



Forming the Antecedent Variable System Framework of Organizational Creativity from Five Perspectives

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Abstract. Organizational creativity has always been the focus of enterprise and organization research. With the increasingly complex market environment, the realization of organizational creativity has become very important. Since there is no systematic review on the factors affecting organizational creativity, this paper constructs the framework of antecedent variables affecting organizational creativity from five aspects by reviewing previous research. In terms of leadership style, different leadership styles will bring different effects. Transformational leadership tends to promote organizational creativity from the organizational level, while transactional leadership tends to promote organizational creativity from the individual level. Dual leadership combines these two styles. In the organizational climate, different climate styles will have different effects. Innovation climate and learning climate tend to promote organizational creativity from the aspect of thinking, and planned organizational climate tends to affect organizational creativity from the aspect of technology and equipment. In terms of organizational culture, organizational culture mainly affects organizational creativity from the individual level. In terms of resources and skills, sufficient resources and reasonable skill arrangement will improve the efficiency of organizational creativity. In terms of organizational structure, the organizational structure will promote knowledge sharing and cultivate a good organizational climate, so as to promote organizational creativity.

Keywords: Organizational Creativity · Leadership Style · Organizational Climate · Organizational Culture · Organizational Structure

1 Introduction

With the economic globalization, the market environment has become more and more complex. Only relying on existing technology and knowledge can not support the long-term sustainable development of the organization. In order to meet the needs of organizations for competitive advantage, organizations must be more creative. Organizational creativity is a key stage in the innovation process and is considered to be the source of competitive advantage [1]. It is defined as applying the knowledge and methods of behavioral science, combining people's growth and development hopes with organizational



Fig. 1. Antecedents of organizational creativity

goals, and adjusting and changing organizational structure and management methods to make it adapt to the changes of external environment and internal conditions of the organization which will improve the efficiency of organizational activities [2].

At present, there are many studies on the factors affecting organizational creativity, further research has proved that informational leadership and proper organization climate have a positive impact on the organizational innervation [3]. Organizational culture encourages innovative thinking [4]. The organizational structure of democracy will promote the communication between employees and even different departments, and lead to the divergence of innovative thinking [5]. However, these studies on organizational creativity factors are too scattered. The disadvantage is that the previous literature has not systematically reviewed and studied the antecedent variables of organizational creativity. Therefore, this paper will propose an analytical framework for the antecedent variables of organizational creativity to gain insight into the lack of research in this field and pave the way for enriching the research and development in this field.

According to the theory presented by Andriopoulos in 2001, this research assumed that there are mainly 5 factors that will affect the organization creativity: Organization climate, leadership style, Organization culture, Resources and Skills and Organization structure [4]. For organization climate, recent research has proved that there are mainly three types: Learning, Planned and Creativity [3]. For leadership style, recent research has proved that there are mainly three types: Transformational leadership, Transnational leadership and Dual leadership [3, 6]. And for organization structure, there are mainly 2 types: Formal and Centralized. Therefore, this essay will study the impact of the above different factors on organizational creation to form a systematic framework. This report could be divided into five parts: introduction, definition of organization creativity, analysis on the framework of antecedent variables of organizational creativity, conclusions and references (Fig. 1).

2 Definition of Organization Creativity

Initially, organizational creativity research concentrated on the outcomes of creativity, resulting in a narrow and broad sense. For limit scene, it is described that the product is the result of innovation, and organizational creativity means that the organization

can design new products and put them on the market, gain profit. For broad sense, it is described that organization product is not only the new product, but also a new idea or a new action that the organization will carry [7].

According to the theory presented by Pu in 2014, the two-stage model of organizational innovation is one of the most highly recognized models [7]. The model divides the process of organizational innovation into initiation and execution stages. The initiation phase includes all activities that facilitate decision adoption, including: perceiving problems, gathering information, forming attitudes needed for innovation, evaluation, access to resources, etc. In the implementation stage, the organization's innovation activities are adjusted and initially applied, and the activities that can promote organizational innovation will continue to be adopted and implemented until they become a regular feature of the organization.

