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RESEARCH ARTICLE

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The formation and management of virtual teams in T Telecom Company

Abstract Virtual marketing teams have emerged in T Company, a regional branch of China Telecom, and led to tremendous success in recent years. It is beneficial to explore the reasons behind such a phenomenon and to identify the factors leading to high performance. Investigating these issues also helps deepen our understanding of managerial experience and some important organizational changes that Chinese state-owned enterprises are going through. In this case study, analysis of the characters of high performing virtual marketing teams in T Company concentrates on four main team processes, namely virtuality and communication, personnel selection, trust, and motivation. Key factors contributing to the team's high performance are analyzed, and the implications of the results for management and future research directions are also discussed.

Keywords T Telecom Company, marketing, virtual team, VIP customer, high performance

摘要 T 电信公司作为中国电信的市级分公司，近些年出现了营销虚拟团队并取得了良好的业绩。考察这些现象有助于认识电信营销虚拟团队出现的原因，深入理解当前中国国有企业的一些重要组织变革及其可借鉴的管理经验。通过研究将 T 公司电信营销虚拟团队的高绩效特征聚焦于虚拟性与沟通、人员选择、信任、激励四个主要的团队过程，分析了 T 公司虚拟营销团队在实际运作中导致高绩效的关键因素，最后讨论了研究结果的管理蕴涵与未来研究方向。

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关键词 T 电信公司，营销，虚拟团队，大客户，高绩效

The emergence of virtual teams is due to the changing internal and external environment that an enterprise faces (Wang and Tang, 2006). Along with the deepening reform in domestic telecom operators, radical changes have taken place in the internal and external environment that China Telecom faces. Virtual marketing teams (VMTs), as a response to competition in the market, are now becoming more and more important for China Telecom Group (China Telecom). Based on VMTs, this new marketing mode, has demonstrated its strength as a powerful organization form in highly uncertain and complex VIP (very important person) customer marketing. Virtual teams, in which members use technology to interact with one another across geographical, organizational, and other boundaries (Gibson and Cohen, 2003), improve the speed of reaction, strengthen the adaptability and flexibility of organization, and has become an important method to develop the core competitiveness of organizations.

Although progress has been made in research on VMTs in China, little attention has been paid to the application and management method of VMTs in enterprises. Nor have there been such studies on large state-owned enterprises. The enterprise concerned in this case study is affiliated to China Telecom, a typical large state-owned enterprise in North China. The aim of this paper is to study the formation process and internal operation mode of VMTs in T Company so as to provide managerial references for other state-owned enterprises, which we believe, is of unique significance to China's ongoing enterprise reforms.

1 Background

Since the separation of government functions from enterprise management in 1995, China Telecom has undergone a number of adjustments and reforms. At the same time, corporate governance reform and technology renovation also promoted fundamental changes in China's telecommunication market. In 1995, China Telecom, for the first time, registered as an independent enterprise legal person, and gradually transformed from a former government department into a business entity. Since then, China Telecom has appeared formally as an enterprise in the legal sense. In 1998, China Telecom's postal services and telecommunication divisions were split into two independent companies and China Telecom began to focus solely on the operation of all telecommunication business. To further boost competitions in China's telecommunication market, in 1999, Chinese government declared that the paging, mobile and satellite services of China Telecom were separated and transferred respectively to Unicom, Mobile and Satcom, and all these enterprises were granted licensees to operate

their own telecommunication services all alone. In 2001, China Telecom was once again split into north China Company and south China Company (mainly with Changjiang River as a boundary), known as the new Telecom and Netcom, respectively.

Around 2003, both parties started to establish subsidiaries in each other's main operation regions. Meanwhile, accompanied by the reform of China Railcom (called Tietong in China) and the emergence of substitute products from other telecommunication operation enterprises, the competition faced by China Telecom became ever intensified. After years of reform, China Telecom has gradually become a telecommunication services provider mainly in the field of fixed-line telephone business, PHS, data and Internet business. For Chinese government's "separate operation" and "asymmetric regulation" regulatory policy in telecommunication market, as well as the ossification of interior management system, China Telecom in recent years faced severe situation of decrease in basic business and deficient in new business increment, including low growth rate of main business income, successive monthly decline of call minutes per single telephone, continuous rise of telephone withdrawal rate, etc. More seriously, due to the intense competition, China Telecom is losing its VIP services that are of decisive importance to its revenue stability and growth.

In order to change the rigidity of enterprise management system, China Telecom has carried out a number of reform measures top down, and has introduced a "market-oriented, customer-centered, and efficiency-targeted" enterprise tenet. However, strict bureaucratic administration system was seriously restricting its market competitiveness. Though China Telecom has set up some small sales and marketing teams, their roles are limited in the face of increased market uncertainty and complexity of customers' need. In 2003, in order to implement customer-oriented business philosophy, China Telecom divided its customers to three segmentations based on their importance and revenue, and constructed three corresponding marketing channels (i.e. VIP, business, and public customer channels) to use differentiation strategy to maintain the current customers and expand the increments from new market. The reform measures have achieved good results and created the organizational basis for cross-functional, cross-regional team coordination. Also, it fostered the formation of customer-oriented corporate culture.

While China Telecom is experiencing reform of interior and exterior system, modern communication and information technology has undergone rapid development. New types of virtual communication means have blurred the boundary with traditional face-to-face communication. In a new era of technology booming and visual reality, telecommunication products have become more complicated and diversified than ever, which requires composite

and integrated marketing strategies to utilize the advantages of network. In the same period, the customers' needs of communications and information begin to increase rapidly. But in face of these new changes, customers often can not really understand their communication and information needs so that it is difficult to predict the development of future technologies. The uncertainty and complexity of customer demand is rising drastically. Therefore, China Telecom not only contributes to the development of customers, but also brings new opportunities for itself by means of integrating its own network and human resource advantages and providing customers with comprehensive, long-term, high-quality solutions and deep support. This cooperative demand is hard to be met by any certain sector or regional team. As a result, a mode of marketing VT has emerged to meet this trend.

T Company is located in a western province of China. As a city-level branch of China Telecom Group, it holds more than 900 million Yuan of fixed assets and a total capacity of about 600 000 telephone exchanges. Its network covers nearly 3.6 million people in the whole city. By 2006, T Company has 500 000 network telephone users, 30 000 broadband users; the operational income is about 260 million Yuan. In T Company, under the background of telecommunication reform, technological development, and drastic change in interior and exterior market environment in the past 10 years, the number of potential customers has begun to drop and its interior network capacity has become surplus. The attention to new market and contest for customer resources in recent years made T Company begin to adopt the new mode of VT in VIP marketing activities. The results were quite satisfactory. Therefore, study on VT's formation, operation, and high-performance characteristics will definitely bring valuable insights into organizational reform of large state-owned enterprise. In addition, team mode as a necessary supplement to the rigid traditional bureaucratic management mode is able to help state-owned enterprises to improve their flexibility and to cope with the environmental uncertainty.

2 Theories on virtual teams

Since the 1990s, with the development of information technology, application of VT in the management practice has become increasingly popular. The inputs-progresses-outcomes (I-P-O) model, as a theoretical framework, is widely used in research on VMTs.

Virtual teams refer to a group with a common goal, who work coordinately by adopting the network information technology crossing obstacles of space, time and organizational boundaries (Lipnack et al., 1997). Gong and Wang (2004)

suggest that VT is a group of people with different capability or resources who work collaboratively, in order to complete a particular task or achieve a common goal, crossing obstacles of time and space or organizational boundaries with the assistance of electronic information technology. These definitions exclude the co-located VMTs, member geographical dispersion is not a requisite for VMTs. However, because co-located team members can communicate and coordinate in a highly virtual manner even though they are in close physical proximity. All teams have their virtuality (Kirkman and Mathieu, 2005).

