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Teamwork as an Innovation Generator: An Analysis of Project Hatchery at Binus University International

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ABSTRACT

There are numerous researchers studying the substance of innovation in an organisation. Teamwork is always the essential part of innovation in organisation; in other words, good teamwork is an important ingredient in achieving innovation. In higher education institutions, many strategies have been implemented to achieve innovation. This paper uses the Team Quality Construct (TWQ) from Hoegl and Gemuenden (2001), which highlights several factors namely, communication, mutual support and balance between member contributions, coordination, effort and cohesion as being other essential qualities for the generation of innovation. In addition, this paper examines the relationship between teamwork and innovation by using TWQ and the Innovation Competency Development (INCODE) assessment at BINUS University International. INCODE is a form of assessment that has been implemented in BINUS' Project Hatchery classes for first-semester students from diverse academic backgrounds. The results of the study have signified the role of teamwork as a construct that influences innovation significantly. The study showed that there were no differences in respondents' perception of teamwork among students enrolled in different programmes included in the sample population. This proved that teamwork can be considered as the main contributing factor in innovation generation.

Keywords: Teamwork, innovation, innovative pedagogy, developing ideas, Project Hatchery, Indonesian higher education, INCODE, communication

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INTRODUCTION

Numerous organisations including education institutions survive competition with very little innovation applied in their system, products (graduates) and even services.

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However, the trend is changing in this era of globalisation. Nowadays, people are required to innovate in order to achieve better results. Innovation is a necessity for every organisation that hopes to thrive well into the future. This condition also applies in higher education business competition. Higher educational organisations are obliged to create more creative and innovative ideas so they can survive the impact of globalisation. Innovation is needed to foster economic growth and creative ideas. Yet, the process of generating innovative ideas can become challenging, especially when organisations are not actually generating innovative ideas, but are, rather, repeating ideas and producing more general ideas that have no innovative meaning at all. What is innovation? Innovation in an organisation is meant to improve the quality of the organisation holistically. According to Shukla (2009), innovation is the process of generating ideas that can lead to a new product or new services. To innovate can be articulated to be creating change. In order to create change, the primary thing that needs to be done is to analyse and define the driving force behind the organisation and to reprogramme it to create change; such analysis should consider what techniques are used by the organisation as well as what previous outcomes have been achieved as a comparison for improvements.

There are many ideas revolving around pedagogical methods that are intended to generate innovation in higher education, especially on how to teach innovation to students. However, the methods used sometimes do not generate innovation, but are mostly repetition of ideas; repetition is not classified as innovation. According to Kalyani (2011), change is usually related to innovation; however, not all change essentially occupies new thoughts or leads to major development or radical breakthroughs. In several organisations, change happens from the organisation structure to the compensation system in order to trigger staff into generating innovative ideas. One of the strategies to achieve this is to foster teamwork. Teamwork can achieve better results, faster decisions and diverse and creative ideas. Countless research works have been done studying the importance of teamwork in the innovative process, for instance teamwork quality and the success of innovative process (Hoegl & Gemuenden, 2001), a conceptual framework for innovation (Cavagnoli, 2011), managing teams as a strategy for success (Hayes, 2002) and innovation and entrepreneurship (Drucker, 1985). However, there is still limited research on how to generate innovation using teamwork as a pedagogical method in higher educational institutions. This paper examines teamwork as a strategy to generate innovative ideas, especially in higher educational institutions.

INNOVATION IN INDONESIAN HIGHER EDUCATION

Indonesia's Minister of Research, Technology and Higher Education has called for improvement of the education system, an increase in working opportunities for graduates and enhancement of innovation in

the country. He has called for the ministry to be reformed (Nurdiani, 2015). The minister pointed out that Indonesia is grappling with a high rate of youth and graduate unemployment. The creation of a common market made up of ASEAN (Association of Southeast Asian Nations) nations, of which Indonesia is a member, will open employment sectors within the region, and this makes it urgent for the Indonesian higher education system to become more internationally competitive. The Central Statistics Agency reported last November that the highest rates of unemployment were being experienced by the most educated people. Some 5.6% of graduates are unemployed, but experts said among new graduates this could be as high as one in four. In addition, according to a recent World Bank report, Indonesia was seeing a disconnect between the higher education system and the labour market. The higher education sector needs to be improved before it can turn out large numbers of 'job-ready' graduates (Nurdiani, 2015).