Based on the two-stage model, different experts give their own understandings. Amabile & Pratt defined organizational innovation as a working process, which uses relevant knowledge and information to create or innovate activities [8]. Drucker believed that organizational innovation is a systematic, organized and rational work, which includes all methods that can change existing resources and have the potential to create wealth [9]. Obstfeld also regarded organizational innovation as a process, which requires people to create new social connections with their ideas and resources with the purpose to produce new alliances [10]. Regardless of paying attention to the results of innovation or emphasizing the process of innovation, the viewpoint of defining organizational innovation from a certain point of view is not comprehensive enough. On the basis of previous studies, Damanpour (2010) integrated the above two views, namely, the view of result and the view of process, to define organizational innovation. He believes that organizational innovation refers to the emergence, development and implementation of new ideas or behaviors, including the output of new products or services, the application of new production technologies, the adoption of new management systems or structures, the implementation of new plans or projects, etc. [11]. This definition not only considers the results of organizational innovation, but also covers the process of organizational innovation, and also includes management innovation in the scope of organizational innovation. It is very comprehensive and accepted by many scholars and applied in research.

In this essay, based on the above explanation, organizational creativity is defined as a process that it apply the knowledge and technology to adjust the organizational structure or management mode to the changes of external environment and internal conditions with a purpose to improve the efficiency of the organization.

3 Analysis on the Framework of Antecedent Variables of Organizational Creativity

3.1 Leadership Style

There are many kinds of leadership styles. This part mainly studies transformational leadership, transactional leadership, and dual leadership, explores their impact on organizational creativity from organizational and individual factors.

3.1.1 Transformation Leadership

Definition The term transformational leadership first appeared in Rebel Leadership by Downtown (1973); then political sociologist Burns introduced the concept of transformational leadership in his monograph Leadership. He believes that transformational leadership is a process in which leaders and members mutually enhance their ethics and motivation to a higher level [12]. In this process, the leadership attaches great importance to improve member intrinsic motivation, give subordinates higher value and ideal, to arouse subordinate consciousness, hope subordinates beyond the original work expectations, the demand level to a higher level, to assist subordinates to achieve their higher level of internal demand, make subordinates willing to beyond personal interests to realize organizational interests. This article will define a transformative leadership: for leaders to personal personality charm and noble morality to stimulate employees internal motivation and demand, to explain them clear organization vision, personalized care for them, and pay attention to their various levels of demand, prompting employees to organizational interests first, to achieve organizational goals.

Impact on Organizational Creativity from Organization Part Promote the formation of innovative and learning organizational climate. Transformational leadership can help employees learn from past experiences and lessons, and formulate long-term learning and development plans, which is conducive to the shaping of learning organization climate; At the same time, transformational leadership style focuses on the long-term development of the organization, depicts the vision of the organization and stimulates the potential of employees which will create an innovative climate in the organization, and then it encourages employees to solve problems in innovative ways. However, the generation of planned organizational climate depends on the full preparation before task execution, which is ignored by the transformational leadership style that focuses on vision establishment. So it is difficult for transformational leadership to create a planned organizational climate.

Promote knowledge sharing. Prior study has proved that knowledge sharing is an important factor in promoting team innovation [16]. In transformational leaders, leaders will encourage team members to think differently and collide with different ideas to promote breakthrough innovation. At the same time, knowledge sharing will also help team members expand their information database and promote the proposal of innovative solutions.

Impact on Organizational Creativity from Individual Part Improve personal innovation ability. Recent study has proved that the transformational leadership style focuses on the organization's long-term goals, stimulates the potential of its members, and helps employees make original breakthrough innovation [3].

Improve the effectiveness of personal innovation. Recent has proved that Transformational leadership style Leaders are often inspiring and creative and are good at bringing intellectual challenges to their employees [13]. When Leaders have such inspiring characteristics that many employees will value innovation in the workplace and try to become more creative which will improve the effectiveness of organizational creativity.

Enhance personal psychological empowerment. Psychological empowerment is a positive psychological orientation, and employees want them to shape their work roles

and background, and believe that they are capable of doing it [14]. Research study has also proved that Psychological empowerment will regulate the relationship between transformational leaders and innovation—helping individuals feel confident that they are able to innovate, so that they can work actively or even independently [15].

3.1.2 Transnational Leadership

Definition First proposed by American Burns in 1978. Is defined as the relationship between the leader and subordinates is defined as the exchange relationship, based on this relationship, leaders through clear role and task requirements, using reward performance, appreciation achievement and other situation rewards and error management exception management, to guide or motivate subordinates toward established goals.

