



**Characteristics of Software Development Teams contributing to Team Effectiveness in
Technopark, Thiruvananthapuram**

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ABSTRACT

This study attempted in identifying the team characteristics that commonly prevail among the Software Development Team members. Through the previous research studies 29 team characteristics were identified. The attitude of the Software Development Team members towards the various team characteristics were identified using Questionnaire and attitude measured through Likert's scale. Based on their attitude team themes were identified through factor analysis. Seven themes were identified and they were labelled according to the nature of the team characteristics contained in it. This research could be further carried out by identifying the relation between generated software development team themes and its relation with the team effectiveness. The team effectiveness can be subjectively measured.

Keywords:

Team Characteristics; Software Development Team; Team Themes; Behavioural characteristics of Team; Model of Team Effectiveness.

Introduction:

An organization creates teams to bring together groups of people with complementary skills and interests to work toward a common goal. Teams are increasingly common and relevant from an organizational perspective, as globalization and technology continue to expand organizational scope and strategy. In organizations, teams can be constructed both vertically (varying levels of management) and horizontally (across functional disciplines). In order to maintain synergy between employees and organize resources, teams are increasingly common across industries and organizational types.

Team refers to a small group whose members have complementary skills, have a common purpose, apply performance goals, and who accept mutual accountability (Proehl, UGC CARE Group-1,



1997, p.139). A complex production environment benefits from the work produced by teams. Forsyth (1990) states that teams utilize individual resources, and team performance should utilize the interpersonal dimensions of the team. Usually, productivity increases when workers see themselves as part of a team, rather than as individuals who work alone. Also, a team approach increases the sense of camaraderie, self-worth, and belonging (Stewart, Manz, & Sims, 1999). Unlike the early concept of teams that rose to popularity in the 1970s, modern teamwork is fully integrated into the activities and culture of an organization. The rationale for teams is myriad evidence that shows employees are more productive when they work together than when they work alone.

Review of Literature:

Previous research studies have contributed a lot in the concept development of Team and its characteristics. Researchers who study general team characteristics often examine and reference the models of Gladstein (1984), Hackman (1987), and Campion et al. (1996).

Based on Campion et al. (1996) model Eun J. Lynn Kwak (2004) developed a model which defined the relationship between Apparel Development Team Characteristics and its effectiveness. Eun Kwak in her research work used both factor analysis and multiple regression analysis and by means of applying factor analysis two themes for team characteristics were identified: team interaction and team interdependence. Based on multiple regression analysis, these two themes predicted team member job satisfaction (TMJS) and team member judgment of effectiveness (TMJE). Among the 11 team Apparel Product Development Team characteristics, potency, workload sharing, communication with teams, and social support displayed the highest correlation (in descending order) with Apparel Product Development team effectiveness. This study found to be a theoretical framework for further research studies among teams who work towards a common purpose.

In another research study by Siok Sim Agatha Heng(2006) among the relationship of team characteristics and team performance among Malaysian manufacturing and telecommunications work teams from various organisations in the study utilised about 13 behavioural characteristics based on the previous research studies and identified its effect on team performance.

Objectives of the Study:

1. To know the profile of Software Professionals in Software Development teams at Technopark, Thiruvananthapuram.



2. To identify the effective Team characteristics among the Software Development teams at Technopark, Thiruvananthapuram.
3. To generate Software Development Team Themes.

Methodology of the Study:

i) Sampling Technique:

The sampling technique adopted for the study is Stratified Random Sampling. As the population were stratified into three strata's such as small- sized companies, medium sized companies and large sized companies. They are classified based on the number of employees working in such companies. If there are Less than 50 members in an organisation it is categorised as Small- sized companies, if there are employees between 50 – 200 they are categorised as Medium –sized companies and if there are more than 200 members working they are grouped as Large sized companies.

ii) Sample Size:

The Sample size selected for the study includes 400 Software Development Team members at Technopark, Thiruvananthapuram.

iii) Data Collection:

Primary Data was collected through Questionnaire. The attitude of software development team members towards these characteristics are collected through Likert 5 point scale ranging from strongly agree to strongly disagree. The Secondary Data was collected through Journals, Books and Websites.

iv) Area of Study:

The Software Development Teams were chosen from the Small, Medium and Large sized organisations at Technopark, Thiruvananthapuram. Technopark offers a one-stop solution to all the business needs related to IT.

v) Tools used:

To analyze the data collected the following tools were used:

- 1) Percentage Analysis
- 2) Factor Analysis

vi) Need of the study:

Teams are supposed to be better suitable for executing complex tasks because



team members share workload, observe behavior of other team members and contribute to the sub tasks of the complex task [Mathieu, Heffner, Goodwin, Salas and Cannon-Bowers, 2000]. Large scale software development is a collaborative activity which requires human resources and coordination among them [Espinosa, Kraut, Lerch, Slaughter, Herbsleb and Mockus, 2001]. This study will enable further research work in identifying the relation between team characteristics and its effect on team effectiveness thereby contributing towards the success of an organisation.

Data Analysis and Interpretation:

1. Profile of the Respondents:

I) Gender of the Respondents:

Table 1.1: Gender of the Respondents

S.No	Gender	No: of Respondents	Percentage	Cumulative Percentage
1	Male	199	49.75	49.75
2	Female	201	50.25	100
Total		400	100	

Source: Primary Data

Table 1.1 indicates that the numbers of female respondents (50.25%) are higher than the number of male respondents (49.75%).

II) Marital Status of the Respondents:

Table 1.2: Marital status of the Respondents

S.No	Marital Status	No: of Respondents	Percentage	Cumulative Percentage
1	Married	132	33	33
2	Unmarried	268	67	100
Total		400	100	

Source: Primary Data

Table 1.2 indicates that the numbers of unmarried respondents (67%) are higher than the number of married respondents (33%).

