Chapter 2

Review of Literature

2.1 INTRODUCTION

This chapter presents an overview of the present research on partnership quality, service climate aspects in relation to the GSD project outcome. The research on partnership quality, service climate aspects in GSD teams is very limited. As discussed in Chapter 1, OB research on GSD teams addresses the significance of social aspects for the success of GSD projects. In this thesis, several approaches are reported that aim at measuring the GSD teams’ partnership quality and team-level service climate aspects which relates to GSD project outcome, and hence will provide an answer to research questions (RQ-1 & RQ-2). In addition, this chapter illustrates the existing studies and develops a theoretical framework that is used in this thesis.

2.2 RESEARCH ON SOCIAL EXCHANGE THEORY

Social Exchange Theory (SET) is identified as one of the most widely used a theory that deals with inter-personal interactions in the current trends of IT outsourcing relationship. Further, Hui and Beath (2004) have applied SET to understand the outsourcing decisions and outcomes. However, the performance indicators applied in various studies based on the grounded theory it has been reported in the earlier study (Sun et al. 2002). In this thesis the theoretical lens of research model is classified under SET elements: knowledge sharing, trust and commitment (Blau 1964; Homans 1958; Thibault and Kelley 1959). It provides the theoretical foundations by evaluating partnership quality aspects of GSD teams’ towards the outcome of a GSD project. In this thesis SET is used as a basis for evaluating the GSD teams’ on-going relationship: partnership quality and service climate aspects are addressed from the OB research perspective. Variables are found based on the previous studies which have been discussed in forthcoming sections. Bock and Kim (2002) observed that SET basically discusses shared responsibility and mutual
benefits over activities which are performed jointly by two or more parties (Bock and Kim 2002).

In addition, Bock and Kim (2002) adopted SET to determine the knowledge-sharing attitude. Moreover, SET is greatly useful for studying knowledge-sharing relationship among geographically distributed subunits (Hall, 2003). In addition, SET is based on the concept of trust and explains the exchange relationships among participants (Blau 1964). Subsequently, Han et al. (2008) investigated the partnership quality in terms of trust and commitment. Moreover, the commitment and trust theory, that is developed based on the SET (Wu et al. 2006). Dyadic relationship structure has been taken into consideration while ‘partnership quality’ and ‘requirements flow down’ are identified as important variables which influence the GSD project outcome. Therefore, in this thesis the GSD teams’ partnership quality aspects are based on SET criteria, it is classified under four dimensions: knowledge sharing, trust, commitment, and requirements flown down. SET perspective presented in this thesis may help in understanding the exchange relationship between GSD teams’ in different settings.

2.2.1 SOCIAL ASPECTS IN GSD TEAMS

Social aspects in GSD teams are studied in detail in OB research. Many studies investigated social aspects in GSD teams through SET elements. As discussed earlier, the empirical research on OB in GSD teams are limited. The earlier studies (Child 2001; Faraj and Sproull 2000; Orlikowski 2002; Herbsleb and Moitra 2001; Kotlarsky et al. 2007) on OB research have revealed the significance of social-related aspects in global collaboration for outsourcing success. In addition, social aspects (knowledge sharing, trust, commitment, requirements flown down and its influencing variables social interaction, interpersonal trust, organizational commitment and knowledge transfer) are addressed from service provider and service receiver point of view. Moreover, this research reveals these social aspects from the perspective of GSD teams’ partnership quality for the success of GSD project outcome will be elaborated in Chapter 3 (section 3.4) and Table 2.1. The Table 2.1 gives an overview of core literature on partnership quality of GSD teams based on the OB research.
This literature is mostly based on organizational behavior on GSD teams in relation to the outcome of GSD projects. The overview of constructs, operational definition, sources of the constructs investigated in this thesis is shown in Table 2.1.