Based on Burns's research, many scholars also give their insights: Sergiovanni believed that transactional leaders will meet the immediate needs of their subordinates to achieve their work goals, while their subordinates will work hard to achieve their main needs. In other words, both leaders and subordinates will agree with each other and negotiate each in order to achieve their own goals [18]. Williams et al. suggested that transactional leaders will give feedback on appropriate rewards and punishments based on the performance and effort of trading [19]. Robbins pointed out that transactional leaders will clarify their roles and clarify their work requirements, so as to point out the goals and direction of their work, so as to guide and motivate their subordinates to work hard to achieve and exceed the goals [20]. In conclusion, in this article, transactional leadership is defined as leaders encouraging employees to complete tasks through some or similar rewards.

Impact on Organizational Creativity from Organization Part Promote the formation of culture climate of learning and planned. Recent study has proved that by understanding and solving the needs of employees and clarifying the role positioning of organizational employees, employees can complete work tasks more smoothly which will create a learning and planned organizational climate [3]. Therefore, through transactional leadership, in a learning organizational climate, employees will continue to learn to seek more innovation opportunities. And due to the planned organizational climate, employees will be prepared to cope with the technological change brought about by innovation.

Promote the formation of culture study. Recent study has proved that organizational creativity depends on organizational learning since active learning not only provides new knowledge and information for the group, but also helps to improve and optimize the ability [17]. When leaders take innovation as their organizational goal, the organization will continuously acquire and develop innovative knowledge, transfer knowledge and create new knowledge through various ways and eventually to enhance the organization's own innovation.

Impact on Organizational Creativity from Individual Part Improve the effectiveness of personal innovation. The outstanding feature of transactional leadership is that it attaches great importance to performance, and the evaluation of performance is based on a strict reward and punishment system. Therefore, in organizational creativity behavior, transactional leadership is conducive to promote employees to continuously complete

innovative tasks which will improve the effective ability of personal innovation, rather than stop.

Promote the trust between individual. The reward system established by the transactional leadership style will require employees to cooperate and communicate to complete a given task. Employees can maintain a higher trust relationship, which is conducive to reducing the degree of conservatism of knowledge and experience among employees without worrying about the threat of other people's ability growth to their own status and income. This will help to form a benign competitive relationship, which is more conducive to communication and knowledge sharing, and promote knowledge integration and new ideas, then promote the organizational creativity.

3.1.3 Dual Leadership Style

Definition Dual leadership means that it is a organic unity of transformational leadership and transactional leadership, using the reward system of transactional leadership to improve the effectiveness of innovation, while using transformational leadership to emphasize the importance of having an overall sense of mission, urge subordinates to actively put forward new ideas and promote creativity.

Reasons for Applying Dual Leadership Style First, it should be recognized that different leadership styles will lead to different organizational creativity output. Transformative leadership style is more conducive to producing novel and effective innovative ideas but its effectiveness is difficult to guarantee, which may cause practical application, market positioning and other problems, while transactional leadership style is conducive to forming more practical creativity in line with market demand, so that enterprises can achieve more effective innovation results but sometimes innovation will be ignored during the normal activity. Secondly, Recent research has proved that compared with a single leadership style, a balanced leadership style helps to coordinate the current and future development of the enterprise, and the organic combination of the two will make the enterprise to obtain a higher creative output [6].

3.2 Organization Climate

3.2.1 Definition

From the prior studies, it can be seen that experts usually use two versions to describe the organization climate. One view holds that organizational innovation climate is an "objective fact", which is independent of the perception and understanding of organizational members; Another view, which is generally agreed by most scholars, holds that the organizational innovation climate is the theoretical framework of organizational level analysis and the shared cognition of organizational members on the innovation working environment of their organization. Specifically, it exists within the organization and can be unanimously recognized and experienced by organizational members and affect their innovation behavior.

According to the theory presented by Pu in 2014, organization climate was described as the factors that organization members can feel in the workplace which can help them produce more ideas related to innovation and implement more various innovation

activities with the purpose of imperceptibly improving the innovation ability of the organization [7].

3.2.2 Impacts on Organizational Creativity

With regard to the research results in the field of cognitive style, the organizational climate can be divided into three types: learning, planning and creation [21]. Different organizational climate will lead to different creative results.

Learning Organization Climate In the learning organization climate, organization members are full of rationality in their work, believe in past facts and data, and conduct objective analysis and research. Organization members tend to carefully understand all relevant details of the task, analyze and study it, find out the regularity, and explore a clear and reasonable solution to a complex problem. When new ideas appear, they usually search past knowledge and experience, look for similar situations, and test their creativity through a logical and systematic method, so their creativity is usually very high.