2.1 Team virtuality

Some researchers are shifting away from defining VMTs as a type of team that contrasts with a "traditional" or "conventional" face-to-face team (Guzzo and Dickson, 1996; Kirkman and Mathieu, 2005), but are focusing instead on "virtuality" as the potential features of all teams (Martins et al., 2004). Team virtuality is the extent to which team members use virtual tools to coordinate and execute team process, the amount of informational value provided by such tools, and the synchronicity of team member virtual interaction (Kirkman and Mathieu, 2005). The amended team virtuality model is shown in Fig. 1.

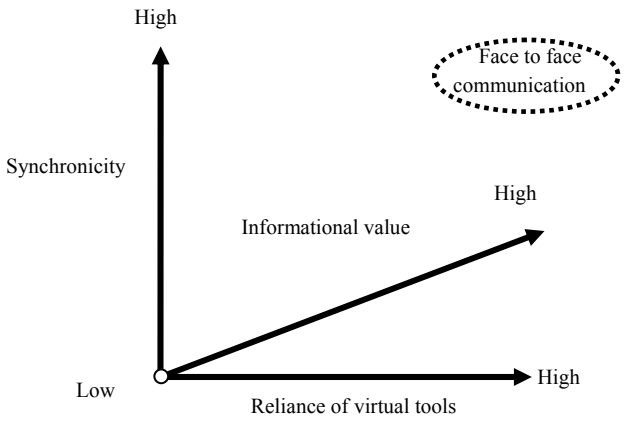


Fig. 1 Three-dimensional structure model of VMTs

The degrees of virtuality vary with different teams. Compared with face-to-face communication, the higher the dependence on virtual tools, the stronger the virtuality of a VT. Communications and information technology in VMTs include not only direct communication, but also valuable information transmission. The richer and more valuable the information exchange among

members, the lower the virtuality. The combination of virtual tools includes communication as well as data transmission. Synchronization refers to real-time exchange, while asynchronism has certain time lag. Although asynchronous communication has some shortcomings, members can have sufficient time to study the information and response, search for resources and reduce the time and space limitations. In short, compared with face-to-face communication, video conference, and instant information, asynchronous communication has higher virtuality than synchronous communication. Kirkman and Mathieu (2005) summarized a total of eight decisive factors of team virtuality from three aspects (Table 1).

Table 1 Team virtuality and antecedents

Contextual features	Numbers of boundaries crossed	Team virtuality increases as the increase of the number of boundaries(e.g., organizational, nations/cultural, time zones) crosses
	Proportion of co-located members	Team virtuality increases as the proportion of co-located team members decreases
	Team size	Team virtuality increases as the increase of team size
Task-media-member compatibility	Task complexity	Team virtuality increases as the increase of task complexity(intensive interdependence)
	Team member competencies	Team virtuality increases as the increase of KSAO (knowledge, skills, abilities, other) owned by team members
Temporal dynamics	Time available for task completion	the more efficiently and quickly the virtual tools are, the more likely team virtuality will increase
	Team evolution and maturity	Team virtuality rises as the increase of KSAO (knowledge, skills, abilities, other) owned by team members
	Rhythms of team process	Virtuality changes as the task attribute executed in different time. Virtuality is usually low at the upspring stage (mission analysis, targeting, strategy development), and high at the action phase (coordination, surveillance environment, execution of the backup plan)

Source: Kirkman and Mathieu (2005).

Shekhar (2006) clarified the directionality and granularity of virtuality under different contexts through the study of virtuality of virtual organization, and suggested that virtuality should be tested through the factors influencing it, the degree of virtuality, and the outcomes of virtuality. Under different circumstance, virtuality can promote team effectiveness, but also may impede it. Therefore, it is necessary to evaluate the outcomes of virtuality. Virtuality is virtuous only when

the business activity or process is being performed better or more effectively than non-virtual or low-virtual state (Shekhar, 2006). Virtual direction includes external customer (EC) direction, namely the virtuality of different types of customers; internal customers (IC) direction, namely the virtuality of working staff or other members within the organization; value chain (VC) partners direction, including virtual linkages with suppliers, alliance partners, affiliates, service providers, and other inter-organizational relationships. Research on the granularity of virtuality focusing on the analysis units includes individual, group, organizational units. Based on the identification of the direction and granularity of virtuality, it can conveniently describe different virtual outcomes. This comprehensive research makes it possible for the T Company assess whether the virtuality is indeed leveraged as a strategic tool or is a merely technical phenomenon. Under this framework, different virtual relations within VMTs can be discriminated (Fig. 2).

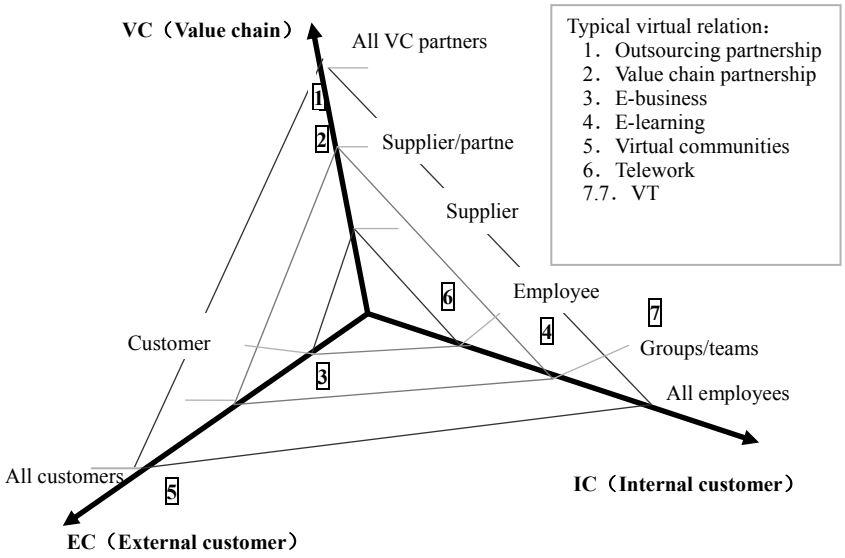
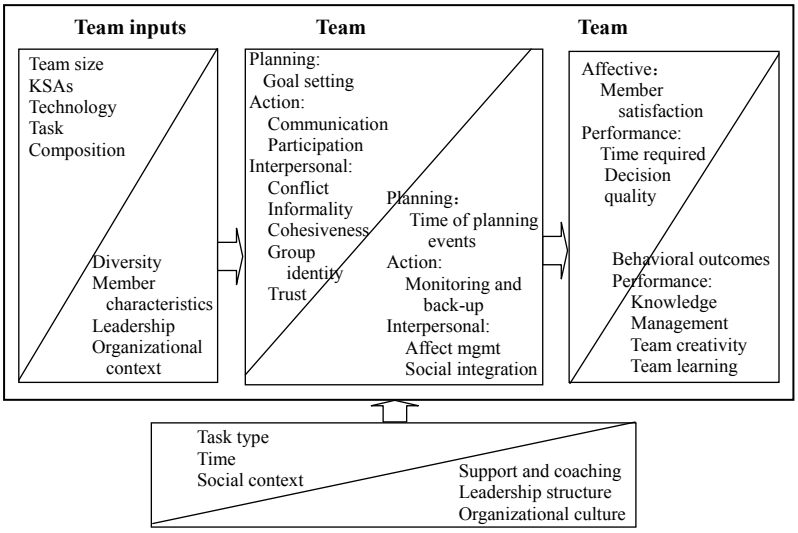


