# Top management and organisational innovation: review and future directions

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**Abstract:** This study reviews the relevant literature on the relation between top management and the organisational innovation based on 21 empirical studies. This study found that: (1) Top management directly influence organisational innovation via characteristics, leadership and behaviour of the Chief Executive Officer (CEO)/Top Management Team (TMT); (2) Top management influence organisational innovation via mediators. The first mediator is strategic decision or choice made by CEO/TMT. The second is the outcomes of top management. Meanwhile, commitment, communication and involvement of CEO/TMT can serve as mediators between organisational activities and organisational innovation; (3) Three levels of variables moderate the relationship between top management and organisational innovation, the first is the social level, including social–cultural context, culture and technological dynamism; the second is the organisational level, e.g. the novelty of business; the third is the group level, including interfunctional coordination of TMT and managerial creativity of TMT.

**Keywords:** administrative innovation; innovation; leadership; organisational innovation; technological innovation; top management; Top Management Team; TMT.

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## 1 Introduction

Upper-echelon theory maintains that the organisational performance is mostly determined by its top management team (Hambrick and Mason, 1984). However, organisational ecology theory suggests that the organisational performance is not as much determined through managerial choice, but through environmental forces by selecting out those organisations that do not fit (Hannan and Freeman, 1977). Though over 30 years, the literature has noted that the perceptions of managerial support influence employee creativity, it remains uncertain whether top management is influential on organisational innovation. Recently, researchers have sought to create a more complicated relationship between top management and organisational innovation (Hoffman and Hegarty, 1993; Elenkov and Maner, 2005).

Scott and Bruce (1994) stated that numerous writers have implicated leadership as critical in innovation, but such accounts have focused mainly on the need for participative or collaborative leadership styles or have provided lists of specific activities that leaders should engage in encouraging creativity. Theoretical development in relation to leadership and innovation has been weak. Earlier research on leadership stressed the distinction between effective and ineffective leadership, or discussed unique leadership behaviour. Recently, the focus of research has been the transformational and transactional leadership. The research question has usually been which leadership styles or behaviours stimulate the best organisational innovation. Furthermore, key questions that must be answered include whether the top management significantly influences organisational innovation and the variables involved in such an influence.

Wolfe (1994) reviewed the past 20 years of organisational innovation literature and identified three discernible streams which developed sequentially. One of these three streams was 'Organisational Innovativeness (OI)' research. This stream addresses the determinants of OI. The research question is 'what determines OI'. This study follows the OI approach to identify whether the organisational innovation is affected by the leadership or top management and the nature of this effect. The definition and scope of innovation is not the main focus of this research, and what is termed 'organisational innovation' in this study includes both administrative and technological innovation (Damanpour, 1991).

Briefly, this study poses the following research questions:

1 Is top management an important influence on organisational innovation?

2 If so, how does top management influence organisational innovation? Specifically, does any mediator or moderator exist between them.

This study tries to answer the above questions via literature review. The analytic base is 21 empirical studies selected based on the search results, which are searched from SSCI and the ProQuest electronic database. The search adopted 'top management'; 'leadership' and 'organisational innovation' as keywords.

Two research objectives are set. The first is to clarify the mediators and moderators between top management and organisational innovation based on the selected empirical research results. The second is to propose an integrated framework to explore the relationship of top management and organisational innovation.

## 2 Literature review

### *2.1 Leadership theory and the research on top management team*

Although the concept of leadership has existed throughout recorded history, researchers have always disagreed regarding its importance. On one hand, organisational ecology theory indicates that the environment determines organisational structure and influences organisational system not through managerial choice rather by selecting out unsuitable organisations (Hannan and Freeman, 1977). Since the 1980s, the core concepts of transformational and transactional leadership have been important issues of the leadership research. These two perspectives are related to the earlier theoretical model, for example, Kreitner and Kinicki (1995) categorised leadership theories such as trait theory, behaviour theory and even context theory into the transactional leadership. All of these theories focus on the interaction between leader and their followers, and leaders can reward or punish employees according to the performance.

Bass (1985) defined transformational leadership as follows:

1 *Charismatic*: the leader instills pride, faith and respect, can perceive what is really important, and communicates a sense of mission.

2 *Individualised consideration*: the leader delegates projects to stimulate learning experiences, provides coaching and teaching, and treats followers as individuals.

3 *Intellectual stimulation*: the leader arouses followers to think in new ways and stresses problem solving and reasoning before acting.

Leadership is the key factor in cultivating organisational culture and climate and perceiving environment support. The next question is which leadership style can best encourage creative thinking among employees. The answer lies in discussing transformational leadership and transactional leadership (Bass, 1985).

Empirical evidence regarding leadership style and innovation performance has emerged in innovation studies, for example, Politis (2004) examined the relationship between the leadership dimensions associated with the model of Bass (1985), and used data from a sample of nine departments in a service organisation operating in the UAE, and the 'stimulant' and 'obstacle' determinants of the work environment for creativity. The findings suggest that:

1 Transformational and transactional leadership and the 'stimulant' determinants of the work environment for creativity are significant and positive.

2 The 'obstacle' determinants of the work environment for creativity are negatively related to both transactional and transformational leadership.

3 Transformational leadership is more strongly correlated than transactional leadership with the 'stimulant' determinants of the work environment for creativity. Thus, transformational leadership is an increasingly important aspect of modern organisations in terms of creating a corporate culture and a work environment that stimulates employee creativity and innovation.

The theoretical foundation of leadership studies has shifted to the upper-echelon theory, proposed by Hambrick and Mason (1984), based on the argument that organisational outcomes are partly predicted by managerial background characteristics. Moreover, the upper-echelon characteristics include psychological cognitive-base values and observable traits. The primary emphasis of research is on observable managerial characteristics as the given indicators that a manager brings to an administrative situation. Examples of such characteristics include age, tenure in organisation, functional background, education, etc. Meanwhile, demographic indicators may contain more noise than purer psychological measures, but measuring the psychological dimensions is not always convenient. If significant findings are obtained based on demographic data, then the upper-echelon theory is put to a relatively stringent test.