Planned Organization Climate The planning climate pays more attention to the task structure, logic and perfect preparation in advance. In the planned organization climate, employees pay more attention to organizational practices, so in the organizational planning climate, employees are likely to be bound by tradition and pay more attention to the systematization of tasks. Even if new ideas are generated in the work process, they will not be applied immediately. However, once the theme of the task is defined as innovation, then employees in an organizational planning climate will attach importance to the preparation before innovation, respond to technological change, and ensure the effectiveness of innovation [3].

Creative Organizational Climate The creation of a creative organizational climate can effectively inspire people of the company to explore more options for completing tasks [3]. They enjoy challenging established organizational procedures and standards. They frequently conduct experiments to validate their creative ideas, and they view issues as chances and challenges. Their thoughts are dynamic and open-minded, which makes it easier to come up with new ones. Employees in a creative organizational environment can not only support the production of novel ideas, but also test those ideas through experiments, ensuring that creativity is successful.

3.3 Organization Culture

3.3.1 Definition

In this article, according to the research presented by Moon in 2012, organizational culture is defined as it is an emerging strategic system composed of common values and norms, which defines the appropriate attitudes and behaviors of organizational members in interpersonal relationships [22].

3.3.2 Impact on Organization Creativity

The impacts are mainly due to three aspects:

Self Efficacy Creative self-efficacy refers to the individual's belief in his ability to complete creative tasks, which belongs to the individual's subjective feeling of his own innovation ability. It emphasizes the individual's confidence in his ability to create and innovate, not just the ability of creation and innovation [23]. Recent research has found that organizational culture has an impact on employees' innovative behavior and employees' creative self-efficacy, and different types of organizational culture have different effects on employees' creative self-efficacy and employees' innovative behavior [24]. Among them, the highly aggregated organizational culture has the most significant impact on employees' creative self-efficacy. The reason may be that when the internal integration and external adaptation are high, the internal is employee oriented, emphasizes employees' dedication, encourages employees' democratic participation, and externally pays attention to social responsibility and innovation. Therefore, it is reflected in a kind of support for employees and encouragement of innovation, which is conducive to strengthening employees' creative self-efficacy.

Social Interaction Recent researched has proved that Socialization is critical for knowledge creation in an organization since it promotes information sharing not just between members of the same team or department, but also between people who operate in different locations [25, 26]. Luckily, according the research presented by Kevin & Manjul in [27], organizational culture has a positive impact on organizational innovation through social activities [27].

Knowledge Sharing According to the study presented by Danvanport & Prusak in [28], in addition to technical qualities, organizational culture is a critical component in the successful sharing and transfer of knowledge in businesses [28]. Recent research has also proved that organizational culture has a positive impact on knowledge sharing, which helps team members expand their information database and promote proposals for innovative solutions [29].

3.4 Resource and Skills

3.4.1 Definition

Based on previous research, the definition of resources and skills of this article are defined as the time, money, equipment, training, etc. needed to improve employees' innovation.

3.4.2 Impact on Organization Creativity

Improve the spread and the production of organization creativity. Recent research has proved that employees' perceptions of resource adequacy may affect their beliefs about the intrinsic value of the projects they undertake [30]. Therefore, by providing sufficient training time and money, employees will greatly increase their knowledge reserve and stimulate the divergence of innovative thinking. At the same time, sufficient equipment

will also support employees to complete various experiments and improve the generation of innovation.

Improve the effectiveness of organization creativity. Recent research has proved that on the basis of skills and interests, matching individuals with work tasks will maximize the sense of positive challenge in work, so as to improve employees' creative ability [31]. Therefore, reasonable arrangement of personal skills and tasks will maximize the exertion of resources and improve the effectiveness of organizational innovation.

3.5 Organization Structure

3.5.1 Definition

Based on previous research, the definition of organization structure of this article are defined as a formal arrangement of work roles and mechanisms for controlling and managing work behaviors across organizational boundaries. And also according to the research presented by Zhang in 2015, there are mainly two forms: Formal and centralized.

3.5.2 Impact on Organization Creativity

Recent study has proved that organizational structure mainly affects organizational creativity from two aspects: knowledge sharing and organizational climate.