Indonesian education experienced stagnancy in innovation during the late Suharto era in the 1990s, when the education system was tightly centralised. Remarkably, a Organisation for Economic Co-operation and Development (OECD) Report (2014) placed Indonesia second most innovative country in education for innovation, behind the highest scorer, Denmark, trumping more developed countries such as South Korea, Singapore, Japan, Germany and the United States, which scored 'below average' in the rating. The report measured innovation in the classroom and school in the primary and secondary education of 24 countries between 2000 and 2011 (Rohmayaningsih, 2014). There are pros and contras regarding this OECD report because the findings are in sharp contrast with another OECD study, the 2013 Programme for International Student Assessment, (PISA), which rated Indonesian students as the second-lowest performers in maths and science. Stephan Vincent-Lancrin, the report's lead author, defined innovation in education either as a new and emerging method that had not been used before or an old practice that had changed significantly, such as using textbooks as the primary source and parental participation. Indonesia performed better on the latter.

It is believed that innovation generation should be started in the early years of children's development (Kasper, 2008). In support of this idea, BINUS University International, one of Indonesia's renowned private universities, has taken great strides in growing innovative generation by implementing hatchery courses. Several studies on how to produce hardy students who can survive the current trends have also been done at BINUS University International. In line with the university motto, "People, Innovation and Excellence," BINUS came up with the idea of creating a curriculum fuelled by innovation.

Inspired by Turku University, Finland, BINUS University International formed a division called CIE (Centre for Innovation and Entrepreneurship) to trigger, guide, monitor and evaluate the process of innovation. As the starting stage, a

course named Project Hatchery (PH) was established in 2014-2015. The purpose of this course was to facilitate students towards understanding the importance of the innovation process. The course introduced the concepts and practice of working on real-world projects involving a variety of stakeholders. Students from different programmes were brought together to work as a team. A well-defined problem chosen by the lecturer/mentor was assigned to each multi-disciplinary group. Every session comprised a brief lecture of concepts and best practices, followed by practical work on the project under the mentorship of the lecturer. The project adapted design-thinking methods, which include empathise, ideate, prototype, test and exhibit to elaborate the innovative process being experienced by the students. BINUS University International believed that this project would generate innovative behaviour among its first-year students.

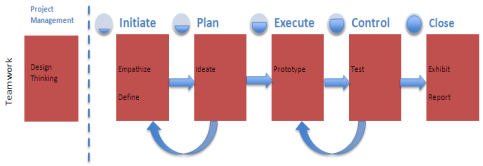

Figure 1: . Stages of Project Hatchery

PROBLEM ANALYSIS

Methods of solving problems and creating innovation in groups is an crucial focus of organisations and businesses. In essence, innovation is seen as being necessary for the resolution of various problems affecting an organisation. Without innovation, it would be difficult to achieve progress and to achieve targets designed by the organisation. To comprehend how teamwork can generate innovation, one should know how innovation is first created. According to Drucker (1985), there are seven sources of innovation, which are:

1. The unexpected. Innovation can be generated from unique opportunity such as an unexpected achievement, unforeseen failure or unexpected occasion.
2. Incongruities. Sometimes, differences can be part of the innovation.
3. Process needs. Innovation refines the existing process using a weak connection in the chain or by redesigning an old process that previously existed.
4. Industry and market structure. Opportunity to approach products, services or innovative business happens when the fundamental foundation of a business or market changes.
5. Demographics. Population movement and differences in age, composition, job, education level and earnings might generate innovative chances.
6. New perception. Innovative opportunities can increase when the attitudes, beliefs and assumptions of people, in general, change.
7. New knowledge. Progress in scientific knowledge and non-scientific knowledge is able to trigger the invention of innovative products and new markets.

Clearly, then, innovation is a force that can be created and implemented. Nonaka and Takeuchi (1996) also mentioned that knowledge creation or innovation in knowledge is based on how an individual or organisation is able to mobilise and convert tacit knowledge. In a team, converting tacit knowledge into explicit knowledge can accelerate the innovation process. The research problems studied in this work were framed as four major questions: Does teamwork generate innovation? What are the difficulties in generating innovation? What are the advantages and the disadvantages of using teamwork as a new method for generating innovation? What is the impact of using teamwork?

