

Primary Investigation to Promote Team Innovation of Scientific Research in Colleges and Universities

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Abstract: scientific research team is one kind of important carrier in our present scientific research in colleges and universities. The team form of scientific research can integrate the scientific research resources more effectively. Innovation promotion is the key element to create great achievement in the research team. This article combines psychology and management to provide seven advices from the team heterogeneity, innovation atmosphere, team introspection, and so on.

Keywords: colleges; research team; innovation

With ceaseless fusion, interaction, and percolation in the various scientific areas, innovation socialization, integration grade increasing makes the innovation of scientific research team has been the main approach to achieve the self- dependent innovation. Since the first research team at Dalian University of Technology that built in July 2003, lots of famous colleges and key universities build many research teams. The colleges have the feeble research ability to build the scientific research team. It can effectively integrate scientific resources, and have significant meaning for promoting scientific achievement.

Innovation research team is the key factor to influence the high-level achievement in scientific research. Promote team innovation is the urgent assignment in colleges and universities as well as the complicated question. Combines with psychology, management, and the research of sociology, the writer believes we need to work hard in the following seven parts.

I. Identify and employ the innovative talents

Innovative talent means the talent that has innovative consciousness, innovative thinking, innovative spirit, innovative skill, and even has the ability to achieve the innovation. The scientific research team is combined with individual person. Therefore, the basement to promote research team innovation needs to identify and employ the innovative talents.

Research shows the innovative talents have the following characteristics except the abundant creativity. 1. Strong career heart and high-level responsibility. Innovative talents love their own works, clinging to their career, has high responsibility, and study assiduously. 2. Clear-cut individuality. Innovative talents have clear-cut

individuality, strong curiosity, and achievement motivation. 3. Comparatively strong independent study. The innovative talents have the individual learning sense and ability. 4. Perfect cooperation. In the diversified society, independence decides innovation. At the same time, team spirit expresses huge potential through the innovative actions as well as the isolated quality for innovative talents. Especially in the innovative actions of scientific research, team spirit means importance. We can test innovation ability. When the scientific research team is searching for the members in colleges and universities, we can use innovative ability to exam the creativity and creative spirit. At present, the common used evaluation tool of innovation ability has Guilford Creativity Table and Williams Creativity Table. In the domestic, we have the Chinese Creativity Scale (CCS) from Psychology in Beijing Normal University. The larger college can independently research suitable model follows the own character as the innovative ability standard to evaluate the new members.

II. Keep the modest heterogeneity of scientific research steam

Team heterogeneity means the team members have differences in profession background, education, knowledge structure, age, length of service, quality, attitude, and value. The research shows section members have different experiences, characteristics, abilities, skills, and experiences that they can focus on the various fields. It will bring multiple messages for the team. Moreover, the diversified information is one of the required factors in the innovation. The team members, which have the high level of heterogeneity, will provide different views of observation. That is the essential condition during the

innovation process. Team heterogeneity will create positive influence with the moderate level. When the heterogeneity threatens the team security and solidarity, it will influence the creativity and innovation.

From the above, we know the heterogeneity has correlativity with the innovation. Therefore, when the team leader integrates the members, it is correct to keep the moderate heterogeneity by the following methods. In the first, select the members of various characteristics during the employment. The talent combination of different major background, knowledge structures, social background, ages, and professional qualifications will fully express the personal specialty. We cannot limit in the present research direction. Especially the team leader, it is worse having prejudice to the 'job hunter' from different departments. We need to familiar with the positive meaning of member heterogeneous. In the second, we can apply psychological assessment equipment to keep the members' heterogeneous temperament, character, communication style, value, and control point. For example, MBTI is one of the correct tools. Many human resource managers use this tool to integrate special talents in various research teams that can obtain the perfect effectiveness. The third is during the strategic operation, we need to keep the team dynamic heterogeneity and monitor the level. When the team members are in the long-term service and become similar to each other, we need to train, rotate, or refuse the members in order to keep the correct team heterogeneity.