Following Hambrick and Mason (1984), Bantel and Jackson (1989) focused on the top management team as the unit of analysis and identified two approaches to investigate the relationship between leader personal characteristics and organisational outcomes. One approach is assessing the psychological attributes of decision-makers and directly examining their relationship with outcomes. Meanwhile, the other approach is to assess demographic characteristics (including age and educational level) based on the assumption that such characteristics are related to cognitive abilities, attitudes and expertise. Previous research has indicated that cognitive diversity is a valuable resource, and the presence of people with differing perspectives ensures consideration of larger sets of problems and alternative potential solutions.

Based on discussion of leadership and top management team research results while simultaneously considering the scale of modern enterprises, this study gains some insights regarding the concept of 'top management'. The optimum leadership style depends upon the situation and environmental needs, but generally 'transformational leadership' exerts a more positive effect on stimulating innovation.

### *2.2 Factors leading to organisational innovation*

Despite extensive research on the subject spanning numerous decades, there is little agreement regarding the causes of successful innovation (Service and Boockholdt, 1998). Thus, Service and Broockholdt (1998) surveyed the literature and identified 15 factors or factor categories that may contribute to the successful innovation ability of organisations. Eight of these factors or factor categories are hypothesised to be independent variables cited in the literature, including management, structure, human resources, innovation player, organisational culture and climate, external environment, innovation characteristics and marketing. Three of these are hypothesised to be mediating variables, namely:

1 top management commitment to the change

2 the importance of the change to organisational success

3 the degree of communication between top management and employees.

Demographic factors relating to the organisation itself are hypothesised to be moderating variables, including organisational size, industry, reliance on technology and type.

Although the empirical results by Service and Boockholdt (1989) show that only innovation characteristics mediated by top manager commitment and HR practices mediated by top manager communications can affect innovation. This study found that the organisational innovation is complex, and also identified the importance of top management for innovation.

The dual core model divided organisational innovation into administrative and technological innovation (Daft, 1978). The factors affect administrative and technological innovation deserve study. For example, Kimberly and Evanisko (1981) considered individual, organisational and contextual variables much better predictors of hospital adoption of technological innovations than of administrative innovations. Based on the individual variable perspective, other studies suggest that the characteristics of key organisational actors cannot be ignored.

The earlier focus of the factors leading to organisational innovation is primarily as Chief Executive Officers (CEOs) and leaders. The role scope of leaders has recently expanded to influential individuals such as innovation champions, who are described as the individuals who promote or influence innovation adoption (Scott and Bruce, 1994). Innovation champions strongly promote innovation to other organisation members to identify the value of the innovation to ensure it will be executed.

Besides a champion with technical background, organisations also require champions with an executive background to provide vision and allocate resources. Thus, top managers can be viewed as important champions of organisational innovation because the jobs of top managers are to exercise influence and introduce the basic development of the organisation (Hoffman, 1999). Executive champion frequently influence innovation by controlling financial and human resources, which is why executive champions are said to play a significant role in innovation execution (Madique, 1980).

### *2.3 Impact of top management on organisational innovation*

Although the concept of leadership has existed throughout recorded history (Doftman, 1996), its importance remains controversial. On one hand, organisational ecology theory proposes that the environment determines organisational structure and influences organisational systems not through managerial choice but rather by selecting out unsuitable organisations (Hannan and Freeman, 1977). Environmental forces drive organisational evolution, and organisations survive or fail regardless of the actions of managers. On the other hand, innovation research and leader effectiveness studies posit that top managers positively influence the outcomes of innovation processes in organisations. Research on innovation has paid growing attention to the influences of leadership on various aspects of those processes (Elenkov and Manev, 2005).

Leadership is the predicting factor of organisational innovation (Meyer and Goes, 1988). By tracking 300 potential adoptions by organisations over a six-year period, Meyer and Goes proposed that organisational assimilation of technological innovation s is determined by three classes of antecedents: contextual attributes, innovation attributes and attributes resulting from the interaction of contexts and innovations. The results demonstrate that the demographic variables of leadership (CEO tenure, CEO education and recency of medical education) are not significantly related to innovation adoption, but that the innovation-decision variable is CEO advocacy. Nevertheless, CEOs can exert a significant influence by championing the assimilation of specific innovations.

Kimberly and Evanisko (1981) examined individual, organisational and contextual variables as predictors of hospital adoption of technological and administrative innovations. The four sets of individual level variables include job tenure, cosmopolitanism, educational background and nature of organisational involvement of leaders. The results indicate that the educational levels of both the Chief of Medicine (CM) and the Hospital Administrator (HA) are positively related to technical and administrative innovation.

Papadakis and Bourantas (1998) used a sample of 97 manufacturing enterprises to test a model of the impact of strategic leadership and corporate context on technological innovation. The personality and demographic characteristics of CEOs' were used to measure strategic leadership. Analytical results indicate that CEO characteristics strongly influence the personality characteristics of CEOs in relation to technological innovation (need for achievement, reputation goals, power goals and locus of control) appear to be strongly associated with all four dimensions of technological innovation (new product introduction, significant product innovation, incremental product innovation and innovation in the production process). Particularly, the data suggest significant intercorrelations between 'need for achievement' and 'new product introduction', 'goal of reputation' and 'innovation in the production process' and 'goal of power' and 'innovation in the production process' ($p < 0.001$). Table 1 lists the key findings of the above three studies and classifies the independent variables as characteristics of CEO/leader.