PLANNING INNOVATION DISCUSSION: TEAMWORK AS INNOVATION GENERATOR

After determining the issues that obstruct innovation generation, as discussed in the previous section, the next stage in the process of generating innovation is to determine the technique to achieve innovation. First of all, it should be acknowledged that many factors can impede innovation from the culture of the organisation to the organisation structure and also the resources (people and money) owned by the organization. There are also work culture problems related to organisational structure, such as individuality and reluctance to openly share ideas with the team. We first consider the source of innovation by starting from a change in perception.

Many people generate innovative ideas every day. However, they usually do not lock their ideas in written format, and this, instead of anchoring the ideas for development, allows it to disperse. The process of generating ideas, capturing them and applying them are the foundation of innovation. Ideas can be a solution for problems in an organisation, and at the same time they create opportunities for inventing new products and better service, new business models and a new marketing concept. Therefore, the notion of creating a pool of written ideas in teamwork in order to generate innovation is an alternative in pushing boundaries in expressing ideas. In addition, innovation requires teamwork. Without ideas, the innovation process will not occur. However, one thing to remember is that innovation not only consists of a set of ideas; innovation is a process that will shape ideas to their maximum results.

Lee and Na (1994) in their research explained that innovation is a cultural factor implanted in organisations including the people in them. Positive relationship between supportive culture and organisational innovation were indicated in research done by Chang & Lee (2007), who found that organisational culture affected knowledge management, which can trigger innovation within an organisation itself. Significant influence is also felt in business management performance and competition. It is recognised that teamwork has sophisticated function that can influence culture, such as clarity, trustworthiness, innovative consciousness and participation

from members. Another research work related to teamwork and innovation comes from Amabile (1990), who showed that there are some factors that can affect innovation at work that can obstruct innovation such as work culture, management style and resources. Hoegl and Gemuenden (2001) identified six elements to construct quality teamwork namely, communication, mutual support, balance of member contributions, coordination, effort and cohesion. Hoegl and Gemuenden (2001) also stated that the success of innovative projects requires that team performance and motivation be maintained.

Teamwork should be the primary principle in generating innovation. It is similar to the creativity technique invented by Osborn in 1939, brainstorming. It cannot be denied that current organisations use the teamwork principle in their management style as a focus. Effectiveness and efficiency are the main reasons to create teamwork in an organisation. Jones et al. (2007) stated that cooperation, individual skills and constructive feedback would be generated if teamwork were applied in organisations. Cohen (1997) defined a team as a pool of people who shared responsibilities and were connected and interdependent in carrying out tasks. Frye (2015) added that maximum results could only be achieved when all members within a team worked together to gain the common goal. Brainstorming activity has effectively proven capable of solving problems and providing alternative ideas in the beginning stages of innovation generation.

According to Osborn (1963) brainstorming is a method where a group tries to find solutions to specific problems by collecting a list of ideas spontaneously contributed by group members. As has been analysed in an earlier section, individuality is the common issue in teamwork. In the author's perspective, an organisation will not accomplish its goals effectively if there is more individuality than group identity in team work. At this stage, it is recommended that the working culture be changed to one of effective cooperation and teamwork. There are three mandatory efforts designed to create a successful team, namely, create a good culture, construct the best team and be planned and prepared (Frye, 2015). This paper will add to previous research by Hoegl and Gemuenden (2001) regarding the six elements to construct quality teamwork, namely, communication, coordination, balance of member contributions, mutual support, effort and cohesion. Hoegl and Gemuenden (2001) also mentioned that in order to make sure of the success of an innovative project, team performance and motivation should be maintained.

