

# An Empirical Study of IT-based faultlines in Chinese Corporations

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## Abstract

*Since Lau and Murnighan first introduced the concept of faultlines in 1998, there are many extended studies related to faultlines theory. It is obvious that faultlines theory adds valuable explanations in addition to what numerous previous demographic studies have explored. However, previous research has not been able to fully integrate the characteristics embedded in the workplace environments, and the influence of faultlines in IT industries has yet to be explored. So it is not reasonable and convincing to extend the findings from previous faultlines research to other industries in the global world.*

*In this study, IT related influence is given considerable weight into traditional faultlines theory and the impact of IT-based faultlines is revealed. Our study indicates that IT-based faultlines have negative impact on task conflict, process conflict and relationship conflict, and also have negative impact on individual outcomes such as individual performance and satisfaction. The influence of IT-based faultlines on people's intend to remain in the current organization is found to be insignificant. Our empirical study reconfirmed that faultlines are important indicator in group works and also that faultlines are intimately related to various conflicts and individual outcomes. We hope our research findings would be beneficial to the organizations concerned with effective and efficient group work.*

## Keywords:

Faultline, IT-based Faultline, Groupwork

## 1. Introduction

So far most studies have been focused on how different demographic attributes or various compositions of these demographic attributes affect individuals or organizational outcomes (Tsui, 1992), and not much attention is given to the combined influence of two or more demographic attributes. One original yet very interesting research direction is faultlines theory introduced by Lau and Murnighan (1998). According to the faultlines theory, the combined consequence of two or more multiple demographic attributes makes a group split into subgroups

based on similarity and closeness. Although faultlines are supposed to form based on a few but the most important demographic attributes, its theoretical and empirical foundation is yet to be confirmed. So far research about faultlines in organizations is mostly focused on those seemingly apparent or easily retrievable social attributes, thus IT-related attributes' influence is unconsciously neglected or unnoticed.

IT has emerged as one of the most prosperous industry and showed rapid growth in the whole world. Thus the number of people engaged in the IT industry has also skyrocketed recently, and IT personnel have appeared to be non-negligible professionals in the current labor force. As more and more industries found themselves inseparable with IT and IT personnel, the increasing dependence on IT and IT personnel is also clearly foreseeable. Also as organizations evolve into new information-based business stage and the complexity inside and outside organizations intensifies, the desire to understand how newly emerging IT personnel behave and the need to manage and control IT personnel into existing business environment have become increasingly urgent and critical.

While researchers have not paid much attention to the significant difference between IT and non-IT workers, it is definitely a new potential research area to study the different identities and characteristics of IT workers, such as specialized expertise, relatively short life-span turnaround. In this research, we extend existing diversity and faultlines study and develop theoretical model to facilitate our exploration about IT-based faultlines and also to discover the impact of mediator and moderator in our proposed model.

## 2. Literature Review

### 2.1 Diversity Research

Pelled et al. (1999) refer to demographic diversity as the extent that demographic attributes are different by their contents in a workgroup or an organization. As demographic attributes shape the characteristics and behavior of each individual in a unique way, many researchers have concentrated on how demographic diversity affects individuals or groups.

One commonly discussed construct related to diversity is

various types of conflicts in work groups (Thatcher, 2000). Jehn (1995) introduced three distinctive types of conflict that are aroused at work places in business organizations. Task conflict is differences on how any specified job is carried out, relationship conflict is interpersonal incompatibilities at work place, and process conflict is differences of work related procedures.

For the summary of previous demographic diversity research, Williams and O'Reilly (1998) concluded that it is still in the early stage to acknowledge convincing and consistent effects of diversity on organizational outcomes. They proposed that new research paradigm might be required to more thoroughly understand the nature of diversity impact on various corporate performances.

## 2.2 Intergroup Theory & Social Identity Theory

Organization is a complex multi-dimensional system in which competition, conflict and challenge arise among its groups for specific powers or resources (Baldrige, 1971) and also in which members of groups depend on each other in order to retrieve and take control of crucial values (Kramer, 1991). That is, individuals often act to ally with people who share similar interests or perspectives for the purpose of joint objectives. There are a few existing theories such as intergroup theory and social identity theory that illustrate how people think and behave at group working environment from theoretical point of view.

