nd</sup> International Conference on Information Systems*, Cambridge, Mass, December, pp. 215-227.
- Ein-Dor, P., Segev, E., Blumenthal, D. and Millet, I. (1984) Perceived Importance, Investment and Success of MIS, or MIS the Zoo, *Systems, Objectives, Solutions*, 4, pp. 61-67.
- Ein-Dor, P. and Segev, E. (1986) Attitudes, Association and Success of MIS: Some Empirical Results from Research in the Context of a Business Game, *The Computer Journal*, 29 (3), pp. 212-221.
- Ettema, J. S. (1985) Explaining Information System Use with Systems-Monitored vs. Self-Reported Use Measure, *The Public Opinion Quarterly*, 49 (3), pp. 381-387.
- Gelderman, M. (1998) The Relationship Between User Satisfaction, Usage of Information Systems and Performance, *Information & Management*, 34, pp. 11-18.
- Guimaraes, T., and Igarria, M. (1997) Assessing User Computing Effectiveness: An Integrating Model, *Journal of End User Computing*, 9 (2), pp. 3-14.
- Guimaraes, T., Yoon, Y. and Clevenson (1996) Factors Important to Expert Systems Success: A Field Study, *Information & Management*, 30, pp. 119-130.
- Harrison, A. W. and Rainer, R. K. (1996) A General Measure of User Computing Satisfaction, *Computers in Human Behavior*, 12 (1), pp. 79-92.

- Igbaria, M. (1990) End-User Computing Effectiveness: A Structural Equation Model, *Omega, Int. j. of Mgmt Sci.*, 18 (6), pp. 637-652.
- Igbaria, M. and Nachman, S. A. (1990) Correlates of User Satisfaction With End User Computing, *Information & Management*, 19, pp. 73-82.
- Igbaria, M. and Zviran, M. (1991) End-User Effectiveness: A Cross-Cultural Examination, *Omega, Int. J. of Mgmt Sci.*, 19 (5), pp. 369-379.
- Igbaria, M. and Guimaraes, T. (1994) Empirically Testing the Outcome of User Involvement in DSS Development, *Omega, Int. J. of Mgmt Sci.*, 22 (2), pp. 157-172.
- Igbaria, M., Schiffman, S. J., and Wieckowski, T. J. (1994) The Respective Roles of Perceived Usefulness and Perceived Fun in the Acceptance of Microcomputer Technology, *Behaviour & Information Technology*, 13 (6), pp. 349-361.
- Igbaria, M. and Tan, M. (1997) The Consequences of Information Technology Acceptance on Subsequent Individual Performance, *Information & Management*, 32, pp. 113-121.
- Khalil, O. E. M. and Elkordy, M. M. (1999) The Relationship Between User Satisfaction and Systems Usage: Empirical Evidence from Egypt, *Journal of End User Computing*, 11 (2), pp. 21-28.
- Kim, C., Suh, K. and Lee, J. (1998) Utilization and User Satisfaction in End-User Computing: A Task Contingent Model, *Information Resources Management Journal*, 11 (4), pp. 11-24.
- Kivijarvi, H. and Zmud, R. W. (1993) DSS Implementation Activities, Problem Domain Characteristics and DSS Success, *European Journal of Information Systems*, 2 (3), pp. 159-168.
- Lawrence, M. and Low, G. (1993) Exploring Individual User Satisfaction Within User-Led Development, *MIS Quarterly*, June, pp. 195-208.

- Lee, S. M., Kim. Y, R. and Lee, J. (1995) An Empirical Study of the Relationships Among End-User Information Systems Acceptance, Training, and Effectiveness, *Journal of Management Information Systems*, 12 (2), pp. 189-202.
- Leidner, D. E. (1996) Modern Management in the Developing World: The Success of EIS in Mexican Organizations, *Proceedings of the 17<sup>th</sup> International Conference Information Systems*, December 16-18, Cleveland Ohio, pp. 290-306.
- Liang, T. P. (1986) Critical Success Factors of Decision Support Systems: An Experimental Study, *Data Base*, 17 (2), Winter, pp. 3-16.
- Loh, L. and Ong, Y (1998) The Adoption of Internet-Based stock trading: A Conceptual Framework and Empirical Results, *Journal of Information Technology*, 13, 81-94.
- Maish, M. A. (1979) A User's Behavior Toward His MIS, *MIS Quarterly*, 3 (1), pp. 39-52.
- Mawhinney, C. H. (1990) A Study of Computer Use by Knowledge Workers: User Satisfaction Versus System Use, *Proceedings Annual Meeting of Decision Sciences Institute*, SAN DIEGO, CA, pp. 954-956.
- Mawhinney, C. H. and Lederer, A. L. (1990) A Study of Personal Computer Utilization by Managers, *Information & Management*, 18, pp. 243-253.
- McGill, T. J., Hobbs, V. H. and Klobas, J. E. (2000) Testing the Delone and McLean Model of IS Success in the User Developed Application Domain, *Proceedings of the 11<sup>th</sup> Australasian Conference on Information Systems*, Brisbane, 6-8 December, 2000, pp. 56 (Abstract, Full paper on CD).
- Nath, R (1989) Are Frequent Computer Users More Satisfied?, *Information Processing & Management*, 22 (50), pp. 557-562.