Politis (2004) studied the relationship between the dimensions of leadership and the 'stimulant' and 'obstacle' determinants of the work environment for creativity separately. The study of Politis reached three main findings. Firstly, a significant and positive relationship exists between transformational and transactional leadership and the 'stimulant' determinants of the work environment for creativity. Secondly, negative correlations exist between the 'obstacle' determinants of the work environment for creativity and both transactional and transformational leadership. Finally, transformational leadership is more strongly correlated than transactional leadership with the 'stimulant' determinants of the work environment for creativity. These stimulant determinants include organisational encouragement, supervisory encouragement, work group support, freedom, sufficient resources and challenging work. Meanwhile, obstacles included workload pressure and organisational impediment (Amabile et al., 1996).

Scott and Bruce (1994) studied Leader–Member Exchange (LMX) theory and the effect of leader role expectations on innovation behaviours. LMX theory indicates that the quality of the relationship between supervisors and subordinates is related to innovativeness. Moreover, if the relationship matures, interactions characterised by trust, mutual liking and respect (high quality LMX), subordinates are permitted greater autonomy and decision latitude, both of which have been demonstrated to be essential to

innovative behaviour. When managers expect subordinates to be innovative, those subordinates will perceive the managers as encouraging and facilitating their innovation efforts. These behaviours are then seen as representative of the organisations, and thus, the organisations are perceived as supporting innovation.

**Table 1** Characteristics of CEO/leader and organisational innovation

| *Concept of top management* | *Concept of innovation* | *Reasoning* | *Research design* |
|---|---|---|---|
| *Researchers: Meyer and Goes (1988)* | | | |
| *Leadership variables*<br>CEO tenure(×)<br>CEO education(×)<br>Recency of staff medical education(×) | Organisational assimilation of technological innovations | Leaders allocate resources to influence adoptions of innovative equipment<br>Innovations are more likely to be assimilated into organisations with chief executives with long-tenures and high levels of education, and whose physicians had been trained recently | To examine 300 processes of organisational decision-making by investigating 25 hospitals assimilated 12 medical innovations |
| *Researchers: Kimberly and Evanisko (1981)* | | | |
| *Individual variables*<br>HA tenure(+)<br>CM tenure(×)<br>HA&CM cosmopolitanism(×)<br>HA educational substance(×)<br>HA educational level(+) | *Technological innovations*<br>–Hospital responses regarding the presence or absence of 12 new developments in the area of medicine | New leaders with fresh perspectives might be more likely to support innovations<br>Cosmopolitanism is associated with higher receptivity to innovation<br>Individual receptiveness to innovation increases with education level | To examine the combined effects of individual, organisational and contextual variables on organisational adoption of two types of innovations<br>The data was developed as part of the programme on organisation and technology at Cornell University |
| *Individual variables*<br>HA tenure(×)<br>CM tenure(+)<br>HA cosmopolitanism(+)<br>CM cosmopolitanism(×)<br>HA educational substance(×)<br>HA educational level(+) | *Administrative innovations*<br>–Hospital responses regarding the use of electronic data processing for eight potential] managerial functions | | |

**Table 1** Characteristics of CEO/leader and organisational innovation (continued)

| *Concept of top management* | *Concept of innovation* | *Reasoning* | *Research design* |
|---|---|---|---|
| *Researchers: Papadakis and Bourantas (1998)* | | | |
| *CEO personality characteristics*<br>Need for achievement(+)<br>Goal of reputation(+)<br>Goal of power(+)<br>Locus of control(×)<br>*CEO Demographic characteristics*<br>Tenure(+)<br>(only influence new product introduction)<br>Formal education(+)<br>(only influence innovation in the production process) | *Technological innovation*<br>New product introduction<br>Significant product innovation<br>Incremental product innovation<br>Innovation in the production process | CEOs with a high need for achievement eschew the risk of aggressive innovation<br>Innovation enables a firm to achieve competitive advantage and thus increase its power and reputation<br>CEOs with an internal locus of control favour innovation strategy, introduce more new products, engage in more R&D and innovate in service and production process | A sample of 97 manufacturing enterprises for testing a model of influence of strategic leadership and corporate context on technological innovation |

Note: '×' denotes insignificant relationship; '+' represents a positive significant relationship and '–' means a negative significant relationship.

Table 2 lists the key points; the above literature suggests that leadership is a complex concept and different dimensions of leadership influence organisational innovation. The result of the study of Politis (2004) also support the superiority of transformational to transactional leadership behaviour.

Bantel and Jackson (1989) stated specific hypotheses regarding the expected relationship between innovation and each aspect of the composition of TMT. The hypotheses were studied for a sample of 199 banks. The analytical results indicate that more innovative banks are managed by more educated teams that are diverse in terms of their diverse functional areas of expertise (see Table 3). The linkage between education and technical innovation indicates that technical innovation needs more ability of TMT to assimilate technical knowledge. In addition, the findings confirm the points from previous studies that the diversity of TMT (e.g. education and functional background) is closely related to administrative innovation.

Hoffman and Hegarty contended that executive characteristics explain more variation in the innovation process than organisational and environmental variables.

Thus, Hoffman and Hegarty (1993) studied the degree to which executive characteristics explain the influence of top management on Product/Market (PM) and administrative innovations and focused on two characteristics particularly relevant to executive influence on innovations, namely, expertise and access to resources, and to two executive activities which are also relevant to both strategic decision and innovation processes: environmental scanning and planning/control. The results indicate that different executive characteristics explain the influence on each type of innovation. Table 4 summarises the key findings of the relevant studies, the independent variables belong to the behaviour/strategic choice made by the CEO/leader/TMT.