Intergroup relations is initially defined by Sherif and Sherif (1969) as "functional relations between two or more groups and their respective members" in which "functional relations" means "the actions by one group and its members have an impact on another group and its members, regardless of whether the two groups are actually engaged in direct give-and-take at the time." People have desire to belong to one distinct social group that best fits his/her social identification and self concept so that they could obtain a unique and favorable position from their own group. Previous researches (Rabbie, 1971; Billing, 1973; Tajfel, 1970; Tajfel, 1982; Brewer & Silver, 1978) indicate that there is intergroup competition resulting from various social groups by which people behave attitudinal and perceptual biases favoring their own group members over members of other group.

Tajfel (1972) first defined social identity as "the individual's knowledge that he belongs to certain social groups together with some emotional and value significance to him of this group membership". The social identity perspective argues that people are motivated to identify themselves into groups for two main reasons: subjective uncertainty reduction and enhancement of self-esteem (Hornsey & Hogg, 2000). Social identity theory indicates ingroup favoritism and outgroup discrimination for group studies.

## 2.2 Concept & Characteristics of Faultlines and Previous Research on Faultlines

The theories we discussed above all analyzed one to one

relationships between demographic variables and dependent variables until Lau and Murnighan (1998) introduced a new concept, known as group faultlines, "which depends on the compositional dynamics of the multiple demographic attributes that can potentially subdivide a group". The authors state that members in a group are split into subgroups according to similarity and closeness based on one or more demographic attributes. That is, the separation of members in a group is the consequences of combined influence of more than one demographic attributes.

Compared to previous demographic diversity research, faultlines theory possesses three major properties which are essential in the formation of faultlines in group work. These properties are as follows (Lau and Murnighan, 1998). First, group members have multiple demographic dimensions. Second, group faultlines usually become major issue with the appearance of external force. And finally, there is huge impact of strong and hidden faultlines whenever exposed. When we consider faultlines, not only are the factors that influence the formation of faultlines reviewed, but also the factors that are associated with the strength of faultlines are considered.

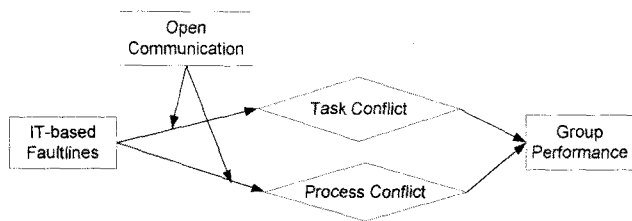
Thatcher et al. (2003) developed theory-based algorithm to calculate the strength of faultlines by comparing multiple dimensions of group members simultaneously. They applied recoding and rescaling method to combine nominal and numerical variables together into a single comparable measurement, and this makes the comparison of different faultlines strength possible. Gibson et al. (2003) examined the relationship between subgroups and team learning behavior. Contrary to Lau and Murnighan's (1998) statements, the authors concluded that the presence of subgroups within teams is not always detrimental, but might stimulate learning behavior according to different levels of subgroup strength. Bezrukova et al. (2006) compared the different effects of heterogeneity and faultlines on group processes and performance.

Although faultlines theory is originated from diversity research and other existing theories, its construct, dynamics, processes and impacts are still in the early stage of exploration and more in-depth investigations are required to discover how faultlines work in business settings.

## 3. Conceptual Model & Hypotheses

### 3.1 Conceptual Model

In an effort to discover the dynamics of culture based faultlines, we explain how the same demographic variables affect the formation of faultlines in different ways when IT-related features are taken into account. In the organizational workplace process, we introduce two types of conflicts (task conflict, process conflict) that are explored in connection with IT-based faultlines, and the mediating roles of the two conflicts are proposed which are supposed to interact between faultlines and group performance. Also moderating effect of open communication is measured and discussed. A conceptual model for IT-based faultlines is introduced as follows.