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Operational Definition</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Interaction (SI) (Interpersonnel Interaction)</td>
<td>Social interaction represents the strength of the relationships, the amount of time spent, and the frequency of communication among members. (Liang et al. 2008)</td>
<td>Chiu et al. (2006), Edward Shih et al. (2012)</td>
</tr>
<tr>
<td>Interpersonal Trust (IT)</td>
<td>Interpersonal Trust effectively promotes the formation of strong interpersonal relationships among members of the network, also improves team cohesion, and ultimately enables the team members to co-operate with high efficiency to reach a common goal. (Yanfei et al. 2010)</td>
<td>Adler's (2002), Zaheer A et al. (1998)</td>
</tr>
<tr>
<td>Organizational commitment (Affective Commitment)</td>
<td>Affective commitment refers to an individual’s emotional attachment to, identification with, and involvement in an organization. (Meyer et al. 1997)</td>
<td>Bishop et al. (2000), Meyer et al. (1993))</td>
</tr>
<tr>
<td>Shared Understanding</td>
<td>Shared Understanding is defined as the extent to which a source and a recipient dyad’s work values, norms, philosophy, problem-solving approaches, and prior work experience are similar. Ko et al. (2005)</td>
<td>Ko et al. (2005), Gerwin et al. (1997)</td>
</tr>
<tr>
<td>absorptive capacity</td>
<td>Absorptive capacity is defined as the ability to acquire and assimilate and use the knowledge. (Cohen et al. 1990)</td>
<td>Szulanski (1996), Ko et al. (2005)</td>
</tr>
<tr>
<td>Arduous Relationship</td>
<td>Arduous relationship is defined as emotionally laborious and distant relationship between a source and a recipient that affects the ability for the source to transfer the needed knowledge and of the recipient to learn and apply the knowledge. (Szulanski 1996, Ko et al. 2005)</td>
<td>Szulanski (1996), Ko et al. (2005)</td>
</tr>
<tr>
<td>GSD Project Success/Outcome</td>
<td>Satisfaction with benefits from outsourcing gained by an organization as a result of deploying an outsourcing strategy. (Grover et al. 1996)</td>
<td>Markus Westner et al. (2010), J.M. Erickson et al. (2006), Grover et al. (1996), Tomi Dahlberg et al. (2006), J.J. Jiang et al. (2006)</td>
</tr>
<tr>
<td>Knowledge Sharing</td>
<td>It is the process of transmitting or presenting or transferring knowledge to a potential recipient. (Devenport et al. 1998)</td>
<td>Dixon's (2000), Lee et al. (2001), Kankanhalli et al. (2005), Bock et al. (2005),</td>
</tr>
</tbody>
</table>
Table 2.1: Overview of Measurement Indicators from the Literature

<table>
<thead>
<tr>
<th>Table 2.1: Overview of Measurement Indicators from the Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust</td>
</tr>
<tr>
<td>Requirements Flow Down (Software Requirements Knowledge Transfer)</td>
</tr>
<tr>
<td>Commitment</td>
</tr>
</tbody>
</table>

2.3 RESEARCH ON PARTNERSHIP QUALITY FACTORS

Many studies also emphasized the importance of partnership quality in IS outsourcing (Jae-Nam Lee et al. 2001; Fitzgerald et al. 1994). In addition, a lot of researches (Kedia et al. 2007; De Vita et al. 2010; Marshall et al. 2007; Cui et al. 2009; Han et al. 2008) have reported that the partnership quality factors are key predictors that influence the IT outsourcing success.

Figure 2.1: The Research Mode: Factors Influencing the GSD Teams’ Partnership Quality on GSD Project Outcome.
Based on this context, this thesis focused on the measurement of perceived partnership quality factors (knowledge sharing, trust, commitment, and requirements flow down) between GSD teams’ rather than gap analysis, as early research has indicated the partnership quality factors influence the outcome of GSD projects. The overview of our theoretical arguments is shown Fig 2.1.

This thesis captures the partnership quality factors based on SET elements that underlay the offshore-on-site team’s relationship towards the outcome of GSD project. Knowledge sharing is treated as a kind of exchange behavior (Wu et al. 2006). This thesis focuses on the exchange relationship to realize how the GSD teams’ share their knowledge in order to achieve team tasks (Grover and Cheon 1996). In addition, it identifies the dimensions of partnership quality based on trust and comfort. Trust is an important component of the quality of outsourcing partnership and determines outsourcing success (Sargent 2006). This thesis attempts to measure the GSD teams’ trust behavior and its significant effects towards the outcome of GSD projects.

Mowday(1998) defined organizational commitment as employees’ positive attitude and psychological disposition toward their organization. In the context commitment, there is a natural division of tasks that fall into three groups: the client, the vendor team in on site, and the vendor team in offshore. Therefore, this study focuses on how these groups coordinate—i.e., internally within the vendor team and externally with the client. Previous study (Drew procaccino et al. 2002) has reported the requirement factor that contributes to the success or failure of software systems.