**Table 2** Leadership and organisational innovation

| *Concept of top management* | *Concept of innovation* | *Reasoning* | *Research design* |
|---|---|---|---|
| *Researchers: Politis (2004)* | | | |
| *Transformational leadership(+)*<br>Charismatic behaviour<br>Individualised consideration<br>Intellectual stimulation<br>*Transactional leadership(+)*<br>Contingent reward<br>Management-by-exception<br>*Transformational leadership(–)*<br>Charismatic behaviour<br>Individualised consideration<br>Intellectual stimulation<br>*Transactional leadership(–)*<br>Contingent reward<br>Management-by-exception | *Stimulate determinants*<br>Organisational encouragement<br>Supervisory encouragement<br>Work group support<br>Freedom<br>Sufficient resources<br>Challenging work<br>*Obstacle determinants*<br>Workload pressure<br>Organisational impediment | A leadership role of a facilitative kind fosters the generation of new (creative) outputs. Supportive, non-controlling supervision enhances creativity, and employees are more creative when they are granted high autonomy. It is responsible to expect a leadership style focussed on specific techniques to be an essential means of influencing the behaviour of employees in creating a work environment conductive to creativity | • Survey of a sample of nine departments in a service organisation operating in the UAE<br>• 118 returned usable questionnaires |
| *Researchers: Scott and Bruce (2004)* | | | |
| *Leadership*<br>Leader role expectations(+)<br>Leader–member exchange(+) | Individual innovation behaviour | The quality of the relationship between a supervisor and a subordinate is related to innovativeness<br>Managers expect subordinates to be innovative, and subordinates perceive managers as encouraging and facilitation their innovation efforts | It is hypothesised that leadership and other variables affect innovative behaviour both directly and indirectly<br>Structural equation analysis is used to test the proposed model using data gathered in a large, centralised R&D facility of a major US industrial corporation |

Note: '×' means insignificant relationship; '+' means positive significant relationship; '–' means negative significant relationship.

**Table 3** Characteristics of TMT and organisational innovation

| *Concepts of top management* | *Concepts of innovation* | *Reasoning* | *Research design* |
|---|---|---|---|
| *Researcher: Bantel and Jackson (1989)* | | | |
| *Composition of TMT* | Technical innovation | Organisational leaders will influence organisational outcomes including innovation | A demographic approach is adopted to assess the relationship between TMT and innovation |
| Average age(×) | | | |
| Age heterogeneity(×) | | | |
| Average tenure(×) | | Demographic variables of TMT are related to cognitive abilities, attitude and expertise | A sample of 199 banks |
| Tenure heterogeneity(×) | | | Questionnaires sent to 460 CEOs in six states and the response rate raged from 29 to 62% |
| Average education level(+) | | | |
| Heterogeneity of educational specialties(×) | | | |
| Heterogeneity of functional backgrounds(×) | | | |
| *Composition of TMT* | Administrative innovation | | |
| Average age(×) | | | |
| Age heterogeneity(×) | | | |
| Average tenure(×) | | | |
| Tenure heterogeneity(×) | | | |
| Average education level(×) | | | |
| Heterogeneity of educational specialties(×) | | | |
| Heterogeneity of functional backgrounds(+) | | | |

Note: '×' denotes an insignificant relationship; '+' represents a positive significant relationship and '–' means a negative significant relationship.

**Table 4** Behaviour/strategic choice made by CEO/leader/TMT and organisational innovation

| *Top management concepts* | *Innovation concepts* | *Reasoning* | *Research design* |
|---|---|---|---|
| *Researcher: Meyer and Goes (1988)* | | | |
| *Innovation-decision variables*<br>CEO advocacy(+) | Organisational assimilation of technological innovations. | Innovations would be more likely to be assimilated into organisations in which the innovations were compatible with patterns of medical specialisation and whose CEOs enjoyed influence | To examine 300 organisational decision-making processes by investigating 25 hospitals which assimilated 12 medical innovations |
| *Researcher: Kimberly and Evanisko (1981)* | | | |
| *Individual variables*<br>HA committee participation(–)<br>HA involvement in medical activities(+)<br>CM involvement in administrative activities(+) | *Technological innovations*<br>–Hospital responses regarding the presence or absence of 12 new medical developments | Greater involvement in policy (as opposed to operations) is associated with receptiveness to innovation | To examine the combined effects of individual, organisational, and contextual variables on organisational adoption of two innovation types<br>The data was developed using the organisation and technology programme at Cornell University |
| *Individual variables*<br>HA committee participation(×)<br>HA involvement in medical activities(×)<br>CM involvement in administrative activities(×) | *Administrative innovations*<br>–Hospital responses regarding the use of electronic data processing for eight possible managerial functions | | |
| *Researcher: Jeyaraj, Rottman and Lacity (2006)* | | | |
| Perceived usefulness(+)<br>Top management support(+)<br>Computer experience(+)<br>Behavioural intention(+)<br>User support(+) | Individual IT adoption | IT adoption is a behaviour related to psychological characteristics, including perceived usefulness, behavioural intention and environmental climate, e.g. external pressure, and support from top managers and users | The sample included 48 empirical studies on individual and 51 studies on organisational IT adoption published between 1992 and 2003 |
| Top management support(+)<br>External pressure(+)<br>Professionalism of the IS unit(+)<br>External information sources(+) | Organisational IT adoption | | |

**Table 4** Behaviour/strategic choice made by CEO/leader/TMT and organisational innovation (continued)

| *Top management concepts* | *Innovation concepts* | *Reasoning* | *Research design* |
|---|---|---|---|
| *Researcher: Hoffman and Hegarty (1993)* | | | |
| *Executive characteristics*<br>Scanning activities(+)<br>Planning/control(+)<br>Access to resources(×)<br>Expertise(+) | Product/Market innovation | Scanning influences strategic decisions and innovations<br>Planning/control activities influence strategic decisions<br>Access to resources is an important source of decision power<br>Top management functional expertise influences strategic decisions | The influence of top management on innovations is conceptualised as a function of executive characteristics, culture, and other contextual variables<br>Given the strategic perspective, top management is adopted as the unit of analysis<br>A sample of 361 top managers from 97 manufacturing business units in nine industrial western nations |
| *Executive characteristics*<br>Scanning activities(×)<br>Planning/control(×)<br>Access to Resources(+)<br>Expertise(+) | Administrative innovation | | |

Note: '×' denotes insignificant relationship; '+' represents positive significant relationship; '–' means negative significant relationship.