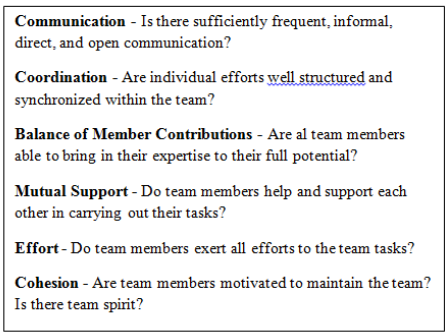

Figure 2: Team work quality construct (Hoegl & Gemuenden, 2001)

BINUS University International adapted the pedagogical method used by Turku University to prove that teamwork can be used to generate innovative ideas by implementing the Innovation Competency Development (INCODE) assessment in its Project Hatchery course for first-semester students. INCODE is an assessment rubric used by some universities to measure the innovation process. It covers three levels of generic assessment i.e. assessment of individual, interpersonal and networking competencies (Watts et al., 2013).

Table 1
PINCODE Assessment Rubric

No.	Attribute	Peer Group	Final Grade
1	Transmits ideas effectively		
2	Listens to teammates		
3	Collaborates actively		
4	Contributes to group functioning		
5	Takes initiatives		
6	Drives others to act		
7	Faces conflicts with flexibility to reach agreements		

In this study, teamwork was implicitly defined and listed in INCODE form. The Project Hatchery mentors believed that forming a small team would create a better work environment. Therefore, teamwork from INCODE and and the team quality construct from Hoegl and Gemuenden (2001) were mapped and aligned as given below:

Table 2
Teamwork Mapping

Teamwork (INCODE)	Team Work Quality Construct
Transmits ideas effectively	Effort
Listens to teammates	
Collaborates actively	Coordination
Contributes to group functioning	Balance of member contributions
Takes initiatives	Cohesion
Drives others to act	Mutual support
Faces conflicts with flexibility to reach agreements	Communication

ADVANTAGES OF TEAMWORK

As described by Osborn (1963), innovative ideas come from the brainstorming; this is similar to the idea itself, which is teamwork. Different people with different backgrounds have a tendency to produce different ideas and this can be harnessed for the common good when they work together effectively as a team. Ingram (2000) in his research specified that a good manager is a person who can assign a task to his subordinates in group form in order to attain the greatest output from his subordinates. Additionally, Ingram (2000) also emphasised that in the process, teamwork could develop individual performance and organisation. The relation between innovation and teamwork is clearly stated by Cavagnoli (2011), who attested that decision making among individuals and distributing responsibilities is a result of innovation engagement. Luca and Tarricone

(2002) explained some of the attributes needed for effective teamwork as given below:

1. Team success and commitment to shared goals – Members are obligated to achieving the team's success and they are expected to shared their ideas and visions.
2. Interdependence – Members should encourage one another as this contributes to a better working environment.
3. Interpersonal skills – Trust, honesty and support can create an effective work environment. Erdem et al. (2003) concluded that better skills and the coordination of individuals are actually formed by constructing trust in teamwork.
4. Open communication and positive feedback – Respecting each other and valuing one another's contribution is also needed. Internal communication also has a positive impact on team performance and innovation. According to Hola and Pickhart (2014), if an organisation is able to add internal communication in their management system and maintain it systematically, then efficiency of communication will be achieved.
5. Appropriate team composition – This is related to job allocation, depending on what skills the members have.
6. Commit to process, accountability and leadership – Awareness of the processes and accountability for contributions by team members will generate a better teamwork environment.

Furthermore, as a trial to understanding how teamwork runs, Lombardo and Eichinger (1995) improved the T7 Model to signify the main aspect of team work performance. Each aspect begins with the letter T. The aspects are:

- Thrust: Usually related to general purpose regarding what is needed to be achieved or regarding team objectives
- Trust: It is important to believe in each other as team members
- Talent: The communal ability and skills of teammates to finish the job perfectly
- Teaming skills: Effectively working together and efficient as a team
- Task skills: Successfully implementing or getting the job done

The two external team factors are:

- Team-Leader fit: Compatibility between the team leader and team members; this enables the team leader to assure members of their needs
- Team support from the organisation: Support for the team leader and the team as a whole enables the leader to lead the team to perform effectively within the organisation

Each aspect within the team can be defined into sub-factors or dimensions.