Fig. 2 Directionality and granularity of virtuality

2.2 The I-P-O mode of virtual teams

The inputs-processes-outcomes (I-P-O) model (Hackman and Morris, 1975) is the dominant framework used in studies of teams, and it also provides sound foundation for integrating the theory of VT (Martins et al., 2004). The input variable represents the design and compositional characteristics of a VT such as the member personalities, KSAs, group size, technology, task or experience that influence how team operates and performs (Hackman and Morris, 1975). Team

process means how VMTs achieve their outcomes, including planning process, action process and interpersonal process (Marks, Mathieu and Zaccaro, 2001). Planning process encompasses mission analysis, goal setting, strategy formulation and other processes related to focusing the team efforts. Action process includes the interaction among members when implementing team task, such as communication, participation, coordination, and supervision, etc. Interpersonal process refers to membership relation, including conflict, tone of interaction, trust, cohesion, affection and social integration and so on. Outcomes represent task and non-task consequences of performance outcomes (such as effectiveness, speed of decision, and decision quality) and affective outcomes (such as member development, satisfaction and so on). The I-P-O model is actually an open efficacy framework, from the study of different combination of input and process to achieve the intended performance within the company goal. The I-P-O model proposed by Martins et al. (2004) is shown in Fig. 3.



Note: Within each category of variables, those that have been examined in research on VMTs are listed above, and those in need of future research are listed below the diagonal.

Fig. 3 I-P-O model of virtual teams functioning

3 The changes of telecom marketing mode of T Company and the application of virtual teams

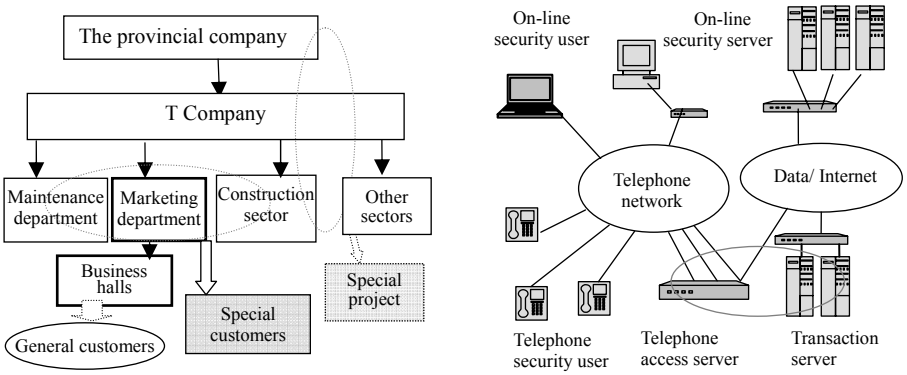
The marketing mode of telecom enterprises changes with the uncertainty of

the environment, especially the uncertainty of customer demand and the changes of the factors like the complexity of customer demand and internal business of enterprise. The marketing mode of T Company has experienced the traditional bureaucratic mode, small team mode and VT mode. Though the bureaucratic mode is still the main marketing mode in T Company, the VT marketing mode has developed rapidly in recent years and is mainly applied in VIP marketing.

3.1 The earlier bureaucratic style telecom marketing mode of T Company

The rapid development of telecom business of T Company started in 1994. In that year, this company opened ten thousand of computerized telephones and 900 MHZ analog mobile phones**.** The development process was in line with the overall background of China Telecom. During the south-north separation and reorganization of China Telecom in 2001, T Company was merged into China Telecom. The early stage of development was characterized by monopoly. Business was easy and simple, which was mainly composed of single business such as fixed and mobile phone or point-to-point data transmission and so on. There were few combinations or integration among different businesses. The consumers then were the scattered individual users with simple demands. During this typical period of demand exceeding supply, T Company's pace of construction of telecom network was far behind the market demand. Network construction and price adjustment were the main jobs of the "marketing department" in T Company. Services offered by the market department were passive and waiting-styled. Accordingly, the marketing mode had very strict bureaucratic organization attributes then.

During this stage, network construction and maintenance played an important role. A large amount of technology and management staffs were concentrated on these two departments to deploy network planning, equipment procurement, construction, maintenance, and optimization work. More advanced telecommunication technology improved the service quality of the company fundamentally. When customers apply for phone installation, pay for phone bills, or do other business with the company, they did it through the business hall or other relevant departments in the company. There was nearly no need of marketing at all. The only expectation of customers at that time was to obtain standard services. The main responsibilities of marketing department included: price management (e.g. reduction of nonrecurring charges such as the initial installation fee) and accomplishment of new phone installation tasks. The standard of service was to reduce skip-level complaints as many as possible (Fig. 4).



A1.Team marketing mode A2.Team marketing case（e.g. securities）

Fig. 4 Team marketing and example

3.2 The marketing mode based on the cross-functional team in T Company

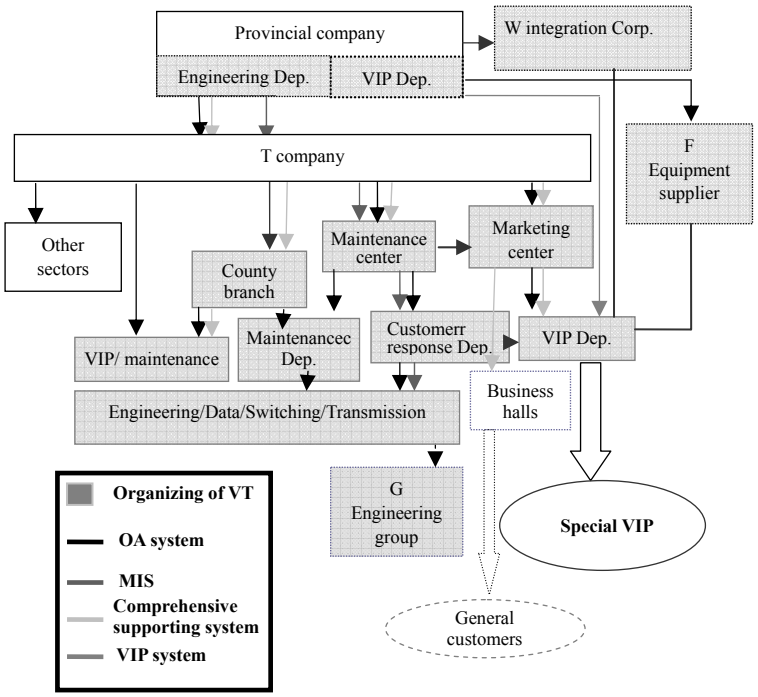
With the increase of customer demand, especially the increase in demand of computer and other data communication, the emergence of telephone private network and telephone service center, the complexity of customer demand increases greatly for telecommunication enterprises. Although there is still little competition among different telecom enterprises, it is necessary to integrate separate businesses together for sales promotion reasons. Hence links among different business divisions increase gradually. At this time, the interior sales department and other functional department cooperate with each other on the customer's project, which leads to the emergence of cross-functional teams. Such kind of team also appears in some important engineering project construction. Taken the example of a project in a certain securities company in City T (Fig. 5), in order to improve the service and expand telephone commissioned transaction and online transaction systems, the securities company wanted to satisfy its customers' demand of remote transaction by means of telephone network and internet access. To guarantee the quality of these remote transaction systems, the securities company required T Company to provide higher quality optical fiber access, double routing for backup and potential interfaces for future system upgrading. In addition, the securities company did not want to halt its business even during the process of network reconstruction. In this case, any single division in T Company was unable to complete such a complicated project on its own. To meet the customer's requirement, T Company built a cross-functional team based on division of labor in order to accomplish the task before the deadline

required by customers.