III. Keep the best research team size

Team size is the must considered factor when establishing the research team. The best fit for the innovation in colleges and universities is a hard question for research management department or team leader. The small size will lack of opportunity and various views that go against innovation. The large size research team can provide different views to discuss and consider the questions. Moreover, compare with the small size team, it has more abundant human resources and social network relationship that can integrate human power, materials, and finance to support the innovation development. However, in large teams, the research target is slack, members participate levels are low, groupuscule problems, research quality, innovation level and officialism is the disadvantage to the innovation of scientific research.

The too large or too small team size cannot benefit for the innovation development. Therefore, the size selection needs to based on the basic condition. In ordinary, we can evaluate from the following dimension. The first one is the mission character in scientific research team. The team needs to expand the scale with clarified mission and single team function when undertake the task research or production design. If the mission needs to be distinct during the research, the team will have low levels of participation. The second one is the proficiency degree of scientific research team. If the team leader has more management experiences, the clear research planning, working standard and work process, we can expand the size. On the contrary, we need to small

the size or divide the team into several parallel teams. The third one is the heterogeneity of team members. The large heterogeneity will hard to manage, and the small size team is easier to participate and communicate. Therefore, from the management cost, the large heterogeneity team needs to have the small size.

IV. Select the integrative leadership style

The team leader influences the promotion of team innovation. During the action organization process, leadership style divides into task-oriented and relationship-oriented style. These two types of leader behaviors will have the different impact. Task-oriented style through setting the clarified target concentrates the member energy that they can hammer at the work, provide, and practice the new thinking. Relationship-oriented style means transporting the loose signal of the research environment. It will create safety and peace feeling during the research process that benefit for innovating. However, in the relationship-oriented style, the members might decrease the mission standard, lack of seeking for the higher academic that go against the team innovation.

At present, our scientific research teams at colleges and universities are just in the very beginning. In different development period, the leader will use different ways of managing to achieve the research task and keep the perfect interpersonal relationship. During the formative period, the organization is inattentive, with many contradictions and lack of research consistency. At this time, the leader needs to lead with the task, integrates the character classification, segregation of duties, and task integration. He needs to lead members to reach an agreement of team target, and work style. Moreover, bring them to formulate the common research target and behavior standards. During the development period, members have their understanding about the team will form the common behavior standards. During this period, the leader support can build a team cooperative atmosphere and initiative innovation spirit. In the mature period of the scientific research team, members will have a higher sense of identity and they trust each other instead of keep distance. The openness and free environment allow members to provide different academic opinions, and encourage the constructive viewpoint conflict. In the harvest time, team concept will form deeply in the mind. They have the strong feeling of an organic whole, explore the unprecedented innovative power, and create the extraordinary achievement. At this time, team leader authorizes members to increase the self-management and autonomously research.

V. Create innovation atmosphere for scientific research team

Team innovation atmosphere means the working environment that can express the team members' innovation as well as the accepted key process factor that can influence the team innovation. At present, organizational behavior summarizes team innovation into four factors. They are goal commitment, participate safety,

task orientation, and innovation support. Goal commitment means the team target is valuable in general and it can encourage the subjective initiative of team members. Participate safety means the leader encourage members to participate the decision. This is the safety interpersonal environment. Task orientation means the teams has clear target, mission performance evaluation, modify, and control the system perfection, moreover, it can control the key circle of completing the task. Innovation support means provide resource, regulation and interactive support to the innovative behaviors. The establishment of an innovation atmosphere in the scientific research team needs to follow the above four factors.

From the view of goal commitment, the setting of research target needs to commit by all the members, reflect their requirements, and thinking. The target with academic difficulties will encourage the morale.

From the view of security participation, the team leader can organize interactive actions, deepen members' understanding and believes. Moreover, through the encouragement and help of each other to create the trustful relationship team will determine the psychological safety.

