

# ROLES OF SOCIAL CAPITAL RESOURCES IN SCIENCE AND TECHNOLOGY ACTIVITY OF SCIENTIFIC WORKING GROUPS

Nguyen Thi Huong Giang<sup>1</sup>  
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## **Abstract:**

*Scientific collaboration is considered a cornerstone of 21<sup>st</sup> Century Science and a spring board for economic prosperity. Collaboration is believed to be influential on researchers' productivity. At a more basic level, it is also considered to be a fundamental part of the development of scientific human capital. Scientific collaboration is facilitated through social capital. Through a series of collaborative interactions, scientists move to positions within collaboration networks, which in turn creates value for scientific working group as well as individuals in that group.*

*The aim of this study is to evaluate the role of social capital in science and technology activities of scientific working groups (SWGs), including the case of Hanoi National University excellent scientific working group.*

**Keywords:** *Intangible resource; Science and technology; Scientific working group; Social capital.*

**Code:** 19013101

## **1. Introduction**

*Social capital* was first noted by Lyda Judson Hanifan (1879-1932), American researcher, in his 1916 paper "The Rural School and Rural Life"<sup>2</sup>. In this paper, Hanifan proposed a concept that the social capital is "tangible substance which causes impacts to almost all the human daily activities". This concept, however, was left outside attentions and in fact remained mentioned in some works of individual researchers during the years from 1950s to 1970s. This concept was dealt by numerous researchers only after research works by Bourdieu (1984) and other researchers (*Pierre Bourdieu, 1984; James Coleman, 1990; Robert Putnam, 1995*). Despite of different research approaches, authors agree commonly in consideration that the social capital is a broader notion on social relations including social links.

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<sup>1</sup> Author's contact email address: giangbtv@gmail.com

<sup>2</sup> [http://en.wikipedia.org/wiki/L.\\_J.\\_Hanifan](http://en.wikipedia.org/wiki/L._J._Hanifan)

Components making the social capital include: (i) Network of links; (ii) Faith and collaboration (reciprocal); (iii) Norms and rules.

Prof. Vu Cao Dam considered that the social capital itself is “the network which links people but not people itself in the network as tangible resources. It is not individuals separated each from other in the society but, more than that, people which get shaped and converge spiritual values in a well defined social network and cultural tradition. These peoples harmonized in a community form intangible resources which make forces for social development including S&T development”. In S&T activities, these intangible resources can be named out: sustainably linked networks between researchers, faiths in S&T activities, ethic norms of S&T community and collaboration relations in S&T activities. Social capital in S&T activities are under consideration in three levels: micro level (individuals), meso level (social groups) and macro level (national and international). Interactions between individuals and social groups (inside a nation or between nations) could increase or reduce social capital (*Vu Cao Dam, 2013*).

In a policy based approach, the author of this paper agrees with the opinion by Prof. Vu Cao Dam considering that the social capital is the harmonized integration of links and reputations of individuals in certain social networks. In these networks, they have rules, norms, faiths and reciprocal interactions between actors herein. Even being intangible, the social capital can be accumulated, used and transferred to other forms of resources.

For understanding the roles of social capital in S&T activities of *scientific working groups* (SWG), the author introduces some largely used notions on SWG. According to Truong Quang Hoc (2014), one of the first Vietnamese scientists having conducted researches in this sector, SWG is a scientific research/activity team set up by their wishes or development plan of an organization (not administrative unit). Leads of SWGs are the persons eager, professionally qualified, responsible for research directions and capable of organizational works (including capacities to set up relations, search operational finances for the group and gain respects from group members). SWG members are eager and capable scientists and also students which decide to follow well defined scientific directions of research. The group should have basic working conditions including working spaces, equipment, information sources, document materials and finances to ensure continuous successful research activities which are, in most of cases, long lasting (*Truong Quang Hoc, 2014*). Scientific research groups/teams are an expanded form to conduct S&T activities as well as post-graduate training activities. Over the world, in countries with advanced education systems, SWGs developed since early the XX Century. In Vietnam, according to

Nguyen Van Dao, “SWG’s have developed strongly since 1960s” (*Nguyen Van Dao, 2012*).