3.3 The formation and application of marketing virtual teams in T Company

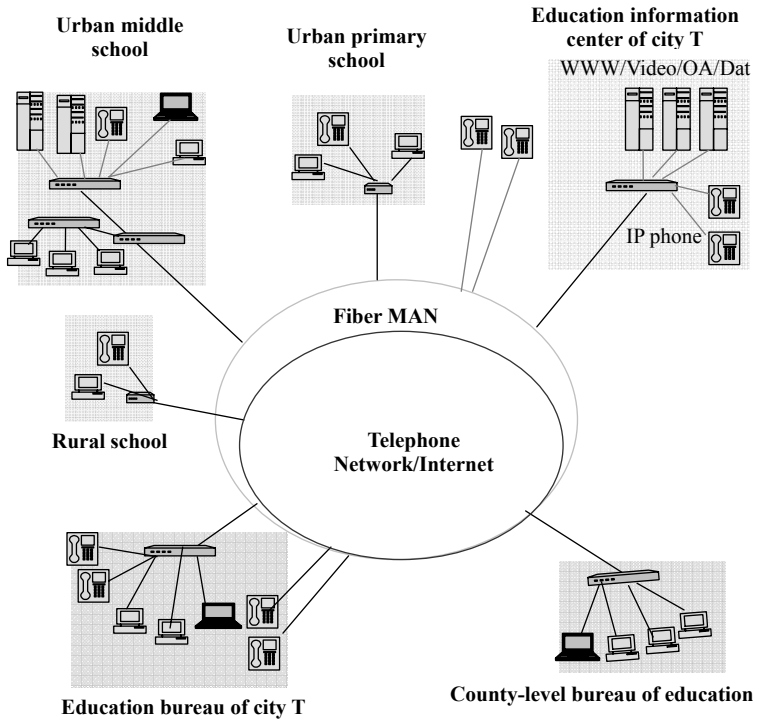
The year of 2003 was a turning point in terms of competitive environment for T Company. Before that, it faced only limited competition from mobile phone service companies. In 2003, several events happened which lead to the intensification of competition in the telecommunication market. First, the reconstruction and integration of Railcom was officially completed in that year. Without support from the wealthy railway network, Railcom had to make a living on its own. Therefore Railcom eagerly entered the telecommunication market. Second, all the core members of Netcom were from the former China Telecom. Ever since the separation, NETcom had to start from scratch. It hence was desperate for juicy VIP customers. Third, although the CATV network was not yet an independent enterprise in 2003, its close relation with local governments at different levels (since a vast majority of the investment of the network construction was from these government) makes it a disquieting potential rivals for all telecommunication market participants. As a result, in the very year of 2003, market competition became more furious than ever before. At the same time, the information demand of various kinds of customers also increased rapidly. Customers from education sectors, governments, and enterprises generally require telecommunication service providers to integrate various existing networks and expand the function of these networks. Such factors made the complexity of customer demand increase. Problems faced by T Company included: network capacity became surplus; customer demand was getting more and more complex; new business emerged increasingly; talents and technicians were scattered in different department and regions; unable to meet customers' requirements on its own; can not meet specific requirements (such as certification of Cisco or Microsoft qualifications, etc.) in providing large scale comprehensive network construction. Under such circumstances, the traditional bureaucratic organizational structure or small team were not able to cope with these new market challenges. In order to adapt to environment, satisfy the demand of customer and to promote its own increasingly surplus network capacity, T Company began to try the marketing mode based on VT and made some achievement.

A typical VT marketing mode in T Company and a project provided by it are shown in Fig. 5. The team was established for the project of information, Construction of the education of city T. The gray boxes in Fig. 5. A1 represents the virtual composition of three directions that the VT concerned: internal customer (IC, such as VIP department, network maintenance department, customer response department, support departments, branch institutes and the VIP department of company of high level, engineering department), external customer (EC, such as the electrified education center of education department, staff of network center), partner (VC, value chain partner, such as integrator T, equipment supplier F, engineering company G and so on), the arrows of different color represent virtual tool existed and applied inside, namely OA (office automation) system, engineering MIS (management information system), PowerIBSS(integrated business support system), VIP system in all four computerized information systems. Meanwhile, each member of the VMTs has the convenient PHS (personal handy-phone system) or other mobile communication tools and broadband access to the internet.



A1.Marketing mode of VT (VT)

Note: The grey area is the composition of VT of T Company.



A2.Marketing example of VT（e.g. Education project of City T ）
Note: The grey area is the integrated service promoted by VT of T Company.
Fig. 5 Marketing mode of VT and its services

The four information systems connect different team members respectively with different application ranges and functions. The OA system is mainly used in document sending and delivery, E-mail, discussion board, and so on within the company. Usually, the OA system connects different departments and staff in the T Company together. It is thus the most frequently used system. Engineering MIS (management information system) is used for the forecasting, collection, declaration and management of engineering information, the input information is from the frontier marketing department providing marketing demand. After summarization by customer response department, the demand will be reported to provincial telecom company for project approval and the following engineering management. PowerIBSS comprehensive support system, originally called “system 97”, is the first and most important business support and customer resource management system in T Company. During the MCC (marketing channels construction) and BPR (business process reengineering) reform from 2001 to 2002, the PowerIBSS was given a thorough upgrade with new

CRM (customer relationship management) mode added. The VIP system is built based on www management system of intra IP network. The use of which is limited to information exchange among VIP departments within the province telecom company. The system is widely applied in VIP marketing. Since it skips the strict and lengthy process of examination and approval of OA system, the efficiency of information transmission is much higher.

Different combinations of these virtual tools enabled T Company to accomplish the above educational information network project successfully. During the course of the project, centered around the VIP marketing team, a number of departments in T Company and outside business partners were connected cross-functionally, such as the interior technical support departments (e.g. data, exchange, transmission services), customer response center, province-level telecom companies, integrators W, integrators F and engineering companies G, etc. Later, technicians from the education system of city T also joined the VT. In accordance with specific progress of the project, T Company established different VMTs at different stages. At each stage, these VMTs were empowered to do jobs independently, such as present market demand survey, future market demand prediction, provision of solutions, business negotiation, contract signing, and bringing in new team members, etc. Once the plan was made, the VT was divided into a series of sub-task groups of marketing, engineering, construction, and then entered the project implementation stage. Upon completion of the project, a comprehensive testing and acceptance procedure was carried out. Afterward, the experiences of VMTs building and project completion were summarized and shared in company. From 2002 to 2004, after more than one year of cross-functional and cross-regional cooperation, T Company ultimately established an education information system shown in Fig. 5-A2, by using this VT marketing mode. This system covers all the education departments in the city, including education management institutions, educational assistant departments, and schools at all levels (universities, secondary schools, primary schools, kindergartens, etc.). It also provides various available accesses to the network, according to different positions, network conditions and economic conditions of schools. In addition, the network also provides or reserves various centrally managed application services on the network platform. With all these facilities, the education information network is able to spread various educational resources to all kinds of educational institutions and schools in the whole city.