West et al. (2003) revealed that specialist healthcare teams are characterised by a strong relationship between leadership clarity and team processes, and that in turn a strong relationship exists between team processes and team innovation. Thus, both the characteristics of TMT and its process or behaviour can influence innovation. Elenkov and Manev (2005) further noted that the top managers directly influence organisational innovations as they set up an organisational structure, process and culture that supports innovation and adopt a leadership role in implementing organisational innovation.

Over the past 20 years or more, research on TMT like the upper-echelon theory proposed by Hambrick and Mason (1984) has suggested that TMT is likely to be the optimum unit of analysis for studying the influence of managers and their strategic choices on organisational performances. To date, research examining the relationship between leader personal characteristics and organisational outcomes has adopted two different approaches. One approach is directly assessing the psychological attributes of decision-makers and examining their relationship with outcomes. Meanwhile, another approach is assessing demographic characteristics (e.g. age and education) based on the assumption that such characteristics are related to cognitive abilities, attitudes and expertise (Bantel and Jackson, 1989). Cognitive diversity is a valuable resource when solving complex, non-routine problems. Meanwhile, demographic heterogeneity can reduce communication and increase conflict.

This study summarises the results of research regarding the influence of top management on organisational innovation from Tables 1 to 4 as listed above. Regarding the demographic variables, the influence of CEO educational level and tenure can be explained by the fact that education level is related to the reasoning and the assimilation of technical information. And tenure is related to the professional experience at the

position to champion the innovations. Psychological traits, managerial behaviour and leadership style also impact organisational innovation.

Based on prior research results, innovators require power tools (e.g. information, resources and support) to exercise influence (Hoffman and Hegarty, 1993). Consequently, the relationship of top management and organisational innovation is complex, thus allowing other variables to be included in the relationship and increasing the importance of discussing the relationship between relevant variables.

### *2.4 Mediators of the relationship between top management and organisational innovation*

Numerous researches dealing with the influences on innovation from context, organisation and individual levels (Kimberly and Evanisko, 1981; Meyer and Goes, 1988). However, we all know that leaders or top managers require powerful tools to exercise their influence, and thus, it is necessary to focus on examining how leadership affects innovation in organisational contexts.

Kickul and Gundry (2001) performed research on the influence of management diversity and creativity on the assessment of opportunities for e-commerce organisations, and on innovative internal and external managerial relationships and practices. Results from a sample of 120 CEOs of e-commerce firms demonstrated that opportunity assessment mediates the interactive effects of managerial diversity and creativity, influencing the adoption of innovative practices that focus on employee relationships, external networks and new products and services.

Abbey and Dickson (1983) believed that a possible explanation for the inconsistent results could be the tendency of researchers to use the entire organisation as the unit of analysis rather than using the specific subsystem form which innovations are generated. Thus, Abbey and Dickson surveyed the R&D managers in 42 companies that listed their business activities as being related to semiconductors (SIC 3674) using questionnaires of 11 work climate scales, namely, autonomy, cooperation, supportiveness, structure, level of reward, performance–reward dependency, achievement motivation, status polarisation, flexibility, decision centralisation and perceived innovativeness. The survey results suggest that the work climate of innovative R&D subsystems is characterised first by a reward system that recognises and equitably rewards excellent performance and, secondly, by a willingness to take risks and experiment with innovative ideas and proposals. Work climate is defined as a relatively enduring quality of the internal environment of an organisation that results from the behaviour and policies of organisation members, especially in top management.

Besides the empirical support, this study also found that top management engage in mediating behaviour. For example, Service and Boockholdt (1998) investigated manager perceptions regarding the causes of innovation. The results demonstrate that the variable effect of human relations practices was mediated by the commitment variable, while the communications variable mediated the innovation characteristics variable effect. Mangers perceived that human relations practices influence innovation by increasing commitment (see Tables 5 and 6).

**Table 5** Mediators of the relationship between top management and organisational innovation (hypothesis supported)

| *Mediators* | | *Top management concept* | *Innovation concept* | *Researcher* | *Research design* |
|---|---|---|---|---|---|
| *Category* | *Concept* | | | | |
| Decision or strategic choice of top management team | Opportunity assessment | *TMT diversity*<br>–Functional background | *Managerial practices and innovations*<br>Product/service offerings<br>Internal business relationships<br>External business relationships | Kickul and Gundry (2001) | A sample of 120 CEOs of e-commerce firms via online surveys. |
| Outcomes of top management | *Organisation work climate*<br>level of reward<br>performance-reward dependency<br>achievement motivation<br>flexibility<br>perceived innovative-ness | Behaviour and policies of top management | *Innovativeness*<br>Initiation<br>Adoption<br>Implementation | Abbey and Dickson (1983) | The unit of analysis was the subsystem of the organisation<br>Survey R&D managers of 42 companies |

**Table 6** Mediators of the relationship between top management and organisational innovation (hypothesis not supported)

| *Mediators* | | *Concept of top management* | *Concept of innovation* | *Researcher* | *Research design* |
|---|---|---|---|---|---|
| *Category* | *Concept* | | | | |
| Outcomes of top management | *Organisational work climate*<br>autonomy<br>cooperation<br>supportive-ness<br>structure<br>status polarisation<br>decision centralisation | Top management behaviour and policies | *Innovativeness*<br>Initiation<br>Adoption<br>Implementation | Abbey and Dickson (1983) | The unit of analysis is organisational subsystems<br>Survey the R&D managers of 42 companies |

Leadership behaviour varies due to the different importance of innovation objects to organisational strategies. The more important the R&D project is to an organisation, the more attention and support it will receive from the top managers. Green (1995) studied the top management support of 213 R&D projects in 21 major firms and obtained similar findings (*Note*: Similar to what? Could you clarify?). Testing a model based on a strategic leadership perspective, identified top management support as being directed at certain types of projects, namely, those that were expected to contribute strongly to business goals, represented large investments, were seeking new products and processes rather than incremental improvements, and had originated from business sources rather than R&D. In addition, even after controlling for these project characteristics, projects with top management support had a lower likelihood of termination.