As definition for SWG, Circulation No. 37/2014/TT-BKHHCN by Ministry of Science and Technology regulates: SWG is a team of scientists which defines long term and common research directions with detail plans defined for every stages, sets up research contents of break-through nature and gathers numerous members for implementation. Key members of SWGs need to have outstanding research results. Concrete requirements towards SWG leads include: (i) Having research results published in reputed ISI journals within 5 years up to submission of application; (ii) Being capable of involving many high qualified scientists for implementation of project research works, to maintain regular scientific research works with international research teams of the same profile; (iii) Having at least two key researchers-members meeting requirements to be SWG leads; (iv) Being capable of arranging technical bases, research capacities and to commit regular supports during implementation time of research projects. Some requirements are also put to results of activities of SWGs, namely two papers to be published in reputed ISI journals and 1 paper in reputed national journal (*Circular 37/2014/TT-BKHHCN by Ministry of Science and Technology, 12<sup>th</sup> December 2014*).

Guideline No. 1409/HD-KHCN on 8<sup>th</sup> May 2013 by Hanoi National University regulates that the excellent scientific working group is a team of scientists which are: (i) Selected on basis of the profile of research directions; (ii) Conducting efficient scientific research and training activities with high quality results; (iii) Orienting to meet indexes of advanced research universities; (iv) Capable of playing core roles or to coordinate with other research teams for implementation of scientific contents of the Program (*Guideline No. 1409/HD-KHCN on 8<sup>th</sup> May 2013 by Hanoi National University*).

On basis of the above notions, the author states that SWG is a collective of outstanding scientists with: (i) High scientific reputations home and abroad; (ii) Firm directions of researches; and (iii) Reputed scientific leads.

Further, the paper provides analysis of the roles of social capital in activities of SWGs in general and excellent SWGs of Hanoi National University in particular, as study case, to clarify the important roles of impacts from social capital to efficient activities of SWGs and then to propose certain policies for development of social capital.

## 2. Social capital in activities of SWGs

In our modern time, the inter-discipline nature of research works are largely observed not only in S&T activities but in all social activities where collaboration and team working skills are highly required. The team working skills and culture become common trends of development in all sectors of social activities. The team working philosophy - effects of majority (but not majority itself) - is the result of a process of inheritance and evolution. When a group of individuals collaborate for joint working the common effects increase multiply with the time, much better than the mechanical sum-up of works by separated individuals. Here, we have a synergy where strong potentials of every individual get mobilized fully as result of resonance effects and weak points get offset by other partners. In actual context of Vietnam with low levels of R&D potentials, scientific linkage and competition, and limited and spread-out budgets for scientific research, the model of SWG will provide means to promote effective S&T products, to develop high quality human resources and to create breaking-through moves in certain sectors which require focused attentions on development.

Margaret Heffernan, UK management thinker, author of “TED Book” (TED = Technology, Entertainment and Design), indicated that the important element for efficient operation of an organization is the social capital<sup>3</sup>. According to Margaret Heffernan, the most components of social capital include the faith, knowledge, reciprocal relations and norms which are shared between to create life quality and to make a group stand out. In any group, you may have many outstanding individuals, but the relations between individuals who make them share ideas and concerns, give contributions and issue early warnings of hidden risks are the factor to link members in the group. The social capital locates in center of a single culture: what they depend on and what they create (*Margaret Heffernan, 2015*).

In a research made on collective intelligence, Thomas Malone, who created MIT Center for Collective Intelligence, and collaborators<sup>4</sup> had proved the particular effective mode in solution of the problem of creativity. Their target was to define outstanding qualities which make a group better than other ones. They had found out that the presence of smart individuals (measured by IQ scores) does not make great differences. The presence of certain individuals with high intelligence level or “super men” in a

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<sup>3</sup> <<https://ideas.ted.com/the-secret-ingredient-that-makes-some-teams-better-than-others/>>

<sup>4</sup> <<http://mitsloan.mit.edu/faculty-and-research/faculty-directory/detail/?id=41335>>

team/collective is not important but the following factors are more important, namely: (i) Members in the team/collective share equivalent time for talking and communication; (ii) All the members have equal rights to give opinions and no opinion considered as redundant; (iii) There exist a social sensibility where individuals have adjustment of behavior, feeling and mutual understanding in case of change of mood and attitude. The most remarkable point of this research work is the clarification of importance of social linkage (*Thomas W. Malone and Michael S. Bernstein, 2015; Young Ji Kim et al, 2017*).

Therefore, the social capital is not only the substance to join “bricks” in a structure but the factors to make the structure stronger and more solid. In today contexts, the social capital gets more important because it reflects the mutual dependence, the links in the network and the faith between peoples. In working place, the social linkage plays important roles in making individuals and the group more resilient and outstanding. The high level of social capital creates more faith between members in the network, makes conflicts safer and turns the team/collective stronger and more open. The conflicts in creativity if well managed will create the social capital then make conflicts constructive. The process to build up the social capital should start from accumulation of minor actions.