LIMITATIONS OF TEAMWORK

The limitations that might appear from this strategy were developed by Lencioni (2002). Based on his research, there is the potential for a team to be dysfunctional. To develop proper team functioning, it is important to recognise the dysfunction type and level. Here are five potential dysfunctions of a team based on Lencioni's (2002) research:

1. Absence of trust. This will occur if teammates are hesitant to be vulnerable with each other and do not want to confess their faults, limitation or ask for assistance.
2. Fear of conflict. Decisions that are inferior will be created if team members feel the environment does not allow them to express their opinion. Teams that lack trust engage in serious and transparent debate on key issues.
3. Lack of commitment. Without conflict, lack of commitment might affect employees, particularly workers who are role models, who might be dissatisfied.
4. Hindering accountability. This will happen when the team does not have a clear plan of action.
5. Inattention to results. Team members usually have a tendency to put personality, recognition, job development and other issues ahead rather than the interests of the team. If a team has lost focus of its target, then the business will ultimately suffer.

Joseph (n. d.) stated that there are five things that can impede teamwork: uneven participation, not inclined to be a team player, hindering creativity, lengthy process and internal conflict. The literature clearly defines that the advantages of teamwork far exceed itts limitations even though those limitations are factual and to a degree, unavoidable. The reasons will be clarified in the following sections.

IMPACT OF TEAMWORK

Teamwork has a huge effect on improving innovation and work performance, and it is very sophisticated when researchers try to use teamwork to achieve results. Organisations that apply teamwork have the habit of keeping their best people in order to create higher performance among staff and to achieve better profit (Manzoor et al., 2011). Pedler et al. (1991) identified a learning organisation as an organisation that provides and endorses education from all its members and systematically changes itself. The hypothesis here is that teamwork generates an environment for shared knowledge, responsibility and also for developing personal and professional members continuously, all of which will finally generate innovation.

Basically, this method impacts all factors in different types of organisation such as its human resources, its culture, its other resources and its organisational structure. Related to the human resources of an organisation, teamwork can change the attitudes of workers, increase their skills and enhance job satisfaction as well. According to Hayes (2002), teamwork enables and assists individuals to develop

their own creativity and this can lead to job satisfaction and decrease pressure at the work place. When there is adequate trust from team members, task conflicts will tend to be avoided (Jehn & Mannix, 2001). In addition, resources such as time efficiency and ideas will be efficiently used by a team of workers rather than by individuals. Recognition (rewards) as another resource can considerably affect performance positively. Teamwork can also result in clear, linear communication that ensures smooth flow of operations. Teamwork shatters non-linear communication and allows information to flow smoothly to all members of the team.

The main objective of this study was to examine the influence of teamwork when building innovation competency, using the Teamwork Quality concept and Innovation Competency Development (INCODE) within the scope of BINUS University International's Project Hatchery classes for semester-one students from different programmes (six different study programmes, two different main faculties). Two main hypotheses were formulated to signify the impact of teamwork on innovation among first-semester students from different programmes in BINUS University International, and to acknowledge possible differences in student perception of Teamwork Quality values and innovation competency based on the available programmes.

RESEARCH METHODOLOGY

The study was conducted to prove the influence of teamwork on innovation as perceived by BINUS University International students from different main programmes or majors, and furthermore, to analyse whether there were possible differences among students from multiple programmes in perceiving teamwork value. The quantitative research technique was used due to the nature of the study that was based on explanation. A survey strategy was applied in order to collect sufficient data within a short time from a sizeable population. Quantitative data for the study were collected through self-evaluation and peer-evaluation questionnaires as the main data-collection tool. The questionnaire itself was distributed during the fall semester of 2014 and it was used to gather perceived views and experiences from BINUS University International students on developing teamwork to generate innovative ideas through a standardised set of questions compiled as a questionnaire. The questionnaire was modified based on the Innovation Competency Development (INCODE) questionnaire used by Turku University, which consisted of 25 questions representing all the variables relevant to teamwork in building innovative values. Each question was measured using a rating scale; closed-ended questions were given a specific scaling measure where '1' was the lowest possible score and '10' the highest. The innovation values came from the assessment questionnaire given to the

assessors (faculty) in evaluating the works of each student who participated in this study at the end of the fall semester 2014 and upon evaluating their final project or work. The two assessments were separated although they were later analysed as one set of data for the study. Although the required data for the study was conducted through two different data collections conducted at different time, the study itself was conducted using the concept of cross-sectional research time frame, in which the study focussed on a particular phenomenon at a particular time frame, thus mostly relying on a mono-method through single-data collection techniques.