III) Age – Group of the Respondents:

Table 1.3: Age -Group of the Respondents

S.No	Age-Group	No: of Respondents	Percentage	Cumulative Percentage
1	Less than 30 years	210	52.5	52.5
2	More than 30 years	190	47.5	100
Total		400	100	



Source: Primary Data

Table 1.3 indicates that the number of respondents less than 30 years (52.5%) are higher than the number of respondents in the age group of more than 30 years (49.75%).

II) Factor Analysis:

Based on the previous literature 29 team characteristics were included in the study. Factor analysis tool has been used to group the variables. The factor analysis used Varimax Rotation with Kaiser Normalization, producing uncorrelated factors. Based on factor loadings, the 29 team characteristics generated 7 factors. The characteristics that had large loadings were grouped together (greater than 0.40 in absolute value). Factor 1 accounts 14.8%, Factor 2 accounts 13.73%, Factor 3 accounts 11.19%, Factor 4 accounts 10.93%, Factor 5 accounts 8.03%, Factor 6 accounts 7.40%, and Factor 7 accounts 6.27% of the total information given by the original data set. Hence all the seven factors together explain more than 70% of the information given by the original team characteristic variables. All the seven factors were identified uniquely with a name based on their characteristics. They are as follows.

1. Team Relations
2. Team Reliance
3. Team Structure
4. Team Ambiance.
5. Team Conflict.
6. Team Bonding.
7. Team Distinctiveness.

The variables which are grouped under each of these factors are listed below.

1. Team Relations:

- a. Liking for each other.
- b. Cohesiveness.
- c. Participation.
- d. Task Significance.
- e. Potency.
- f. Team foundation.

2. Team Reliance:

- a. Workload Sharing.
- b. Organisational Interdependence.
- c. Goal Interdependence.
- d. Managerial Support
- e. Role Satisfaction.
- f. Goal Agreement.

3. Team Structure:

- a. Task Variety.
- b. Training.
- c. Co-operation.
- d. Self – Management.

4. Team Ambiance:

- a. Goal motivation.
- b. Participative leadership Style.
- c. Division of Task into sub – teams.
- d. Interdependent Feedback and Rewards.
- e. Openness in change.
- f. Role Clarity



5. Team Conflict:

a. Intra Team Conflict

b. Cliques.

6. Team Bonding:

a. Task interdependence.

b. Emotional Bonding

7. Team Distinctiveness:

a. Informal Leadership Role.(Team Distinctiveness is negatively influenced)

b. Social Support.

c. Openness in Differences.

Appendix – 1: Data and results of factor analysis on team characteristics

Variables	Factors						
	1	2	3	4	5	6	7
Eigen Values	4.29	3.98	3.25	3.17	2.33	2.15	1.82
Percentage Information	14.80	13.73	11.19	10.93	8.03	7.40	6.27
Cumulative Percentage	14.80	28.53	39.72	50.65	58.68	66.08	72.35
Liking	0.825	0.215	-0.068	0.227	-0.011	0.202	0.101
Cohensiveness	0.779	0.123	0.207	0.238	-0.067	0.235	0.107
Participation	0.653	0.143	0.477	0.191	-0.132	0.028	0.011
Task significance	0.651	0.202	0.235	-0.059	0.229	-0.066	-0.264
Potency	0.630	0.341	0.223	-0.060	0.383	0.093	0.061
Team foundation	0.608	0.500	0.155	0.154	0.126	-0.035	0.101
Workload	0.206	0.760	0.021	0.211	0.171	-0.031	0.093
Organization	0.276	0.709	-0.025	0.215	0.055	-0.023	0.106
Goal	0.033	0.699	0.221	0.153	-0.161	0.427	0.171
Managerial support	0.367	0.647	0.438	0.144	-0.108	0.029	0.046
Role satisfaction	0.245	0.555	0.362	0.387	0.147	0.250	0.335
Goal agreement	0.141	0.537	0.038	0.265	0.083	0.408	-0.110
Task variety	0.161	0.092	0.842	0.183	0.012	0.143	-0.073
Training	0.075	0.267	0.788	0.185	-0.110	0.184	0.134
Self management	0.408	-0.157	0.590	0.087	-0.169	0.058	0.223
Cooperation	0.287	0.197	0.537	0.232	0.300	0.025	0.435
Goal motivation	0.197	0.076	0.333	0.759	0.060	0.175	0.025



Participative	0.090	0.353	-0.011	0.676	0.032	-0.013	-0.149
Division	-0.003	0.360	0.226	0.659	-0.058	0.133	0.133
Interdependent	0.353	0.127	0.362	0.491	-0.187	0.321	0.058
Openness	0.376	0.238	0.090	0.448	0.099	-0.003	0.434
Role	0.384	0.384	0.242	0.400	0.050	0.132	-0.054
Intra	-0.028	0.068	-0.098	0.029	0.913	-0.074	-0.042
Cliques	0.113	0.019	-0.051	0.011	0.902	-0.036	-0.026
Task	0.115	0.160	0.153	-0.075	-0.118	0.879	0.125
Emotional	0.125	-0.021	0.135	0.381	0.015	0.743	-0.032
Informal	0.093	-0.035	-0.048	0.120	0.160	-0.024	-0.735
Openness in difference	0.252	0.363	0.132	0.500	0.160	0.076	0.523
Social support	0.442	0.349	0.257	0.181	0.310	0.237	0.455

Conclusion:

The research work attempted in identifying the team characteristics that commonly prevail among the Software Development Team members. Based on their attitude team themes were identified through factor analysis using SPSS package (SPSS 16.0 for WINDOWS). Seven themes were identified and they were labeled according to the nature of the team characteristics contained in it.

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