Improve Knowledge Sharing Knowledge is the basis of enterprise innovation. Recent research has proved that organizational structure is an important carrier of enterprise knowledge, which can affect the cost of knowledge transfer by providing organizational scenes, so as to affect the formal or informal communication of organizational employees, and finally affect knowledge transfer [32]. In the formal organizational structure, the communication between different departments will not be limited. Through communication, employees can stimulate their innovative thinking and stimulate the generation of organizational innovation. Although, there are more communications in the centralized structure, too much communication may lead to casual communication, scattered and messy topics and insufficient effective communication, which may lead to confusion and contradiction and unable to effectively implement creativity.

Develop Positive Organization Climate Recent research has proved that the organizational innovation climate of an enterprise is affected by the organizational structure of the enterprise [32]. The existence of the organizational structure not only determines the transformation of innovation ideas into innovative products and the realization of enterprise objectives, but also constructs a unique cultural climate of the enterprise and affects the innovation working environment of the enterprise. From the above study of organization, it can be seen that different climate will lead to different creativity results. The formal organizational structure is conducive to the formation of planning and learning climate, while the decentralized organizational structure is conducive to the formation of innovative climate.

4 Conclusion

Organizational creativity will be affected by leadership style, organizational climate, organizational culture, resources and skills and organizational structure. In the leadership style, different leadership styles will bring different effects. Transformational leadership tends to promote organizational innovation from the organizational level, while transactional leadership tends to promote organizational innovation from the individual level. Dual leadership combines these two styles and flexibly transforms appropriate leadership styles in different environments. In the organizational climate, different climate styles will bring different effects. Creative climate and learning climate tend to promote organizational creativity from the aspect of thinking, and planned organizational climate tends to affect organizational creativity from the aspect of technology and equipment. In terms of organizational culture, organizational culture mainly affects organizational creativity from two aspects: improving self-efficacy and social interaction. In terms of resources and skills, sufficient resources and reasonable skill arrangement will promote the efficiency of organizational creativity. In terms of organizational structure, organizational structure will promote knowledge sharing and cultivate a good organizational climate, so as to promote organizational creativity.

References

1. Khedhaouria, A., Belbaly, N. , & Benbya, H. (2014). Exploring the impact of organizational climate factors on organizational creativity within a centralized is. Post-Print. <https://doi.org/10.3917/sim.144.0007>
2. Nias, & David. (1992). Adaptors and innovators: styles of creativity and problem solving, revised ed. *Organization Studies*, 13(12), 1360. [https://doi.org/10.1016/0191-8869\(92\)90187-T](https://doi.org/10.1016/0191-8869(92)90187-T)
3. Sun, Y. L., & Lei, P. L. (2018). Leadership style, organizational climate and organizational creativity. *East China Economic Management*, 32(3), 7. <https://doi.org/10.19629/j.cnki.34-1014/f.170710004>
4. Andriopoulos, C. . (2001). Determinants of organisational creativity: a literature review. *Management Decision*, 39(10), 834–841. <https://doi.org/10.1108/00251740110402328>
5. Szwiec, P. (2006). Organizational structure and staff creativity.
6. Sun, Y., & Jing, S. (2015). Ambidextrous leadership style, organizational flexibility and organizational creativity. *Forum on Science and Technology in China*. <https://doi.org/10.3969/j.issn.1002-6711.2015.02.021>
7. Pu Yanyan. (2014). Research ob the effect of transactional leadership on Organizational Innovation. (Doctoral dissertation, Harbin Institute of Technology). <https://doi.org/10.7666/d.D591864>
8. Amabile, T. M., & Pratt, M. G. (2016). The dynamic componential model of creativity and innovation in organizations: making progress, making meaning. *Research in Organizational Behavior*, S0191308516300053. Drucker P F. The discipline of innovation [J]. *Harvard business review*, 1998, 76(6):149–157. <https://doi.org/10.1016/j.riob.2016.10.001>
9. Drucker P F. The discipline of innovation[J]. *Harvard business review*, 1998, 76(6):149–157.
10. Obstfeld, D. (2005). Social networks, the tertius iungens orientation, and involvement in innovation. *Administrative Science Quarterly*, 50(1), 100–130. Damanpour F. Organizational Complexity and Innovation: Developing and Testing Multiple Contingency Models [J]. *Management Science*, 1996, 42(5):693–716. <https://doi.org/10.2307/30037177>