[Figure 1] Conceptual Model of IT-based Faultlines

### 3.2 Hypotheses

For last two decades, IT industry was considered as one of the fastest growing area in the global world. With improvement and development in technology, more and more traditional industries incorporated with information technology for their continued growth and further development, and IT has become inseparable part of every industry. IT workers show characteristics distinct from the workers in other professions. First, as information technology is rapidly changing, IT professionals have to keep up with the pace of fast technological development. To frequently acquire and update required knowledge or skills is one of the main differences between IT and non-IT professionals (Oz, 1992). Second, compared to workers in other areas, IT workers are more prone to work alone and there is less cooperation or coordination with other workers compared to the rest of professions. So in general, we propose that IT professionals are more independent and less communication oriented than workers from other non-IT professions.

IT workers are more proud about their works, and information systems professionals have higher needs for achievement than those in some other occupations (Ferratt, 1986). The requirements for IT individuals have become more demanding especially when they are related to functional knowledge in business areas (Lee, 1995). Also, less job-related attributes such as age or gender are unlikely to have direct and close influence on technical work (Zenger and Lawrence, 1989; Webber and Donahue, 2001). The projects for IT workers usually require knowledge from different functional areas, and this makes IT workers interact and coordinate with people who has various functional backgrounds (Bassellier, 2004). So,

**Hypothesis 1:** When a group is mostly comprised of IT workers, functional tenure is likely the most important factor in the formation of faultlines.

Since IT professionals are more likely to work independently, they usually have less chance of interaction with other people, even with other members in their work group. This will make them have less opportunity or chance to communicate with other people compared the workers in more ordinary working environment. If the group members are all IT related professionals, the situation might be worse, and this probably causes more unnecessary or avoidable expressions or feelings among group members.

Also every IT workers are more familiar with the way he/she has been doing in work related procedures and they might have strong belief that they have better expertise in

their work, and this might hinder people form effectively solving work related problems with their group members. Highly job-related diversity attributes such as functional or industry backgrounds are proposed to have a stronger impact on the task related group processes (Webber and Donahue, 2001; Milliken and Martins, 1996). So,

**Hypothesis 2-1:** The influence of IT-based faultlines is positively associated with task conflict.

**Hypothesis 2-2:** The influence of IT-based faultlines is positively associated with process conflict.

It is observed from previous research that group members are more inclined to the information that they know than to exchange, share and convey the unique information they know, thus resulting in less productive outcomes (Wittenbaum, 1996). Phillips et al. (2004) stated that whenever a task is conducted by a group with diversity, performance is affected by the fact that who knows what and also whether the information among group members are shared. When there is less open communication for various reasons in the group, incongruence is present in groups and the members are likely to be distracted by unexpected relationships and may be more concerned with reconciling relationship anomalies than with the task at hand (Phillips et al., 2004). Especially for IT workers, more frequent interaction and communication is required in order to work with people from different functional background to establish common job-related vocabulary, experience and knowledge (Reich, 2000; Bassellier, 2004). So,

**Hypothesis 3-1:** Open communication plays moderating role between IT-based faultlines and task conflict.

**Hypothesis 3-2:** Open communication plays moderating role between IT-based faultlines and process conflict.

In business organizations, conflict is inseparable part of everyday social relations, and it will lead to frustration and disappointment if not handled or controlled appropriately. There have been many studies about the relationships between faultlines, conflicts and organizational outcomes (Gibson, 2003; Jehn, 1999; Thatcher, 2003; Bezrukova, 2006) since Lau and Murnighan (1998) introduced faultlines theory. As Lawrence (1997) stated, previous demography studies overemphasized the relationship between demographic attributes and organizational outcomes and underestimated the important role of mediators between these antecedents and consequents. Finding and discovering appropriate mediators is difficult as there are many potential factors that might affect the relationship between demographic attributes and organizational outcomes depending on various social or psychological conditions. Bezrukova et al. (2006) studied the relationships among faultlines, conflicts (task and process), and group outcomes. Their findings suggest that faultlines are significantly associated with tasks and process conflict, and also had negative impact on performances as expected.

When there is high level of IT-based faultlines, people who belong to different subgroup have less commonality and thus have less interest in understanding each other. Consequently, there is less interaction and mutual preference and these will result in more conflict from

various aspects including relationship, task and process conflict. So,

**Hypothesis 4-1:** Task conflict plays mediating role between IT-based faultlines and group performance.

**Hypothesis 4-2:** Process conflict plays mediating role between IT-based faultlines and group performance.

## 4. Methodology

### 4.1 Sites and Sample

Survey data were collected from medium and large sized business corporations located in China. In finding possible research sites, we gained information from acquaintance and was referred to the CEO or the person who is capable of making decisions for survey participation.