By adopting the VT mode, T Company had made fruitful achievement in the educational informationization customer marketing, which helped it win over its rivals, like Unicom and especially, the CATV network. In the several years that followed, T Company became the only information service provider for

customers from the education system in City T. Because of the complexity of the above information service project, traditional bureaucratic or team modes might not function as well as the VT mode. The VMTs, based on the establishment of deep customer relationship, realized the high fusion of various human resources and organizational power. Thus in comparison with other marketing modes, the VT is more likely to accomplish goals successfully. However, the management of VMTs is considerably more difficult because more resources are involved. For this reason, it is usually used in VIP marketing when the project is complex, important and time-limited.

We found that the increase of market uncertainty and task complexity caused by changes of interior and exterior environment forced T Company to employ new marketing modes. First, the interior active innovation, organizational learning and strategic choice promoted the emergence of market-oriented team mode. Also, learning from past experiences and imitation of the marketing modes of partners and competitors laid an organizational foundation for a rapid introduction of VT marketing mode. Finally, the application of virtual tools, such as the four major information systems and convenient communication methods in T Company, raised the team's virtuality, which in turn more flexibly integrated the human and network resources and greatly increased the efficiency of team work.

4 Management of telecom marketing virtual teams of T Company

With marketing VT mode, T Company reduced adverse effects brought by high uncertainty and complexity in VIP market and increased the success rate of VIP marketing. Compared with bureaucratic marketing mode and face-to-face team marketing, through a combined application of various virtual tools, marketing VT mode is able to integrate a variety of human resources in and out the company, reduce the transportation and communication costs, and save time. Hence it can greatly increase the efficiency of the marketing activity. In addition to some common features the same as traditional teams and VMTs, we found the VMTs in T Company have some obvious features in selection of team members, hierarchical management, virtuality and communication of teams, incentive for team members, solution of trust problems, and other aspects. It was these features that provide organizational supports for the team's effective performance. Then we are going to analyze in details these features of management process.

4.1 Selection of members and layered management of telecom marketing virtual teams in T Company

One of the major advantages of VMTs is to integrate human resources scattering at different departments, bring in needed exterior talents, form information and knowledge flow inside the team, promote mutual learning between members, realize high efficiency through integration of human resources and provide solutions satisfactory for customers. Lipnack and Staples (2002) proposed in the "VT management" that goal, member and linkage are the three major elements of VT. Blackburn et al. (2003) believed that one of the advantages of VT is to gather knowledge, skills and abilities (KSAs) of required human resources crossing regions. As a result, selection of team members and team management play a decisive role in gathering knowledge, skills and abilities of human resources in and out the organization, realizing effective operation of VMTs and in successful completion of team tasks.

The establishment of T Company's marketing VT is in accordance with the needs of projects of VIPs. At different stages, the team requires different composition of members to achieve different functions, so as to solve different issues encountered in the marketing of customers' projects. As a marketing team, marketing personnel participate in the project throughout the entire process. They are the core of the team and function as organizers and managers, and make the decision on the choice of other internal and external KSAs members in the follow-up work. Selection of marketing personnel of VT is the top priority of the team.

During the actual operation of marketing VT in T Company, according to the past marketing and team management experience, in the early stage of a project, top management of the company usually designates 2-3 marketing personnel to handle VIP affairs. As a rule, these appointed personnel usually include head or other core members of VIP department. These marketing members are required to have keen awareness of the market, strong marketing capability, and a good understanding of customer needs. And in accordance with the changes in customer needs and market dynamics, they need to continuously improve the deficiency in professional knowledge, skills and ability. In the future, these marketing staff of VIP department will perform as the core of the team. They are responsible for the establishment of good relations with VIP customer at all levels, collection of market information, and selection of technical staff for the team in accordance with the content of customer demand.

The market-oriented culture in T Company (as a result of a series of internal reforms) and top management's attention to VIP marketing make it possible for marketing personnel to select suitable and qualified technicians to join the VT. According to customer demand and through internal screening, the team selects

desired technicians from the company. These technicians are required to have outstanding professional ability, strong sense of customer service and collaboration, and a certain degree of coordination ability. The selection of qualified personnel in T Company often follow the rules of thumb, that is, to choose the leader of maintenance or support groups in related telecommunications service. Years of technological development, network project construction and day-to-day network maintenance, have made most of maintenance representing the technical level of T Company. For positions and work reasons, they have strong customer service awareness and coordination within and outside of the company. After joining into the team, these internal technical personnel will visit customers with marketing members and understand the needs of customers, survey the present conditions of network, and establish direct contact with other technical personnel in the company. Therefore, these technical team members in earlier stage directly determine the quality of service content for customer. The relationships established by marketing personnel can only be truly embodied through the services content provided by technical personnel.

With the deepening of marketing, there will be a lot of communication of internal and external information within the team. Some important decisions are to be made, including negotiations of customer's agreement, preferential treatment of certain customers, expansion of internal network resources and related decision-making for investment, team marketing and other expenditure, etc. In order to reduce the pressure of team members, improve the operational efficiency of the team and improve the communication with customers, the company's vice president in charge of marketing and president will join into the VT at this stage, and so will other management personnel at all levels. Their participation will greatly improve the decision-making and coordination ability of the team. Virtual communication through internal information system will become a major means of communication. With the deepening of marketing, customer needs are more comprehensively revealed, and the customer will ask T Company to provide a package of solutions that is authoritative and technologically advanced. Usually, the customers will organize experts from a third-party for review of T Company's proposed project. Once the project is approved, the customers will take the approved project as the reference for investment and communication costs application.

In order to achieve this requirement, T Company will choose partners with necessary qualifications from the outside of the T Company to join into the marketing team. At this time, the cross-boundary and organization virtual interaction begins to increase significantly. T Company will require external partners to designate marketing and technical personnel to establish direct contact with the VT members of T Company. The professional level and service

awareness to the team becomes the main criteria for the selection of external members. They can supplement the deficiency of T Company with outstanding technical ability, which is the essential standard for the selection of external members. Meanwhile, in order to meet the customers' requirement on the authority of the project, outside partners with certain qualification certificates are preferred in selecting external team members.

From the above member selection process and selection criterion, we can see that the core of marketing VT of T Company is the marketing personnel of VIP department, and the follow-up selection of internal technical personnel and external members is directly affected by them. The establishment of customer relations, the acquisition of market information, and the coordination of various professional members of the team are also carried out by these marketing personnel. These core members become the real organizers and leaders of VT. Their knowledge, skills and abilities determine the overall efficiency of the team. Internal technical personnel make up for the deficiency of knowledge, skills and capacity of marketing members in the technical aspect, establish direct contacts with customers' technical staff, review the solutions provided by external partners, and carry out virtual or face-to-face exchanges with external technical team members. These external team members are helpful in realizing the transformation from market into service content and determining the quality of solutions for customers. The selection of external team members is based on whether they can be useful supplements to T Company's inadequate capacity in certain aspects. Therefore, in addition to their knowledge, skills and competence in their respective professional range, the teamwork spirit and awareness of the importance of customer service also become determinants of the high-performance of marketing VT in T Company.

T Company adopts a layered management way to manage the marketing VT members (shown in Fig. 6). The status of internal and external team members is not exactly the same. VT is divided into different sub-team to carry out corresponding tasks based on different business or sub-tasks, such as marketing, technology, programming, project implementation. In each sub-task group, there is a corresponding "organizers". In the daily operation of a VT, some team members who are concurrently holding leading positions in the organization, partner or customer companies still work as leaders, coordinators, or decision makers in the team, while other members are responsible for the collection of information, the establishment of customer relationships, programming and implementation of the decision made by management members.