The whole population of first-year students from several different programmes was selected, while the programmes were selected through purposive sampling in order to ensure only specific cases would respond and become part of the study. The programmes selected were International Accounting and Finance, Hospitality and Tourism Management, International Business and Marketing, all of were represented the Faculty of Business, while Computer Science and Information System represented the Faculty of New Media and Computer Technology. Overall, 250 questionnaires were distributed, with 210 valid responses received as the final data to be analysed for this study. Upon satisfactory reliability and validity checking on the construct's questionnaire using Cronbach's Alpha and the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test, the consistency, stability and quality of the measurement tools were proven. Two data analyses were conducted. The two main data analyses conducted were the linear regression analysis and t-Test comparison. These two statistical analyses were selected in order to prove the significance of teamwork in innovation within the two variables relationship, as well as to compare the results of both teamwork values and innovation competency as perceived by the students from different programmes in BINUS University International.

FINDINGS

The study managed to gather a total of 210 valid responses from six programmes. The number of responses received were 23 from the International Accounting and Finance programme, 19 from the Hospitality and Tourism Management programme, 72 from the International Business programme, 33 from the Marketing programme, 43 from the Computer Science programme and 20 from the Information System programme. All the responses came from first-semester/year students.

The first data analysis for this study was conducted through the use of linear regression data analysis. The results are presented in Table 3. The main dimension of teamwork significantly influenced innovation as the dependent variable (Sig=0.009, with 95% confidence level), thus supporting the notion of teamwork as one of the crucial factors in forming innovation among the samples. The R-Square value signified 32% variance of innovation, which can be explained by the fact that it was the main variable of interest, teamwork.

Table 3
Results of Linier Regression Analysis

		Unstandardised Coefficients			
Hypothesis	R square	Constant	Teamwork	Significant Value	Status
H_a: Teamwork towards innovation	0.032	60.393	0.164	Sig = 0.009 Sig < 0.05	Reject H_0

From the coefficients result, the following equation can be derived:

$$Y = 60.393 + 0.16XTeamwork$$

Based on the equation model, it is indicated if the value of teamwork increases by 1, there will be an increase within the innovation value by 0.16 points, with the constant or base point of the study given as 60.393 points.

The second data analysis was the t-Test comparison, which was conducted to signify any possible differences among the sampled students from multiple programmes in BINUS University International in perceiving the teamwork values. Results of the t-Test comparison signified no difference in values perceived by the sampled students regarding teamwork based on the 6 different programmes (Sig 0.713, with 95% confidence level). Therefore, it could be acknowledged there was no significant difference in the way students perceived teamwork among different programmes. Results of the analysis are presented in Table 4.

Table 4
Results of t-Test Comparison Analysis

Hypothesis	Significant Value	Status
Ha: Significant differences among the International Accounting & Finance, Hotel Tourism Management, International Business, Marketing, Computer Science and Information System students in perceiving teamwork	Sig = 0.713 Sig > 0.05	Do not Reject H_0
Group	Mean	
International Accounting & Finance	74.78	
Hotel Tourism Management	72.26	
International Business	71.36	
Marketing	71.85	
Computer Science	73.74	
Information System	71.55	

CONCLUSION

Based on the research results, more innovative ideas were certainly developed during the activities on teamwork. Successful teams become stronger when members learnt to work together and appreciate each other's ideas. The result shows there was a major contribution of teamwork as a major motor in developing innovative ideas, which generated innovation ability among the BINUS University International students. However, there were no differences from their point of view in perceiving the function of teamwork quality among students from different programmes although there was an indication that students from different programmes would possess differences in nature that would lead to differences in perceiving teamwork as well as innovation competency. One limitation of this research was that it was conducted only at BINUS University International and only with first-year students as the research object. The results may not be the same in different settings. For future research, it suggested to analyse this method in profit and non-profit organisations, which also implement teamwork in their organisational structure, or in a different educational settings with a wider range or scope of respondents (different age groups or across universities). Different concepts and/or factors in measuring teamwork quality as well as innovation competency could also be used to explore the concept even further.

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