- Raymond, L. (1985) Organizational Characteristics and MIS Success in the Context of Small Business, *MIS Quarterly*, March, pp. 37-52.
- Raymond, L. (1990) Organizational Context and Information Systems Success: A Contingency Approach, *Journal of Management Information Systems*, 6 (4), pp. 5-20.
- Robey, D. (1979) User Attitudes and Management Information System Use, *Academy of Management Journal*, 22 (3), pp. 527-538.
- Saarinen, T. (1996) An Expanded Instrument for Evaluating Information Systems Success, *Information & Management*, 31, pp. 103-118.
- Sanders, G. L. and Courtney, J. F. (1985) A Field Study of Organizational Factors Influencing DSS Success, *MIS Quarterly*, 9 (1), March, pp. 77-93.
- Sanders, G. L. (1983) *A Field Study of Organizational Factors Affecting DSS Implementation*, Unpublished PhD Dissertation, Texas Tech. University.
- Seddon, P. B. and Kiew, M. (1996) A Partial Test and Development of Delone and McLean Model of IS Success, *Australian Journal of information Systems*, 4 (1), pp. 90-109.
- Schewe, C. D. (1976) The Management Information System User: An Exploratory Behavioral Analysis, *Academy of Management Journal*, 19 (4), pp. 577-590.
- Snitkin, S. R. and King, W. R. (1986) Determinants of the Effectiveness of Personal Decision Support Systems, *Information & Management*, 10, pp. 83-89.
- Srinivasan, A. (1985) Alternative Measures of System Effectiveness: Associations and Implications, *MIS Quarterly*, 9 (3), pp. 243-253.

- Suh, K., Kim, S. and Lee, J. (1994) End-User's Disconfirmed Expectations and the Success of Information Systems, *Information Resources Management Journal*, Fall, pp. 30-39.
- Torkzadeh, G. and Doll, W. J. (1999) The Development of a Tool for Measuring the Perceived Impact of Information Technology on Work, *Omega, Int. J. Mgmt. Sci.*, 27, pp. 327-339.
- Udo, G. (1992) Rethinking the Effectiveness Measures of Decision Support Systems, *Information & Management*, 22, pp. 123-135.
- Udo, G. J. and Guimaraes, T. (1994) Empirically Assessing Factors Related to DSS Benefits, *European Journal of Information Systems*, 3 (3), pp. 218-227.
- Vlahos, G. E. and Ferratt, T. W. (1995) Information Technology Use by Managers in Greece to Support Decision Making: Amount, Perceived Value, and Satisfaction, *Information and Management*, 29, pp. 305-315.
- Wilkins, M. (1996) Determinants of Microcomputer Usage in the Republic of Ireland, *Journal of End User Computing*, 8 (4), pp. 3-9.
- Winter, S. J., Chudoba, K. M. and Gutek, B. a. (1998) Attitudes towards Computers: When Do They Predict Computer Use?, *Information & Management*, 34, pp. 275-284.
- Yoon, Y. and Guimaraes, T. (1995) Assessing Expert Systems Impact on Users' Jobs, *Journal of Management Information Systems*, 12 (1), pp. 225-49.
- Zinatelli, N. (1994) *End User Computing Success Factors in Small Firms: A Case Study and Survey of factors Affecting EUC Success in Small Firms in New Zealand*, Unpublished PhD Dissertation, University of Canterbury.
- Zinkhan, G. M., Joachimsthaler, E. A., and Kinnear, T. C. (1987) Individual Differences and Marketing Decision Support System Usage and Satisfaction, *Journal of Marketing Research*, Vol. XXIV, pp. 208-214.

**Appendix-F.** Studies included in exploring User Unrealistic Expectation Emergence Reasons

Alter, S. (1980) *Decision Support Systems: Current Practice and Continuing Challenges*, Addison-Wesley, Reading, Mass.

Alavi, M. (1984) An Assessment of the Prototyping Approach to Information Systems Development, *Communications of the ACM*, 27 (6), pp. 556– 563.

Anderson, W. S. (1978) The Expectation Gap, *Journal of Systems Management*, 29 (6), pp. 6-10.

Ang, J. and Soh, P. H. (1997) User Information Satisfaction, Job Satisfaction and Computer Background: An Exploratory Study, *Information & Management*, 32, pp. 255-266.

Benrad, R. and Satir, A. (1993) User Satisfaction With EISs: Meeting the Needs of Executive Users, *Information Systems Management*, 10 (4), Fall, pp. 21-29.

Bikson, T. K. and Gutek, B. A. (1983) Advanced Office Systems An Empirical Look at Use and Satisfaction, *Proceedings National Computer Conference*, pp. 319-328.