From the task orientation, the management department needs to build the dynamic performance evaluation system. During the innovation process, the system can help to grasp the research schedule and work performance. Moreover, it will be easier to provide modification and support.

From the innovation support, there includes rules support, resource support, and member interaction support. With rules support, the management department needs to formulate or perfect the relative institution, clarify team target, task, discipline, performance standard, and payment system. This method can promote knowledge sharing and mutual aid during the team innovation. In resource support, it will provide enough funds with obligation for training the scientific research team that can encourage members to find new thinking, new method, and new experiments. In the member interaction support, team leader needs to build high quality relationship in the team, encourage members to care for others and form the friendly and harmonious relationship.

VI. Correctly handle the internal conflict in scientific research team

The heterogeneity and competition cannot avoid among team members. The hostility conflict will influence team atmosphere, decrease trust level among members, create strain relation, go against to cooperation, and emerge negative influence. The research shows, moderate conflict can promote team innovation. Constructive debate means discuss around the common benefit with various viewpoints. It can develop new idea, express fresh information, create new doubt, and understanding. Moreover, it can integrate different view for seeking better solutions, capture difficulty, and achieve the success. Therefore, team conflict is the rapier.

Management department and team leader needs to lead the conflict, change negative factors into positive factors, and develop the innovation. At first, we need to evaluate disadvantages of conflict factors and eliminate the negative troubles. For example, obtain the extensive acknowledge of the research target to reduce the conflict, clarify members' roles and responsibility to reduce the role conflict, build communication system to reduce mistakes, open the conflict resolution program to maintain the justice. At second, evaluate the detailed conflict reason, diagnose conflicts quality and consequence, and apply different strategies based on the conflict qualities. It is possible to resolve conflict in time. When facing the academic conflict, it is good to be neutral follow the natural development until the solution comes out. When solving the emotional conflict, the attitude needs to be concern oneself with facts and not with individuals. About the work conflict, conquer scientific difficulties is the target. We cannot impost the academic common view. This method is the best way to promote innovation.

VII. Promote the team innovation of scientific research through team reflexivity

Michael West first proposed team reflexivity in 1996. It means the team members make public introspection of team target, the strategy (such as decision), and program (such as communication) that can adapt the present or prospective environment changes. Through the multiple researches in recent years, team reflexivity can promote team innovation. In colleges and universities, the introspective team can prospect the action result more correctly and accept the advance activity. On the contrary, the scientific teams confine to the responsibility from management department or team leader and they cannot act conscientiously. Otherwise, the introspective team will care about the outside environment changes and evaluate it constantly. This is beneficial for the team provides new target, influence the team members to adjust the research process that follows the new target, and then promote the team innovation.

Team reflexivity includes retrospect the past, query the plan, research and study, accept new thinking and so on. It is not easy to build the reflexivity module of scientific research team in colleges and universities. At first, we need to treat all the members as an internal whole. The research shows teamwork has the positive meaning in the form of team reflexivity. Therefore, the team leader will set collaboration target for the team members, promote the positive interaction, and develop the team reflexivity. The other two subjects that can influence the team reflexivity are member social skill and project management ability. The member social skill includes understanding, respects others' opinion, and consider for others. These skills are the basement to public and effectively compare notes on the internal team. Project management ability means the team members have the skill to plan and control the project. Therefore, when recruit the team members in colleges and universities, it is possible to train the social skill and project management ability, do the necessary selection

will benefit for the team reflexivity development.

Based on the former research, promote team reflexivity of the scientific research can according to the following stages. Before implement the scientific research mission, we need to set the content of introspect the target, research strategy, and research process. This can reduce the differences among members and clarify the common scientific research. During the implement process, introspect the original planning, solve the academic questions, and finish the supposed works. This kind of reflexivity is benefit for finding the problems, and find out the solution. After accomplishing the research mission, the reflexivity is to evaluate the achieved success and operation mode. The introspection can help the research team to develop the academic level and the ability to solve scientific research questions.

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