A survey instrument was developed to collect the quantitative data needed for our theoretical models and hypothesis testing. Survey is conducted at four Chinese corporations and total 77 valid data sets are collected with total 16 groups. Among 16 groups, 7 groups consists of 4 group members, 5 groups with five group members and 4 groups with 6 members respectively. All survey questions are measured by 7 point Likert scale except the ones for demographic variables.

### 4.2 Measurement Variables

In this study, all the variables in our conceptual model except faultlines are measured by survey questions which have been used in previous studies with minor modifications. The detailed explanations of each mediating variables and dependent variables are specified at Table 1.

[Table 1] Operational Definitions

| Variable          | Measurements   | Related Research        |
|-------------------|--|-------------------------|
| Task Conflict     | - How frequently are there conflicts about ideas in your work group<br>- How often do people in your work group disagree about opinions  | Jehn (1995)             |
| Process Conflict  | - How often do members of your work group disagree about who should do what<br>- How frequently do members of your work group disagree about the way to complete a group task<br>- How much conflict is there about delegation of tasks within your work group | Jehn (1995)             |
| Group Performance | - What is the quality of the work performed by your group?<br>- What is the amount of the work performed by your group?  | Hackman & Morris (1975) |

|                    |  |                    |
|--------------------|--|--------------------|
|                    | - What is the quantity of creative or innovative ideas, suggestions or opinions contributed by your group?   |                    |
| Open Communication | - There is open communication in this group<br>- Everyone has a chance to express their opinion<br>- Team members maintain a high level of idea exchange | Manz & Sims (1987) |

### 4.3 Measurement Model

Partial Least Squares (PLS) structural equation analysis is applied in our theoretical model to test proposed hypotheses. PLS is a structural equation modeling technique used to evaluate the reliability and validity of the measures of theoretical constructs and are also capable of displaying all included relationships among the constructs at once (Wold, 1982).

In PLS, internal consistency, convergent validity, and discriminant validity of constructs and measurement indicators should be carefully evaluated. The results show that Cronbach's  $\alpha$  values are all over .60, composite reliability values are all over .70 cut-off and AVE values are greater than .50 cut-off, so internal consistency and convergent validity is well supported. Discriminant validity is also well supported. In addition, factor loading values of each indicator has higher value on the construct where it is supposed to belong than any other constructs. In summary, the results collectively suggest that good measurement properties for proposed models.

### 4.4 Results

For hypothesis 1, we applied the algorithm developed by Thatcher et al. (2003) to calculate faultline scores for each group and also calculated the percentage of each demographic variable accounts for its assigned group's faultlines. As a result, sex accounts for 7.0% of total faultlines scores, age 11.9%, education background 21.2%, functional tenure 38.5%, group tenure 11.5% and organizational tenure 10.0%. As can be seen, functional tenure alone accounts for nearly 40% of total faultlines scores indicating that our hypothesis is well supported.

For the hypotheses 2 and 3, we tested our hypotheses using single linear regression method provided by SPSS, and the results are presented in Table 2.

[Table 2] Results of Hypothesis 2-1 & 2-2

| Hypothesis | T value | Significance | Results |
|------------|---------|--------------|---------|
| 2-1        | 7.058   | .000         | Accept  |
| 2-2        | 6.736   | .000         | Accept  |

From the table above, it is clear that both hypothesis 2 and 3 are well supported and they are both significant at .001 levels. Thus with strong faultlines, the possibility of task conflict and process conflict is much higher in group works and this will result in unanticipated and unpleasant

atmosphere for groups. Whenever there are weak faultlines, there are less chance of severe task conflict and process conflict, and thus produce much harmonious working atmosphere.

Hypotheses 3-1 and 3-2 intend to verify whether open communication has moderating effect between faultlines and conflicts and the results are presented in Table 3. As can be seen, hypothesis 3-1 has t value of -4.661 and it is significant at .001 confidence level. Similarly, hypothesis 3-2 has t value of -4.776 and is also statistically significant at .001 confidence level.