Bozman, J. S. (1990) Coming to Grips with Downsizing, *Computerdata*, 15 (9), September, pp. 26.

Doll, W. J. and Ahmed, M. U. (1983) Managing User Expectations, *Journal of Systems Management*, 34(6), pp. 6-11.

Ein-Dor, P. and Segev, E. (1978) Organizational Context and the Success of Management Information System, *Management Science*, 24 (10), pp. 1064-1077.

Ginzberg, M. J. (1981) Early Diagnosis of MIS Implementation Failure: Promising Results and Unanswered Questions, *Management Science*, 27 (4), pp. 459-478.



- Hartzel, K. S. and Flor, P. R. (1997) Expectation Formation in the Information Systems Development Process, URL <http://hsb.baylor.edu/ramsower/acis/papers/hartzel.htm>
- Iivari, J. and Karjalainen, M. (1989) Impact of Prototyping on User Information Satisfaction During the Specification Phase, *Information & Management*, 17, pp. 31-45.
- Kador, J. (1991) New Tools To Integrate the Office, *Datamation*, February, 15, pp. 55-58.
- Karten, N. (1988) The Myth of the Sophisticated User, *Journal of Information Systems Management*, 5 (1), Winter, pp. 81-83.
- Kaye, G. R. (1990) Information Systems Success and Failure: Research Findings From the Compounding Industry, *Journal of Information Technology*, 5, pp. 73-83.
- Land, F. (1982) Adapting to Changing User Requirements, *Information & Management*, 5, pp. 59-75.
- Lederer, A. L. and Mendelow A. L. (1989) Coordination of Information Systems Plans with Business Plans, *Journal of Management Information Systems*, 6 (2), pp. 5-19.
- Lederer, A. L. and Mendelow, A. (1990) The Impact of the Environment on the Management of Information Systems, *Information Systems Research*, 1 (2), pp. 205-222.
- Lucas, H. C. (1974) *Toward Creative Systems Design*, Columbia University Press, New York.
- Lyytinen, K. (1988a) Expectation Failure Concepts and Systems Analyst's View of Information Systems Failure: Results of an Exploratory Study, *Information & Management*, 14, pp. 45-56.

- Marcolin, B. L. (1994) *The Impact of Users' Expectations on the Success of Information Technology Implementation*, Unpublished PhD Dissertation, The University of Western Ontario London, Ontario.
- McBride, N. (1997) The Rise and Fall of an Executive Information System: A Case Study, *Information Systems Journal*, 7, pp. 277-287.
- Morell, J. A. (1988) The Organizational Consequences of Office Automation: Defining Measurement Techniques, *Data Base Fall/Winter*, 19 (3/4), pp. 16-23.
- Oz, E. (1994) When Professional Standards are Lax: The Confirm Failure and its Lessons, *Communications of the ACM*, 37 (10), pp. 29-36.
- Pitt, L. F., Watson, R. T. and Kavan, C. B. 1995) Service Quality: A Measure of Information Systems Effectiveness, *MIS Quarterly*, 19 (2), pp. 173-178.
- Ramamurthy, K., King, W. R. and Premkumar, G. (1992) User Characteristics – DSS Effectiveness Linkage: An Empirical Assessment, *International Journal of Man-Machine Studies*, pp. 469-505.
- Rushinek, A. and Rushinek, S. F. (1986a) What Makes User Happy?, *Communications of the ACM*, 29 (7), pp. 594-598.
- Rushinek, A. Rushinek, S. F. (1986b) The Effects of Communication Monitors on User Satisfaction, *Information Processing & Management*, 22 (4), pp. 345-351.
- Ryker, R., Nath, R. and Henson, J. (1997) Determinants of Computer User Expectations and Their Relationships with User Satisfaction: An Empirical Study, *Information Processing & Management*, 33 (4), pp. 529-537.
- Shorrocks, W. B. (1990) End User Computing – Fad or Future, *Computerdata*, 15 (9), September, pp. 22, 26, 33.

- Spreng, R. A., and Olshavsky, R. W. (1993) A Desire Congruency Model of Consumer Satisfaction, *Journal of the Academy of Marketing Science*, 21 (3), pp. 169-77.
- Suh, K., Kim, S., and Lee, J. (1994) End-User's Disconfirmed Expectations and Success of Information Systems, *Information Resources Management Journal*, 7 (4), pp. 30-39.
- Szajna, B. and Scamell, R. W. (1993) The Effects of Information System User Expectation on Their Performance and Perception, *MIS Quarterly*, 17 (4), pp. 493-516.
- Teichroew, D. (1971) Education Related to the Use of Computers in Organizations, *Communications of the ACM*, 14 (9), pp. 573-588.
- Watson, R. T., Pitt, L. F., Cunningham, C. J. and Nel, D. (1993) User Satisfaction and Service quality of the IS Department: Closing the Gap, *Proceedings of the First European Conference on Information Systems*, March, 29-30, Henley-on-Thames, UK, pp. 341-351.