To summarise the various findings regarding mediators of the relationship between top management and organisational innovation, this study found that some of the proposed aspects of organisational work climate do not get empirical support to be mediators. These mediators include autonomy, cooperation, supportiveness, structure, status polarisation and decision centralisation. The possible reason of insignificance is that the aspects are directly related to organisational innovation. For example, supportiveness has been identified as an important influence on organisational innovation (Jeyaraj, Rottman and Lacity, 2006).

### *2.5 Moderators of the relationship between top management and organisational innovation*

Elenkov and Manev (2005) argued that the influence of top managers on innovation can be described by the perceptions of the key actors in the innovation process regarding the extent of the influence of top managers on recent anticipated outcomes of the innovation process. Thus, top managers rarely influence PM innovations directly because their involvement may be counterproductive if perceived as 'micromanagement'. These innovations are frequently carried out by lower and middle-level managers and non-managerial employees. Top managers mostly influence such innovation indirectly through allowing autonomy and encouraging intrapreneurial or corporate venturing behaviour.

Hoffman and Hegarty (1993) argued that different executive characteristics can explain the influence on each type of innovation. Moreover, the influence process differed across cultures for administration innovation but not for PM innovation. Based on the study of Hofstede (1980), the four Western cultures (Anglo, European Latin, Germanic and Nordic) investigated in this study differ in these four cultural value dimensions (power distance, uncertainty avoidance, individualism and masculinity). This study analysed a sample of 361 top managers from 97 manufacturing business units located in nine western industrialised nations. The results indicate a moderating effect of culture for general management expertise and administrative innovation but not for PM innovations.

Elenkov and Manev (2005) used data from 12 European countries to examine whether socio-cultural context directly moderate the relationship between leadership and the influence of top-management on innovation. The results demonstrate that socio-cultural context directly influences leadership and moderates the relationship between top management and organisational innovation. This complex relationship supports a culture-specific view of leadership, but challenges the claim that given

leadership factors are universal. As noted by Zhao (2006), cultural barriers to innovation exist at both the business unit and organisational levels.

Wu, Levitas and Priem (2005) examined the moderating influence of technological dynamism on the relationship of CEO's tenure and organisational innovation in the biopharmaceutical industry. Empirical results indicate a curvilinear, inverted U-shaped overall relationship between CEO tenure and invention. However, technological dynamism shifts this curve such that short-tenured CEOs engender more invention under high dynamic technological environments compared to low dynamic environments, while long-tenured CEOs encourage greater invention under more stable technologies. The empirical arguments are based on the review of literature; i.e. short-tenured CEOs are more successful at spurring invention in technologically dynamic than technologically stable environments. Furthermore, long-tenured CEOs are less successful in technologically dynamic than technologically stable environments. The results indicate the complexity of the relationship between CEO tenure and organisation inventiveness.

The moderators discussed below are all 'social level moderators', including social–cultural context, culture and technology dynamism (see Table 7). This study also identifies moderators belonging to the organisation and group levels, as follows.

**Table 7** Top management and organisational innovation with social level moderators (with the empirical results of statistics significant/hypothesis support)

| *Moderators of social level* | *Top management concepts* | *Innovation concept* | *Researcher* | *Research design* |
|---|---|---|---|---|
| *Culture* | Functional specialty<br>Scanning<br>Forecasting<br>Planning | New products<br>New markets<br>Market changes | Hegarty and Hoffman (1990) | 362 top managers from 96 manufacturing business units located in eight European countries and USA |
| *Culture* | *Executive characteristics*<br>Expertise<br>Access to resources<br>Scanning<br>Planning | Product/Market innovation<br>Administrative innovation | Hoffman and Hegarty (1993) | Unit of analysis is top manager<br>361 top managers from 97 manufacturing business located in nine western industrialised nations |
| *Culture*<br>Germanic<br>Latin<br>Nordic | *Strategic management activities*<br>Scanning (social trends)<br>Planning (planning) | *Administrative innovation*<br>Structural innovations<br>Systems innovations | Hoffman (1999) | 71 firms in seven nations<br>Survey of R&D managers in 42 companies |

**Table 7** Top management and organisational innovation with social level moderators (with the empirical results of statistics significant/hypothesis support) (continued)

| *Moderators of social level* | *Top management concepts* | *Innovation concept* | *Researcher* | *Research design* |
|---|---|---|---|---|
| *Socio-cultural context*<br>Power distance<br>Uncertainty avoidance | *Leadership*<br>Corrective-avoidant<br>Developmental/ transactional<br>Transformational | *Influence of top management on innovation*<br>Product/Market innovations<br>Organisational innovations | Elenkov and Manev (2005) | 1774 individuals(270 titular heads, 783 subordinates and 721 key participants in the innovation process) provide data<br>270 business unit located in 12 European countries |
| *Technological dynamism*<br>–Uncertainty regarding the technological endeavours of a firm | *CEO tenure*<br>–Number of years a specific individual had held the CEO position with a company | *Inventiveness*<br>–Total number of patents filed by a company | Wu, Levitas and Priem (2005) | In the context of the biopharmaceutical industry<br>A sample of 238 US-based, publicly traded biotechnology companies |

Amason, Shrader and Tompson (2006) studied the relation between the composition of TMT and new venture performance using empirical data from a sample of 174 high-potential new ventures established between 1983 and 1988 that issued Initial Public Offerings (IPOs) during the first six years after establishment. The findings suggest that the novelty of the venture drives information processing demands on the TMT, higher novelty causes the more demands. Superior new venture performance results when TMT composition matches the information processing demands (see Table 8). The results mean the need for the interaction between the TMT who learn by doing and exchange subjective and vague information increases with the novelty of the new venture. Such frequent interactions also require the TMT to have consistent demographic characteristics. Since the novelty of the new venture is low, the TMT should learn by seeing. Moreover, the performance will be better if the composition of the TMT is more diversified.