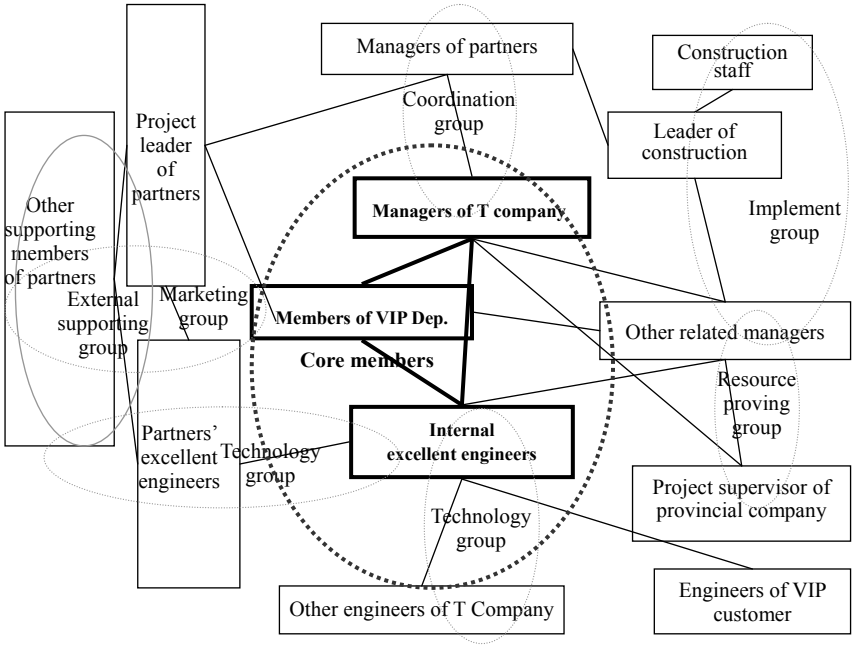


Fig. 6 The composition and layered management of VMTs of T Company

In comparison with the traditional hierarchical marketing mode, the above layered management of the VT shortens the distance between common employees and top management, making information communication more smooth and decision-making of management faster. More importantly, it provides a strong resources support for the operation of the team, which makes it possible for team leader to select appropriate members and purchase needed facilities. In addition, the layered management approach can help to draw the attention of internal members and external partners of the T Company, and the team goals motivate team members to work harder and more actively. Because members can directly feel that their suggestions and recommendations are adopted by the management, their job satisfaction is enhanced dramatically. Compared with VT that has the full equality among members, members of the VT in T Company are more eager to exhibit their abilities in front of the management personnel. Therefore, after the participation of management personnel from T Company and partners into the VT, the coordination level of the team is increased and conflicts among members are more likely to be resolved at an early stage. The layered management and grouping of task sub-team in the marketing VT of T Company allows the tasks to be clearer, which is beneficial to obtain high performance in a short period. The

participation of management personnel of the company also improves coordination, decision-making ability significantly.

4.2 The virtuality and management communication of T Company's marketing virtual team

Virtuality is the main characteristic of VT in contrast with other types of common teams. It is mainly manifested in the use of virtual tools such as modern communication and information systems, which has brought significant changes in the communication of VT.

T Company utilizes the combination of various virtual tools in the communication of marketing VT, which has improved the efficiency of the communication and amount of information conveyed. The communication through virtual tools is mainly task-oriented. The gain in communication efficiency brought by the abundant and fast task information transfer is far greater than the adverse impact of information loss due to the absence of other communication means. Communication through highly virtual methods such as e-mail, OA office systems and BBS etc. has speeded up the transmission and processing of task information, making it possible for the rapid exchange of solutions for customer's project that has large files and images. The virtuality inside the T Company is mainly reflected on the use of the four major information systems (office, engineering, business support, and VIP) built in recent years and various types of telephone, internet and other communication means. Frequent and flexible utilization of these virtual tools in the marketing VT reduces face-to-face exchange of communication. As a result, the virtuality of the team is greatly enhanced and has saved time for the team members. Abundant written information and other latest market information are transferred rapidly among team members and the management layer, facilitating the latter to make effective decisions and better adapt to the ever changing market situation. Therefore, the enhancement of team virtuality in T Company, on the whole, brings about better and more effective marketing activities compared with other non-virtual or low virtual ways. Just as Shekhar (2006) pointed out, virtuality can promote organizational effectiveness.

According to Shekhar's VT model (Shekhar, 2006), the virtuality of T Company's marketing team has some unique features, as shown in Table 2 and Fig. 7. From the 3D team virtuality model by Kirkman and Mathieu, we can better understand the virtuality and communication process of T Company's marketing VT. Through investigation on the eight determining factors of the virtuality of T Company's marketing VT, we find that in the scene characteristics aspect, the VMTs crosses larger amount of boundaries of organizations, regions,

and work time. In this way, the VT in T Company successfully integrated various resources within and outside organizations, and at the same time enhanced the virtuality of the team. We also find that there is a high proportion of co-located members in the team, who are the core members conducting key tasks and management function. This has reduced the virtuality of the team. Finally, the larger the scale of a team, the higher the virtuality is.

In the compatibility of mission-media-members, for high complexity of the task, deep interaction among members at different stages is needed to enhance the virtuality of the team. As a VT is designed to better accomplish customer-oriented work, team members are required to be highly competent. By comparison, technical members and external partners tend to hold higher KSAs (knowledge, skills, and abilities) and possess higher virtuality, while the professional skills of marketing team members are relatively weaker. Meanwhile, for the nature of work, the virtuality of communication is comparative low at this stage. Later, as the deadline of the task is approaching, the time left for task completion is limited, which imposes a high requirement on the efficiency, resulting in an increased virtuality in the team. During the life cycle of the forming-storming-norming-performing-adjourning process (Tuckman, 1965), the forming and storming stage will involve much face-to-face communication, especially small meetings, which reduce the virtuality of communication. At the norming-performing-adjourning stage, for the task has been set, this stage primarily involves the completion of specific tasks as planned, therefore, the virtuality of communication is higher. Generally speaking, among the various stages of the team, the main tasks of the preparatory stage include mission analysis, targeting, strategy development. Therefore, frequent face-to-face exchanges, real-time telephone communication and information transmission in larger amount are necessary at this stage. Consequently, the virtuality of team communication is low. While at the action stage, coordination, environment monitoring, and implementation of backup plan become important. Operations are carried out in accordance with the established plan and standards, resulting in a higher degree of virtuality in the team.

Table 2 Virtual degree of the VMTs in T Company and its results

Virtual directionality	Virtual granularity	Virtual tool	Degree of virtuality	Results
External customers （EC）	Specific VIP	Telephone and email	Low	Timely and rapid informal information contact exists in technical staff from EC. Formal and important communication is carried out through face-to-face way.

(*To be continued*)

(*Continued*)

Virtual directionality	Virtual granularity	Virtual tool	Degree of virtuality	Results
Internal customer（IC）	Different groups and personnel from market, technology, engineering, and managerial departments	Information systems of office, engineering, business, the customer and various telephone and internet emails	Average high	Cross-locations, -departments, -working hours information contact exists in relevant groups, business team and management team, and between individuals. As a supplement to face-to-face communication, it is carried out at any time in accordance with needs. It has enhanced information processing and resources integration ability and is the core of the model.
Value chain partner（VC）	Related groups and the staff of company at the higher level, integrators, equipment manufacturers, and engineering firms	Information systems of office, engineering, business, the customer and various telephone and internet emails	High	Cross- city, -organization, -working hour's task-oriented information communication. With fewer face-to-face mode of communication, it is mainly carried out in virtual forms to make up for insufficient local resources.