In the context of software development outsourcing the offshore and on-site team’s requirement transition has a significant impact towards the outcome of GSD project. The requirements flow down activity consists of deriving requirements specification for each element of the systems architecture which is based on the allocated system requirements (Eriksson et al. 2008). Geographic distribution affects the transferring of the knowledge of requirements to personnel and developers (Päivi Parviainen 2012). Moreover, the geographical distribution leads to loss of cohesion and lack of common understanding of requirements among the development teams (Damian and Zowghi 2003).
In this thesis, requirements flow down is approached from the perspective of software requirements knowledge transfer. Based on the previous studies, it is clear that partnership quality and requirements flow down factors have influenced the outsourcing success. Therefore, partnership quality between two participants (i.e., offshore and on-site development team) is analyzed based upon SET elements in addition, requirements flow down factor significant impact towards the outcome of GSD projects.

Typical to this, prior research is that the partnership quality factors are usually seen from only the service provider (vendor) and the service receiver (client) point of view in a mature relationship (Grover and Cheon 1996; Goles and Chin 2005; Kern and Willcocks 2000; Kishore et al. 2003; Klepper 1995; McFarlan and Nolan 1995; Markus Westner and Susanne Strahringer 2010). This research presents the results from an on-going relationship of GSD teams’ partnership qualities and its influential factors towards the outcome of GSD projects from the service provider perception as discussed in chapter 3 and section 3.4.

2.4 KEY ELEMENTS OF GSD PROJECT OUTCOME

There are several definitions of IT outsourcing success. This thesis, adopts the Grover and Cheon (1996) definition of IT outsourcing success i.e., “satisfaction with benefits from outsourcing gained by an organization as a result of deploying an outsourcing strategy”. In addition, Lacity and Willcocks (1998) defined “outcome of IT sourcing decisions met expectations”. Furthermore, Waheed and Molla (2004) defined the success of Information System (IS) outsourcing in terms of project completion within time and budget limit, better quality of IS and knowledge transfer.

Many researchers (Lee and Kim 1999; Grover and Cheon 1996; Han et al. 2008) have assessed the outsourcing success through the achievement of strategic, economic, and technology benefits of outsourcing. King and Malhotra (2000) defined the impact of outsourcing strategy into three dimensions: short-term operational impacts, midterm tactical benefits, long-term strategic impacts.
This thesis explores the influence of GSD teams’ partnership quality on the basis of tactical (Efficiencies, cost savings, productivity, and service levels) as well as operational benefits (performance and control) towards the outcome of the GSD project from the service provider perspective into three dimensions: product success, (schedule, cost improvement etc) and service quality (personal satisfaction, successful collaboration) will elaborate in Chapter 3.

2.5 RESEARCH ON FUZZY MULTI CRITERIA DECISION MAKING

The fuzzy multi-criteria decision making (FMCDM) approach is a powerful tool for decision makers that has been widely used for selecting, evaluating and ranking problems according to their weights of a finite set of criteria (usually conflicting criteria). Recently, FMCDM has been adopted in selection, evaluation, ranking in the solutions of prediction or forecasting (Tsung-Han Chang and Tien-Chin Wang 2009). In addition, a number of studies (Tsung-Han Chang and Tien-Chin Wang 2009; Yi-Chung Hu and Pen-Che Liao 2011; Buyukozkan and Ruan 2008; Ming-Shin Kuo and Gin-Shuh Liang 2012) have exploited FMCDM for the evaluation of multiple attributes and especially dealing with uncertainty and vagueness within the decision making process by the use of fuzzy set theory.

Tsung-Han Chang and Tien-Chin Wang (2009) presented FMCDM for measuring the possibility of successful knowledge management implementation in Taiwan semiconductor Engineering Corporation. Moreover, Yi-Chung Hu and Pen-Che Liao (2011) applied FMCDM to find critical criteria for evaluating electronic service quality of internet banking in Taiwan domestic banks. In addition, Buyukozkan and Ruan (2008) utilized FMCDM for measuring the performance of software development projects. Consequently, Ming-Shin Kuo and Gin-Shuh Liang (2012) proposed FMCDM for evaluating the performances of intercity public transport system. Based on this literature studies, this thesis extends the FMCDM framework to effectively assess the GSD teams’ partnership quality dimensions, underlying the influential factors and their impacts on the success of GSD project outcome under fuzzy environment which is summarized in Chapter 5.
As discussed earlier, chapter 3 deals with the evaluation of GSD teams’ partnership quality and GSD project outcome with the help of conventional statistical methodologies. However, statistical methods have limitations to deal with people’s uncertainty and subjectivity vagueness to determine the GSD project outcome. To resolve such issues, this research proposes a framework based on FMCDM to assist the organizations in classifying the key factors (refer chapter 4 and Figure 4.1) affecting GSD project outcome. It also analyses the predicted GSD project outcome values are obtained to facilitate an organization to determine the impact of GSD teams’ partnership quality towards the success of GSD project outcome otherwise initiate actions to improve the GSD project outcome.