[Table 3] Results of Hypothesis 3-1 & 3-2

| Hypothesis | T value | R Square | Significance | Results |
|------------|---------|----------|--------------|---------|
| 3-1        | -1.222  | .020     | .225         | Reject  |
| 3-2        | -1.386  | .025     | .170         | Reject  |

Table 3 clearly presents that hypothesis 3-1 and 3-2 are all accepted as they are highly significant ( $p < .001$ ). It indicates that open communication has strong moderating effect between faultlines and conflicts. Since the Beta values are all negative, it is known that the moderating effect of open communication on the relationship between faultlines and conflicts is also negative. With more open communication, there is weak correlation between faultlines and conflicts. On the other hand, strong correlation is unlikely when there is less open communication among group members. In summary, open communication mitigates the influence of faultlines on conflicts. For IT-based faultlines model, open communication consistently plays moderating role between faultlines and task/process conflict.

For the mediator related hypotheses 4-1 and 4-2, we tested our hypotheses using multi-step multi-variable regression method provided by SPSS with faultline in step 1 and task/process conflict in step 2, and the results are presented in Table 4 and 5.

[Table 4] Results of Hypothesis 4-1

| Hypothesis 4-1   | T value | Significance | F Change | Results |
|------------------|---------|--------------|----------|---------|
| Step 1 Faultline | -4.031  | .000         | 16.252   | Accept  |
| Step 2 Faultline | -1.780  | .079         | 5.125    | Accept  |
| Task Conflict    | -2.264  | .027         |          |         |

For both hypothesis 4-1 and 4-2, when faultline is entered alone into the regression model, faultline accounts for 17.8% of total variance and it is significant at .001 confidence level. When faultline is entered together with task conflict in step 2, the significance of faultline decreases and become non-significant. This indicates that both task conflict and process conflict are significantly associated with group performance and it strongly mediates the effect of faultline to group performance.

[Table 5] Results of Hypothesis 4-2

| Hypothesis 4-2   | T value | Significance | F Change | Results |
|------------------|---------|--------------|----------|---------|
| Step 1 Faultline | -4.031  | .000         | 16.252   | Accept  |
| Step 2 Faultline | -1.725  | .089         | 6.564    | Accept  |
| Process Conflict | -2.562  | .012         |          |         |

## 5. Discussion & Conclusion

In this study, we investigated how faultlines form in Chinese IT corporations and also explored the most crucial factor in the formation of IT-based faultlines. In agreement with our prediction, functional tenure influences IT professionals the most and IT-based faultlines are aroused mostly by the differences in functional tenure. IT professionals are proud of their specialities and the field experiences over time have shaped their personalities and judgment during work. So it is convincing that functional tenure become the most important factor whenever faultlines are formed. We also confirmed our hypotheses that faultlines are positively and significantly associated with task conflict and process conflict, and also confirmed that these two conflicts (task conflict and process conflict) play mediating roles between faultlines and group performance. Faultlines, by its nature, create work related contradictions and complications among group members and this eventually affect organizational outcomes. Our study makes it clear that IT-based faultlines, conflicts and group performance are inseparable and highly correlated constructs. In our proposed model, open communication is tested as possible moderator between IT-based faultlines and conflicts. The results indicate that open communication has strong moderating impact. People are more likely to interact with other group members, to understand any differences among group members, and to concentrate on job itself with open communication. Consequently, people are more likely to have less job related task conflict and process conflict compared to when there is less interaction and communication.

This study has important implications for research concerned with faultlines theory. Our study has extended previous faultlines theory with combination of IT dimensions which has yet been approached. This is a pioneering work approving that the general idea of faultlines is also acceptable in IT corporations. The results from this study are beneficial to high level personnel in IT organizations. Since strong faultlines result in detrimental group outcomes and this will lead to overall negative organizational performance, managers who are in charge of work groups should be aware of the important impact of faultlines and should be extremely careful when they organize group members.

Faultlines theory has become an emerging research direction after decades of diversity research and are acknowledged to be an important construct in group works and its influence on organizational outcome could not been

neglected despite the fact that faultline related studies are still in its early stage. Our research is an extended study in addition to previous faultlines theory and opened new dimension for further exploration in this area.

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