11. Burns, J.M. 1978. *Leadership*. New York: Harper and Row.
12. Damanpour F. Organizational Complexity and Innovation: Developing and Testing Multiple Contingency Models [J]. *Management Science*, 1996, 42 (5):693–716. <https://doi.org/10.1287/mnsc.42.5.693>
13. Lofquist, E. A. , & Matthiesen, S. B. . (2018). Viking leadership: how norwegian transformational leadership style effects creativity and change through organizational citizenship behavior (ocb). *International Journal of Cross Cultural Management*, 18(3), 309–325. <https://doi.org/10.1177/1470595818806326>
14. Spreitzer, G. M. . (1995). Psychological empowerment in the workplace: dimensions, measurement, and validation. *Academy of Management Journal*, 38(5), 1442–1465. <https://doi.org/10.2307/256865>
15. Hong, H. , Gu, Q. , & Chen, J. . (2013). How and when does transformational leadership affect organizational creativity and innovation?. *Nankai Business Review International*, 4(2), 147–166. <https://doi.org/10.1108/20408741311323344>
16. Liu, Y. , & Phillips, J. S. . (2011). Examining the antecedents of knowledge sharing in facilitating team innovativeness from a multilevel perspective. *International Journal of Information Management*, 31(1), 44–52. <https://doi.org/10.1016/j.ijinfomgt.2010.05.002>
17. Golparvar, M., Padash, F., & Atashpoor, H. (2008). The role of supervisors' leadership style components on personnel's psychological empowerment.
18. Sergiovanni, T. J. . (1990). Adding value to leadership gets extraordinary results. *Educational Leadership*, 47(8), 23–27. <https://doi.org/10.1177/0013161X90026002009>
19. Gazmararian, J. A. , Baker, D. W. , Williams, M. V. , Parker, R. M. , Scott, T. L. , & Green, D. C. , et al. (1999). Health literacy among medicare enrollees in a managed care organization. *Jama the Journal of the American Medical Association*, 281(6), 545–51. <https://doi.org/10.1001/jama.281.6.545>
20. Robbins. (2001). Marx's ecology. ANTIPODE.
21. Cools, E. , & Herman, V. . (2007). Development and validation of the cognitive style indicator. *J Psychol*, 141(4), 359–387. <https://doi.org/10.3200/JRLP.141.4.359-388>
22. Moon, H., Quigley, N. R., & Marr, J. C. (2012). How interpersonal motives explain the influence of organizational culture on organizational productivity, creativity, and adaptation. The ambidextrous interpersonal motives (AIM) model of organizational culture. Paragon House.
23. Sheng, Y., Pearson, J. M., & Crosby, L. (2004). *An Empirical Examination of the Impact Organizational Culture Has on Employees' Computer Self-Efficacy*.
24. Yang, J., Yang, D., & Sun, Q. (2012). The effect of organizational culture types on employee innovational behavior. *Science Research Management*.
25. Dell, C. O. , & Grayson, C. J. . (1998). If only we knew what we know: identification and transfer of internal best practices. *California Management Review*, 40(3), p.154–174. <https://doi.org/10.2307/41165948>
26. Gold, A. H., & Segars, M. (2001). Knowledge management II knowledge management: an organizational capabilities perspective. *Journal of Management Information Systems*, 18(1), 185–214. <https://doi.org/10.2307/40398521>
27. Scheibe, Kevin P. and Gupta, Manjul (2017) “The Effect of Socializing via Computer-mediated Communication on the Relationship between Organizational Culture and Organizational Creativity,” *Communications of the Association for Information Systems*: Vol. 40, Article 13. Available at: <http://aisel.aisnet.org/cais/vol40/iss1/13>
28. Davenport, T. H., & Prusak, L. (1998). Working Knowledge: How Organizations Manage What They Know. <https://doi.org/10.1145/348772.348775>
29. Cao Keyan, & Long Junwei. (2009). *Study in Science of Science*, 27(12), 8.

30. Amabile, T. M. , R Conti, Coon, H. , Lazenby, J. , & Herron, M. . (1996). Assessing the work environment for creativity. *The Academy of Management Journal*, 39(5), 1154–1184. <https://doi.org/10.2307/256995>
31. Amabile, T. M. , & Grysiewicz, N. D. . (1989). The creative environment scales: work environment inventory. *Creativity Research Journal*, 2(4), 231–253. <https://doi.org/10.1080/10400418909534321>

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