2.6 RESEARCH ON IT SERVICE QUALITY IN THE CONTEXT OF TEAM LEVEL SERVICE CLIMATE

This section summarizes the literature in the following areas to underpin this thesis: IT service quality and service climate of GSD teams. Service quality is defined as the level of service delivered by Information System (IS) service providers to business users in terms of reliability, responsiveness, assurance, and empathy (Gorla et al. 2010). In addition, Parasuraman et al. (1985) defined service quality as “the global evaluation or attitude of the overall excellence of services”. Earlier studies (Gorla et al. 2010; DeLone et al. 2003; Pitt et al. 1995) emphasized that IT service quality has significant impact on the organizational performance along with information quality and system quality.

Furthermore, Parasuraman et al. (1985) has classified the service quality determinants into ten key categories: reliability, responsiveness, competence, access, courtesy, communication, creditability, security, understanding, and tangibles. Subsequently, many studies (Gorla et al. 2010; Kettinger et al. 2005; Jiang et al. 2002) have been widely used under four dimensions (i.e., reliability, responsiveness, assurance, and empathy) to evaluate the quality of service in IT departments. The present study is based on these reviews wherein the IT service quality is measured by using six indicators: responsiveness, competence, reliability, creditability, understanding, and tangibility (as illustrated in Chapter 6 and Section 6.4.1).
Schneider et al. (1998) describes that service climate refers to the employee behavior which is influenced by the policies, practices, procedures, and routines that facilitate the excellence of services that has been outlined by the organization to achieve goals or other organizational imperatives. Moreover, the earlier studies (e.g. Jia Ronnie et al. 2008; Schneider et al. 1998) have conducted an extensive review to construct various service climate dimensions like managerial practices (deliver quality of service), customer orientation, customer feedback, global service climate (measure overall perceptions), service leadership (goal setting, work planning, and coordination), service vision, client feedback and client communication. And they have revealed that these aspects are likely to be relevant in the IT service context.

Based on these dimensions, the present study formulated the construct (refer Chapter 6 and Section 6.4.1) to measure the GSD team-level service climate with respect to IT service quality criteria via three IT service climate dimensions: managerial practices, global service climate and service leadership. Moreover, Ronnie Jia and Blaize Horner Reich (2013) reported that IT service climate aspects have been the key predictors to create a major impact on IT service quality. Subsequently, many studies (e.g. De Jong et al. 2005; Liao and Chuang 2007; Salanova et al. 2005) have been carried out on quality measures for investigating and they have identified the relationship between service climate and service outcome. Based on this context, this research investigated the GSD team-level service climate which has been a key predictor for measuring IT service quality with respect to GSD project outcome/success in the software service outsourcing context (as elaborated in chapter 6).

2.7 RESEARCH ON ADAPTIVE NEURO FUZZY INFERENC SYSTEM

Recently, there has been an interest to use learning and adaptation approaches through a combination of other techniques like fuzzy system-neural networks and fuzzy system-genetic algorithms. Subsequently, Chapter 3 and Chapter 5 explore the GSD teams’ ongoing relationship towards a GSD project outcome on the basis of statistical approach and FMCDM combined with genetic algorithm based learning approach. The ANFIS is a multilayer feed-forward network, which uses neural
network learning algorithms and fuzzy reasoning to map the input space to an output space (Bateni and Jeng 2007). ANFIS is a combination of neural networks and fuzzy inference system. This research’s main intention is to capture the benefits of Neuro-fuzzy approach and to build a powerful framework for decision-making systems. Moreover, the present research aims to propose a Neuro-fuzzy learning approach with fuzzy inference system (FIS) design for evaluating GSD team-level service climate in GSD projects (as discussed in Chapter 7).