During the operation of T Company's VMTs, in order to reduce the adverse effects brought about by virtuality in communication, it is required to use face-to-face meetings flexibly, especially small-scale meetings. Before the meetings, the key issues should be identified. And the discussion, direction and relevant information will be sent to relevant personnel through internal information network. Solutions for customers in the key stage will be first sent for review by technical backbone and marketing staff in joint with external members. Existing problems will be recorded and special personnel will be designated to complete these before the deadline. After modification, another meeting discussion in a lager scale will be organized. In order to timely capture information and take good care of the working hours of team members, daily online information report is requested, which will be collected by special personnel and transmit it in the form of brief report over internal information system. Apart from these specific measures, the communication among members of T Company's marketing VT also show the differentiation of management and tasks assignment: management

personnel and marketing staff will rely more on face-to-face, telephone, and other real-time communication, while technical and other members generally use virtual tools to communicate. The communication content is generally task specific, which improves the efficiency of information management. Social backgrounds clues for management communication is less interfered by the virtual tools, while the communication of task content is carried out through virtual tools, which screens out unnecessary social clues and make members more focused on the quality of tasks.

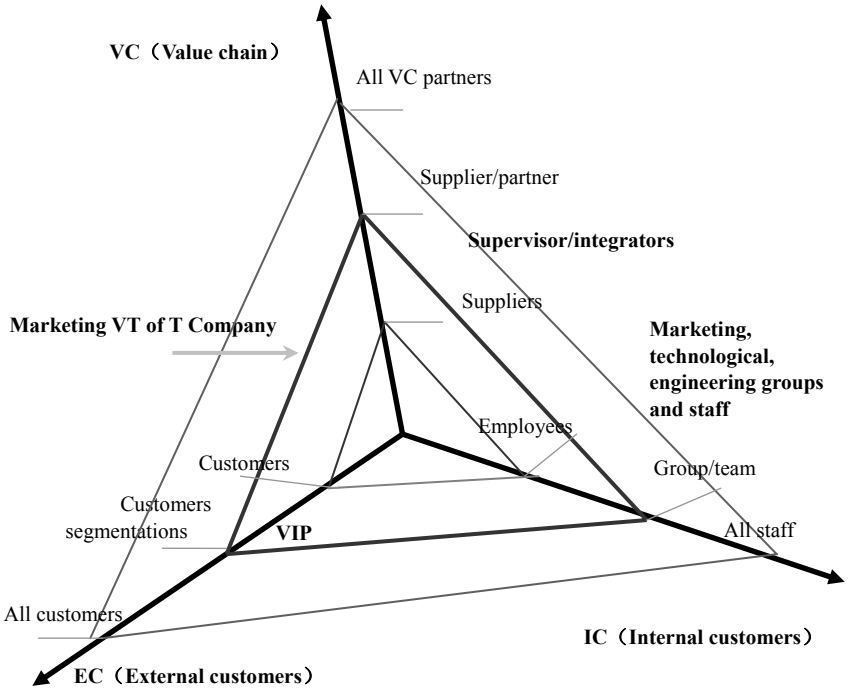


Fig. 7 Positioning of T Company's VMTs

To summarize, among different directionality and granularity, different time scopes, tasks stages, and members, the VMTs have different degrees of virtuality, and combination of communication ways adopted by them is also different. In this team model, through the combination of task-oriented, highly informative, highly asynchronous information system with telephone and face-to-face communications, the content of communication media was enriched, which improved the compatibility of Task-Media-Member, and team performance under the conditions of high degree of virtuality.

4.3 Trust mechanism of the marketing virtual teams in T Company

With large application of virtual communication tools in VMTs, the face-to-face communications are reduced dramatically, especially after the establishment of virtual groups crossing times, regions and organizations. Under such circumstances, the cooperation among VT members is easy to become a "one-off game". Thus mutual trust becomes a major problem that impairs the operation among VT members. For this reason, trust has become the focus of studies on VMTs (Wang and Deng, 2004). Handy wrote in book T*rust and Virtual Organizations* (1995) that "No trust, no virtual organizations". Peter Marshall et al. pointed out in *Structure, Strategy and Success Factors of Virtual Organizations* that the basic success factors of virtual organizations are a common goal, the relationship based on mutual trust, the pleasure to take risks together and mutual benefits based on existence of virtual organizations. In VMTs, high degree of mutual trust is closely related to high efficiency, because trust can enhance cooperation and information communication between VMTs, reduce risks and uncertainty, and avoid mutual harm from conflicts of interest (Wang and Deng, 2004). As in the case of T Company, because of its special history, present resources and unique operation mode of teams, the VMTs can well solve the trust problems and thus lay a good foundation for high performance.

The temporariness of VMTs determines the rapid formation of trust. Meyerson et al. (1996) proposed the concept of swift trust, namely trust must be established quickly at the early stage of VT formation. The VT members in T Company include internal members of the company working at the same working place, and partners working at different places. Therefore, trust is formed with different mechanisms. Coutu (1998) believed that, in general groups and organizations, the development of trust goes through three stages, that is, deterrent-based, knowledge-based and identification-based stages, and recognition is the highest stage of development. Lewicki and Bunker (1995, 1996) divided the trust into three types: calculate-based, knowledge-based and recognition-based. The internal members of VMTs in T Company are from present organizations. They are mainly composed of marketing and technical backbone members. These members are relatively young, with more room for professional development. Part of the core team members are senior management personnel, with certain deterrence. As a result, deterrent-based swift trust is formed at the early stage of team formation. Later, external members start to join in the team, as the customer project of VT marketing may bring a large number of orders. The early cooperation of VMTs allows these outside comers to grasp detailed requirements of T Company and its target customers. With social relationship and mutual trust established through teamwork, more orders will be obtained, or outsider team

members may also build their own social relationships between two groups of customers, which bring along more potential commercial cooperation opportunities. Thus, rational-judgment-based trust is the base of establishment of swift trust between external team members and internal team members.

Once the swift trust is established, the team performance is improved significantly, and the frequency of mutual communication between members is increased. What comes next is knowledge-based trust. At this stage, the common industry and occupational background of all team members as well as the common goal, deeper communication begin among team members, which finally develop into a recognition-based trust. Both the two parties of cooperation show great expectations for the success of the project, and consider more of each other's interests. For example, T Company gives its partner accurate and abundant orders, and cooperate with it in other areas; while the external partner gives T Company quality and efficient technical support, as well as some certain concessions. Through the above different construction mechanisms of swift trust, the internal and external members of VMTs in T Company converge at the same result, that is, transforming the weak early swift trust to deep knowledge-based and ability-based trust.