Uri Alon<sup>5</sup> considers that scientists are, at certain extent, similar to businessmen in the meaning that they get successful through solution of difficult problems, in a race against time. The sharing of time, however, to build up social links is highly important too since it gives contributions of working motivations to individuals in the network which would compensate losses in working time. Scientists rely on social linkage when they try to settle difficulties and challenges which usually are accompanied with break-through achievements in science. According to Uri Alon, the social capital is the important factor to form feasibility of scientific break-through moves. Once without high level of social capital, SWGs would not have hot discussions and exchanges to settle difficult problems. The creativity requires a safe environment and then the absence of social capital would not create new ideas, unpredictable moves and questions for check and review. Even the most talent peoples need to have social capital. The social capital, by its nature, is not consensus. This does not mean that colleagues in the team have always to become best friends or to cheer each other. In SWGs with high level of social capital, the disagreement is not a threatening risk but a sign to show mutual concerns. The team members with the best mindset may not agree with your opinions but always find ways to get hints

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<sup>5</sup> <<https://doi.org/10.1016/j.molcel.2010.01.011>>

from them. They know well that all ideas can start in incomplete ways. In organizations with high level of social capital, conflicts, discussions and exchanges are means to make ideas more perfect (*Uri Alon, 2010*).

The building of social capital makes SWGs more efficient and creative because the high faith offers a safe, honest and credible environment. In an efficient SWG, members would promote the sharing of knowledge and expertise. They do not leave colleagues in stuck and confused situation but try to prevent problems in advances. They do not leave colleagues isolated or separated from the team. The longer the team has the time of co-working the more the social capital gets accumulated and the more the team gets benefits from that (*Zhigang Hu, Chaomei Chen, Zeyuan Liu, 2014; Mark R. Costa, 2014*).

The above analysis shows that the social capital in SWGs is the network of relations, inter-links, mutual faiths, interactions, reciprocal relations and norms shared between members.

### **3. Study case of excellent SWGs of Hanoi National University**

On basis of definition of the core roles of SWGs in scientific and training activities, Hanoi National University is the first organization in the country to build up and develop excellent SWGs. Since 2014 up to date, Hanoi National University develops 28 excellent SWGs including 13 groups in sectors of natural sciences, technics and technology and 15 groups in sectors of social sciences and humanities. The effective of groups varies from 3 to 39 members. About 27% in the total of about 400 members (including leads) hold Prof.-Dr. or Ass. Prof.-Dr. titles and the remaining part include researchers with doctor and master grades, post-graduate students and bachelor grade. All the leads of excellent SWGs are leading scientists with high experience and expertise. Almost all of them were born during 1930s-1960s period (22 leads in total which make 78.6% and half of them were born after 1950) and only 6 leads (21.4%) were born during 1970s-1980s period. Almost all the leads (78.6%) get educated in advanced countries. Members of excellent SWGs come from local and foreign organizations where many of them are high reputed by social communities and recognized by international scientific communities. In order to meet development demands, excellent SWGs have permanent members (post-graduate students, graduates and students) and collaborators from related fields.

Excellent SWGs of Hanoi National University are open collectives of scientific research activity which operate under management of leading scientists. The latters are well reputed and experienced, have numerous international publications and meet governing rules by Hanoi National

University (as required in *Guideline No. 1409/HD-KHCN on 8<sup>th</sup> May 2013 by Hanoi National University*). Leads of excellent SWGs are main responsible for research directions and organizational matters (including development of links, search of operational finances) and, thanks to that, get high reputation among group members. Members of excellent SWGs follow certain scientific research directions and they have basic working conditions enough to ensure successful achievements of research activities in continuous and long term ways.

It is almost 5 years from the day, Hanoi National University started assigning the title of excellent SWG. To date, excellent SWGs give great contributions for development of S&T activities in Hanoi National University, particularly in the increasing number of international publications. Publications by scientists and research groups give part in enhancing the rank of Hanoi National University in international rankings. In the 2014 UK-QS ranking, Hanoi National University gets up to the 169<sup>th</sup> position among Asian universities (249<sup>th</sup> position in 2013 ranking) and holds the first position in Vietnam. By the 2016 ranking, Hanoi National University gets up to the 139<sup>th</sup> position among the top 150 Asian universities and by the 2018 it holds the 124<sup>th</sup> position among Asian universities.