Recently, a number of researchers have applied ANFIS to different areas of application. Abbas Saghaei and HoseinDidekhani (2011) presented ANFIS for the evaluation and selection of six sigma projects in Iran. Moreover, Osman Taylan and Bahattin Karagözoğlu (2009) designed ANFIS model for the prediction of a student’s academic performance in the engineering economy course. In addition, Kwong et al. (2009) proposed ANFIS for generating non-linear and explicit customer satisfaction models for new product development. The earlier studies (Ronnie Jia and Blaize Horner Reich 2013; Schneider et al. 1998) investigated the IT service climate based on conventional statistical methodologies. In this research, adaptive neural-fuzzy inference system (ANFIS) is presented for evaluating GSD team-level service climate with respect to GSD project outcome (i.e., IT service quality derived from GSD teams) as discussed in Chapter 7.

2.8 RESEARCH ON HYBRID TAGUCHI BASED ANFIS APPROACH.

The adaptive neuro fuzzy inference system (ANFIS) is an effective approach in dealing with the non-linear mapping based on both human knowledge (in the form of fuzzy if-then rules) and the specified input–output data pairs (Jang et al. 2004; Wen-Hsien Ho et al. 2009). Moreover, a number of studies (Wen-Hsien Ho et al. 2009; Lo 2003) have investigated that the HTGLA-based ANFIS approach which outperforms prediction accuracy is obtained by ANFIS approach. Based on this context, this present study has applied HTGLA-based ANFIS approach to evaluate the GSD team-level service climate in GSD projects through the lens of IT service quality criteria and it is an extension of earlier works which are discussed in Chapter 5,6 and Chapter 7. In the service climate literature, a number of studies (e.g. Schneider and
Bowen 1993; Ronnie Jia and Blaize Horner Reich 2013; Jia Ronnie et al. 2008; De Jong et al. 2005) have revealed the various types of service climate dimensions: managerial practices (deliver quality of service), customer orientation, customer feedback, global service climate (measure overall perceptions), service leadership (goal setting, work planning, and coordination), service vision, client feedback and client communication, and have investigated that these aspects are likely to be relevant in the IT service context.

Based on the existing literature, the IT service quality in the context of team-level service climate and GSD project outcome relationship is measured via three dimensions: managerial practices, global service climate and service leadership is done on the basis of two approaches, FMCDM with genetic algorithm approach and ANFIS with statistical method. On the other hand, ANFIS is a combination of neural networks and fuzzy inference system. Consequently, a number of researchers have applied ANFIS to different areas of application. In addition, a number of studies (Wen-Hsien Ho et al. 2009; Tsai et al. 2004; Lo 2003) have reported that the HTGLA had produced better results when compared to the ANFIS and the existing genetic algorithm.

Therefore, the main intention is to capture the benefits of both Neuro-fuzzy approach (ANFIS) and HTGLA approach and to build a powerful framework for evaluating the team-level service climate in GSD projects. Here, it should be noted that, to the authors’ best knowledge, there are no existing studies that have investigated the IT service climate on the basis of ANFIS approach, whereas a number of studies have explored the IT service climate based on conventional statistical methodologies (Schneider and Bowen 1993; Ronnie Jia and Blaize Horner Reich 2013; Jia Ronnie et al. 2008).

2.9 RESEARCH GAPS FROM LITERATURE STUDIES

The “research gaps” identified from the literature review are as follows:

1. Analyzing the influence of partnership quality factors in GSD teams’ is not reported.
2. Measuring IT service quality through lens of GSD team-level service climate is *not addressed in depth*.

3. Evaluation of team-level service climate in the context of GSD project outcome is *not addressed*.

4. Use of Neuro-fuzzy approaches in the evaluation of GSD partnership quality and service climate aspects is *not revealed*.

### 2.10 SUMMARY

Chapter 2 presents an overview of the existing literature on GSD teams’ partnership quality and service climate with relation to the outcome/success of GSD projects. In addition, this thesis has identified and reported the research gaps in the literature. The GSD teams’ potential factors may contribute towards the success/outcome of GSD projects is summarized in Figure 2.2.

![Figure 2.2: The GSD Teams' Potential Factors: Contribute towards Success of GSD Project Outcome.](image-url)

Research on these potential factors is collectively identified through existing studies and has been elaborated in section 2.1 to section 2.8.