The selection of members and partners for VMTs in T Company also has some unique mechanisms which promote the establishment of long-term trust based on the same industry. Taking the partners of T Company as examples, just like T Company, integrator W, the supplier F or the engineering company G, are subsidiaries to either the provincial telecom company or city level branch telecom companies. Their orders mainly come from within the telecom system in the province. Even for integrator W and the supplier F, as the outstanding system integrator and equipment supplier in the province, still have more than 80% of their orders come within the provincial telecom industry. T Company has cooperated with these partners for several years. The management and technical personnel on both sides know each other. It is the common industry background and property structure that reinforce the stability and long term of cooperation. Trust issues are no longer obstacles that affect the cooperation of VMTs. The members of VMTs, no matter internal or external, are all outstanding and young in their business areas, with large space for professional development. But the previous bureaucratic organization did not provide opportunities for them to exhibit their abilities. These members also expect to expand their social relationship through the marketing VT, and improve social capital upon human capital. Trust, as the base of social capital, becomes the consensus of these members and promotes the establishment of knowledge-based and recognition-based trust. When selecting VT members, T Company insists on a practice that members of the next VT are chosen according to their previous performances. By doing so, the cooperation among team members shifts from a

one-off game to many-time game and reduces effectively the opportunism tendency among team members. With the increase of projects for VMTs, the mutual trust among team members may grow stronger. Members that do not meet the requirements of teamwork are easy to identify and should be put out of consideration in future establishment of teams.

4.4 Incentive mechanism of telecom marketing virtual teams in T Company

So far, the element of incentive has hardly been mentioned in studies of VMTs. In a review of studies on VMTs, Martins et al. (2004) pointed out that the incentive factors scatter at some stages of the team process based on the model of I-P-O, and among other mediators of team performance. Likewise, there is also no such traditional and open incentive mechanism in the VMTs in T Company. However, the goal setting in operation, the strong goal commitment, position promotion and the social relationship network all have positive incentive effects on its team members.

The goal-setting theory of Locke (1996) presumes that "the goal influences the performance by affecting the behavior direction, the effort degree and the sustainability of behaviors". The team goal is an important variable of planning process of I-P-O performance model. The goal setting is positively correlated to the team cohesion, commitment, collaboration, decision-making quality and the number of alternative schemes (Huang, Wei, Watson and Tan, 2002). Some studies pointed out that it is difficult to set a united goal among members because of the decrease of interaction. As a result, to produce a shared expectation or mission among VMTs is much more difficult (Blackburn et al., 2003). However, this problem is well solved in the VMTs of T Company.

The target of T Company's VT is to discover and understand customer demand, to provide satisfactory solutions for customer project, and to realize value enhancement for both parties. The drastic changes in environment have brought uncertainty of market and complexity of tasks. To cope with the new challenges, T Company has shifted its attention from the traditional maintenance and engineering function to the marketing department. With the increase in the number of competitors and degree of competition, lasting deployment of reform inside the company has made the customer-oriented team culture be widely accepted. Ever since the establishment of VMTs in T Company, the idea of "customer foremost" has been set up and passed on to every team member. The willing to cooperation among external partners is based on rational thinking on income and market expansion. To ensure a consistent understanding of the team goals, the goal will be further clarified and communicated to every team members. More importantly, since every team member directly participates into the user's project and makes up task goal according to the change of user's needs,

each of them can feel his/her own contribution to the overall goal. Therefore, the earlier the participation in the team work, the stronger the consistent recognition of the team goal. This consistent recognition is passed on to other peripheral team members through layered management system. For the target project of T Company's VT has large scale and involves intensive techniques while it can bring about large income to the target customer, partner and T Company itself, both the attractiveness and challenge of these projects are quite high. Team members have high expectation for accomplishing this goal. In this way, T Company's VT has reached and made up clear and consistent goal. As the project progresses, the goal is further divided into specific sub-goals. For members who directly participate in the setting and refining of the goal, they have high commitment to the goal, which in turn enhances the performance of the whole team. Klein et al. once pointed out, in consistent with this conjecture, that "The expectation and attractiveness to realize goal will affect the goal commitment, while the goal commitment has strong and positive impact on the performance."

Although no daily appraisal or rewards and punishment system is established in the VT, in recent years in T Company, the promotion and salary evaluation of marketing and technical backbone are largely based on the previous performances of VT members. As a result, certain psychological contract, which further enhances the goal commitment of team members and improves the attraction of team participation, gradually formed between the company and team members. As for outsider members and young employees inside the company, to participate into the VT is beneficial for them to bring their knowledge, technique and capacity into play. Besides, the flatness and highly effective information flow of VT will make their professional reputations spread rapidly in the whole telecommunication industry, laying a sound foundation for their further professional development. By participating in the VT, under the guidance of common goal, team members will have more chances to build and expand their social network with other members, customers and management at all layers. In this way, young employees will gain social capital more conveniently through this channel and enhance their position in this industry and other related fields. In a typical state-owned enterprise as T Company, such an incentive mechanism may work especially well.

5 Conclusions

This paper investigates and analyzes the development of T Company's telecommunication marketing mode and the formation of marketing VT mode in its VIP marketing. In doing so, detailed and systematic research was carried out on the application and management of the VT, a new group work way in

telecommunication enterprise. It can be seen that internal and external environment change has leaded to higher market uncertainty and task complexity, which in turn compelled T Company to take brand new marketing mode. In the end, organizational structure reform, organizational learning, and strategy choice in T Company finally leaded to the emergence of market-oriented team mode.

By adopting the marketing VT mode and widely applying various virtual tools, T Company converges successfully all kinds of human resource inside and outside of the company and thus reduces the expenditure on traffic and communication, significantly enhancing the efficiency of marketing activities, reducing the adverse impact brought about by the high uncertainty and complexity in VIP marketing and improving the success rate of marketing activity toward VIPs. For instance, the wide use of virtual tools such as the above four large information systems and other convenient communication tools in T Company has enhanced the virtuality of the team, integrated more flexibly human resources and internet, and significantly improved the efficiency of VT work.

T Company has fused some traditional management measures into the mode of the marketing VT, which has inhibited the adverse impact of virtuality and improved team performance. Study on these "combined management" measures can provide reference for the management practice of VT. Research has found that except for some common features with traditional team, the marketing VT in T Company has obvious characteristics in the selection and layered management of team members, team virtuality, communication, incentive for team members, mutual trust problem solution and other aspects. These characteristics provide organizational support for the team's high performance. Specifically, these characteristics of high performance and key success factors are mainly manifested in: the flexible combination of communication channels with varying virtuality has improved the communication efficiency of the team; special selection of members and distribution of tasks; constructing and developing the member trust system; goal setting, strong goal commitment, the incentive functions of position promotion and social capital, etc. These findings have suggestive significance on the management practice and theory development of VT.

This study has limitations that should be borne in mind when applying the results and planning future research: first, due to the limitation of data collection and space, this study mainly studies the formation and effective management of T Company's VMTs. Comparatively less analyses are conducted on the existing problems of this type of team mode. Second, from the actual operation of T Company, we can see that the construction of VMTs is a difficult and complex task, which requires input of great resource and energy. Therefore, the direct participation of senior management personnel into the VT can guarantee high

level of coordination among team members and necessary resources for the team. In addition, considering the long cycle of the virtual team's project, without direct participation of senior management personnel and large resource input, the efficiency of this team mode will be much lower. Third, from the case background, we can see that, T Company is only a small branch company of China Telecom Group. Thus in T Company, the VIPs served is comparatively small-scaled, the task of marketing and maintenance center is simple, and the process of VT tasks has only small impact on the company's daily work. Therefore, the company can assign some of its best maintenance and technical employees to the VT and team members can devote most of their time and energy into the team task. In other large scale telecommunication enterprises, however, the application of this full-time VT mode may not work as well.

In order to test and refine the above research conclusions, we need to investigate the operation of VMTs in companies with larger scales or to conduct comparisons among different teams of the same type to further analyze factors leading to their success and to find out some existing problems.

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