In addition, excellent SWGs of Hanoi National University publishes many books and scientific curriculums in related fields, conducts high quality post-graduate training programs (doctor and master grades), produces useful products, transfers knowledge, technologies and S&T products for many enterprises and localities over the whole country. According to 2018 survey results by Dao Manh Quan<sup>6</sup> among scientists actually working in excellent SWGs of Hanoi National University, during the last 5 years, averagely every scientist publishes 2 monographs and 4 ISI/Scopus papers, 5 papers in other international journals, 18 papers in local scientific journals, finishes 0.6 products ready for commercialization and transfer, has 2.6 time to attend international workshops as invited speakers, leads 3 research projects and participates in 5 research projects of various levels (*Dao Manh Quan, 2019*).

These remarkable results come from contributions of members of excellent SWGs, particularly leads of excellent SWGs which are scientifically reputed individuals with strong domestic and international collaboration links. Every excellent SWG is a research and social organization with large extending

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<sup>6</sup> Presentation: "Policies for development of excellent scientist working groups in Hanoi National University: Status and solutions", at the National workshop *Development of scientific working groups in universities: theoretical backgrounds, domestic and international experiences, actual status of development of research groups in universities in Vietnam*. University of Technology, Hanoi National University held by University of Technology, Hanoi National University on 5<sup>th</sup> January 2019.

research networks of scientists of the same or related profiles. Particularly, the survey of views by leads of excellent SWGs shows that all of them appreciate the faith among members.

Interactive activities in SWGs gets reflected multi-formly in numerous activities, namely a large practice of: (i) Individual deals with components in the global project where the member is strong; (ii) Joint discussions, consultations and proposals of solutions; (iii) Discussions and exchanges of research results; (iv) Joint publication of scientific papers and research results, joint participation in scientific activities and events, sharing and exchange of research experiences, methods and facilities. In activities of SWGs, there are, between research directions, interactions and reciprocal supports in terms of expertise and human resources if needed. For example, during a site investigation, upon demands by Group A for supports in terms of scientific staffs, Group B is ready to arrange its staffs for assistance, and inversely Group A provides their staffs to support Group B for realization of a short term project. Interactive links are highly important in S&T activities of SWGs. It is the same for sharing of interests (including reputations, finances and etc.). It is practice of interactions between scientists inside and outside of SWGs and also home and abroad. However, actually, interactive relations in S&T activities still have some shortages, practice of undocumented rules and, in some cases, locally so-called “feedbacks” in granting research projects (which are subtle and sensible topics without evidences in many cases). There is still a practice of “group benefits” where favors are given without considering qualification level and fields of expertise of researchers. It is found that, in activities of SWGs, the leads have the crucially important roles. Once the leads are incorruptible, mindful and capable, they would considerably restrict or prevent negative and unwished problems.

The survey shows that the social capital is used mostly in brain storming for and shaping of scientific ideas (54.54%), realization of scientific tasks (50%), publication of scientific works (40.9%), training activities (36.36%), international cooperation (36.36%), development of research networks (31.81%), searching of research finances and supports (31.81%) and transfer of knowledge and commercialization of technologies (22.72%).

Team building activities such as excursions, tours, academic activities, collective activities and other social activities are conducted by SWGs with different levels of attentions. They may be regular (50%), sometimes (40.9%) or rare (4.55%). Only 4.55% of SWGs do not carry out team building activities.



#### **4. Conclusions**

The social capital is seen and used in various activities of research teams in general and of SWGs in particular. They help consolidating the research networks and bring in common values for the teams. The social capital also facilitates cooperation between members inside SWGs and between members and research communities as well as domestic and abroad organizations. At the same time, the social capital brings success for development strategies of each individuals in research teams.

Hanoi National University, as study case, shows well that the social capital plays important roles to influence efficiency of activities by excellent SWGs, particularly the leading roles of team leads, effective research networks, international cooperation activities and mutual faiths between members of excellent SWGs.

Effective use and increase of social capital in S&T activities of SWGs require policies for development of social capital in macro and micro plans. They target to push up research links and networks between excellent SWGs of Hanoi National University and between excellent SWGs of Hanoi National University and other social networks home and abroad; to promote forms of collaboration in S&T activities; to issue financial policies to support research activities and publication of research results; to create favorable working and research environments; to motivate individuals and SWGs to work. In addition, scientists need to maximize use of advantages of social communication media largely available in research communities for better linkage with research networks home and abroad and, at the same time, update and share information and research results in fastest and effective ways./.

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