Auh and Menguc (2005) designed a contingent model of how TMT diversity acts as a form of human capital and can positively influence innovativeness when effectively leveraged with favourable social capital. The theoretical underpinning depends upon the argument that greater interfunctional coordination is a source of internal social capital, mitigating the costs while simultaneously highlighting the benefits of TMT diversity. The results of model testing generally indicated that TMT diversity positively affected the innovativeness given increasing interfunctional coordination.

**Table 8** Top management and organisational innovation with organisational level moderators (with the empirical results of statistics significant/hypothesis support)

| *Moderators of organisational level* | *Top management concept* | *Innovation concept* | *Researcher* | *Research design* |
|---|---|---|---|---|
| *Novelty of venture*<br>High novelty: create value by introducing a new product or service<br>Low novelty: create value by improving existing offerings | *TMT composition*<br>Size<br>Heterogeneity<br>1 age<br>2 educational level<br>3 education specialisation<br>4 functional background | *Venture performance*<br>Profitability<br>Sales growth<br>Market performance | Amason, Shrader and Tompson (2006) | A sample of 174 high-potential new ventures established between 1983 and 1988 that issued Initial Public Offerings (IPOs) during the first six years after establishment |

Kickul and Gundry (2001) researched the influence of management diversity and creativity on the assessment of e-commerce opportunities, and on innovative internal and external managerial relationships and practices. Results from a sample of 120 CEOs of e-commerce firms revealed that the opportunity assessment mediates the interaction of managerial diversity and creativity, influencing the adoption of innovative practices focused on employee relationships, external networks and new products and services (see Table 9).

**Table 9** Top management and organisational innovation with group level moderators (with the empirical results of statistics significant/hypothesis support)

| *Moderators of group level* | *Concept of top management* | *Concept of innovation* | *Researcher* | *Research design* |
|---|---|---|---|---|
| *Interfunctional coordination of TMT*<br>A structural mechanism for enhancing common organisational goals<br>A method of fostering increased communication, collaboration and cohesiveness<br>Paves the way for building trust and commitment between TMT from diverse backgrounds | *TMT diversity*<br>Functional<br>Experience<br>Educational level | *Innovativeness*<br>Structural innovations<br>Systems innovations | Auh and Mengue (2005) | 753 SBUs and 242 usable questionnaires, with a response rate of 32.9%<br>Average SBU size is 681 full-time employees |
| Managerial creativity | TMT diversity | Opportunity assessment | Kichul and Gundry (2001) | A sample of 120 CEOs of e-commerce firms with online questionnaire survey |

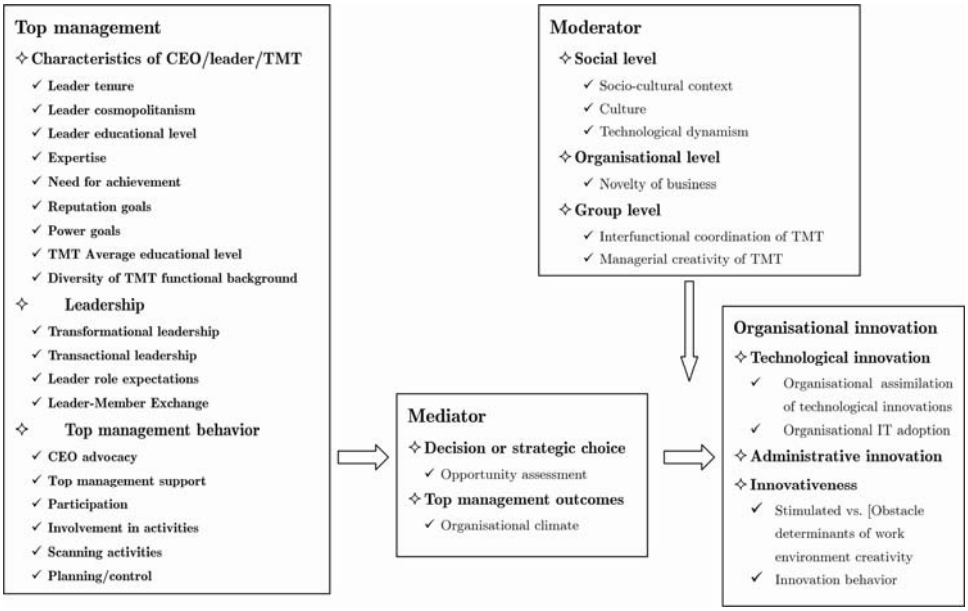
Summarising the various findings regarding the moderators of the top management and the organisational innovation (Tables 7–9) demonstrated that social–cultural context, technological dynamism, novelty of business, interfunctional coordination of TMT, managerial creativity of TMT moderate the relationship between top management and organisational innovation. These moderators cover the different levels of society, organisation and group.

## 3 An integrated framework

According to the review of the relevant literature, this study proposes an integrated framework, as illustrated in Figure 1. In the framework, top management is the independent variable while organisational innovation is the dependent variable, and moderators exist between these variables.

This study summarises top management as the characteristics of leaders, TMT and leadership. Leader/TMT characteristics can be clarified into two types, including both demographic and psychological traits. The influences of both variable types on innovation are demonstrated by empirical data. Innovation appears to increase with the diversity of psychological characteristics. Further research found that the relationship is more complex than this, for example, being moderated by interfunctional coordination (Auh and Menguc, 2005).

**Figure 1** Integrated framework of top management and organisational innovation




The left box of Figure 1 contains the independent variables grouped as ‘characteristics of CEO/leader/TMT’, ‘leadership’ and ‘top management behaviour’. The variables investigated in the prior researches have been reviewed in the earlier section. The CEO/leader/TMT influence on organisational innovation has been found to be mediated

by 'decision or strategic choice' and 'top management outcomes'. And the relationship of top management and organisational innovation has been found to be moderated by variables grouped as 'social level', 'organisational level' and 'group level'.

The dependent variable is organisational innovation, and can be conceptualised as technological innovation, administrative innovation and innovativeness. Technological innovations relate to products and services, and also to production processes and operations related to the central activities of the organisation. Administrative innovations relate to changes in the organisational structure and the members of the organisation (Bantel and Jackson, 1989). Finally, innovativeness refers to organisational inclination to engage in innovative behaviour (Auh and Mengue, 2005).

## 4 Future research directions

We have noted the very need for further theory development and empirical inquiry in the relationship between top management and organisational innovation. This study has already proposed an integrated framework and sketched a broad picture to present the related research issues. Some important research questions in the nearby agenda are as follows.

Firstly, according to Meyer and Goes (1988), the demographic variables related to CEOs (tenure and education) do not determine the aggregate rates of adoption by organisations. However, a positive relation exists between average education level and the diversity of functional background of TMT and technical innovation (Bantel and Jackson, 1989). Thus, the question arises of the reason for these two confusing results. Specifically, do these confusing results indicate that the characteristics of individuals are unimportant, while group characteristics are important?

Secondly, some research results indicate some difference between the factors leading technological and administrative innovation (Kimberly and Evanisko, 1981; Hoffman and Hegarty, 1993). Thus, the question arises of whether organisational innovation should be separated into two different types of innovation to establish a dependent variable during research.

Consistent with the request of Elenkov and Manev (2005) that the relationship between top management and organisational innovation requires further examination, this study believes that researchers and practitioners should consider the influence of top management on organisational innovation. Likewise, research should be conducted to obtain an improved understanding of top management and organisational innovation. For example, leadership style analysis is necessary to identify the temporal rhythms of OI episodes and the characteristics of CEO/TMT.

## 5 Managerial implications

The integrated framework of top management and organisational innovation in this study has many implications for mangers. Surely, further elaboration and more empirical testing of the relationship in the framework are needed to upgrade its practical helpfulness.

The first important question involves the usefulness of involving top management in the innovation process. This study suggested that managers should sense their influence

on organisational affairs, because innovation has been demonstrated not to be accidental, but rather results from evaporations of the managers. As indicated by the findings of Markic (2006) that managerial innovativeness should not be taken for granted, it is important to pay more attention to innovation regarding values, feelings, knowledge, skills and management.

The second question involves the possibility of reducing innovation performance in situations where the TMT (or CEO) have longer tenure. Restated, does the chance of the management team adopting new ideas or innovations reduce with increasing length of time that they are in power? West and Anderson (1996) observed the importance of innovation in the TMT, and found that management team innovativeness can predict organisational innovation performance. Finally, Bjerke and Hultman (2003) associated entrepreneurial growth with leadership, imaginary organisations, explorative learning, relationship marketing and value constellations.

While this study has focused on methods for enriching both top management and innovation research, it also adopts the view that consideration of top management is quite useful to managers. This study describes various reasons for the usefulness of such consideration:

1 Matching TMT characteristics to the communication from top manager, the greater diversity of the former and the associated greater need for communication are beneficial to organisational innovation.

2 Enhancing the commitment to and involvement of top managers in organisational innovation, with the chance of an innovation coming true increasing with the commitment and involvement of the top managers.

3 Paying increased attention to the strategic choices of top managers, for example, possibilities for innovation increase with opportunity assessment and the quality of the rational decision process.

4 Be aware of the significance of information systems for strategic decision-making and moreover that such management information systems help the top management to make complex, far-reaching and unpredictable decisions (Markic, 2005).

Finally, it is important to note the importance of learning effect: from a learning perspective, TMT should be good at single loop learning, double loop learning and deutero learning to solve its task of strategic planning and strategic innovation. It is natural to assume that numerous TMT are less adept at double loop learning and deutero learning than at singled loop learning (Drejer, 2006).

## 6 Conclusions

Since Hambrick and Mason (1984) argued the importance of upper-echelons perspective of organisations, numerous researches have followed the top management perspective and test the relationship of organisational outcomes. This study resonates the importance of the upper-echelons approach. Top management is influential on organisational innovation and thus organisational performance through their strategic decisions and behaviour outcomes. The proposed framework contributes to both management research and practice. Regarding the academic side, the proposed approach is, to the knowledge of

the authors, the first theoretical framework of top management and organisational innovation.

This study began with the perspective that cross-border leadership is crucial to organisational innovation. Despite considerable research on top management and organisational innovation, no previous studies have systematically examined its theoretical relevance and used such an examination to propose an integrated research framework. By incorporating verticalness–horizontalness, this study hopes to further highlight this important line of inquiry. The framework of this study delineates some important moderators of top management and organisational innovation. Furthermore, by extending the analyses in this study to the influence process, this study can incorporate some important mediators and their effects on the process.

The review of research on top management highlighted three dimensions describing the influence of top management on organisational innovation. Furthermore, the analytic result was obtained from empirical researches which have already been tested. To summarise, this study proposes three approaches for observing top management influence organisational innovation. Firstly, the characteristics of CEO/leader/TMT and the dimensions of leadership influence organisational innovation. These characteristics include both demographic and psychological variables. Secondly, the impact mediates work climate and the assessment of business opportunities. On the other hand, commitment, communication and involvement of top managers can mediate the relationships among organisational activities (e.g. HR practice), innovation characteristics and organisational innovation. Furthermore, the relationship is moderated by social-cultural context, culture, technological dynamism, the novelty of the business, interfunctional coordination and managerial creativity.

This paper has reported the results of a comprehensive analysis of top management and organisational innovation. Two primary conclusions can be drawn based on the analyses presented here. Firstly, the influence of top management on organisational innovation is complicated, with top manager characteristics and behaviours acting as an independent variable influencing organisational innovation, but behaviours such as communication and commitment also mediating the relationships. Secondly, the review demonstrates the importance of moderators, which include group, organisational and contextual level variables. Organisational innovation results from multi-stage outcomes of multi-level factors.

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