ENHANCEMENT OF RESEARCH AND DEVELOPMENT SERVICES AT ABU DHABI POLICE ADOPTING OPEN INNOVATION MODEL

Mohamed Al-Karaeen
Abu Dhabi Police General Headquarters (ADPGHQ)
P. O. Box: 253, Abu Dhabi, UAE
Decision Engineering Centre
Cranfield University, Cranfield, Beds
MK43 0AL, UK

Ahmed Al-Ashaab
Decision Engineering Centre
Cranfield University, Cranfield, Beds
MK43 0AL, UK

Wael Saleh
Decision Engineering Centre
Cranfield University, Cranfield, Beds
MK43 0AL, UK

ABSTRACT
Open innovation is one of the most discussed topics among management researchers. Some of the crucial matters that are of interest in open innovation research are recognizing the significance of open innovation beyond high-tech industries and analyzing how organizations implement it in reality. This paper is addressing the role of open innovation model in enhancing the research and development services in Abu Dhabi Police via conducting a comprehensive field study in several departments. The open innovation framework is formulated, an in-depth case study is conducted, data sets are analyzed and recommendations are bestowed. In case of Abu Dhabi, there is a critical need to have a new innovation dimension that is represented in research and development. Theoretical, practical and managerial consequences are clarified through out the paper and will be presented at the conference.

INTRODUCTION
Availability of information and knowledge is a key factor in promoting open innovation within a firm. Innovation is dependent on the existence of information that can be used in a manner that creatively helps to address operational issues and help organizations meet their operational goals. Therefore, investing on collection, analysis and storage of data on internal organizational operations and various external factors that affect organizational operations may be helpful in improving innovation. Furthermore, the collaborative approach that is required in open innovation places immense pressure on organizations to

employ teams that have been well-formulated and developed. The use of teams allows for collaborative engagement in innovative activities; however, such endeavors require robust communication and information systems within a firm (Almirall and Casadesus-Masanell, 2010).

This paper is addressing the role of the open innovation model in enhancing the productivity and services of governmental entities of the Emirate of Abu Dhabi. The Emirate of Abu Dhabi, capital of the United Arab Emirates (UAE), is the base of such studies. Currently, the Emirate of Abu Dhabi is experiencing a rapid growth with a major diversification and strategic liberalization of the economy. Deliberate steps have been taken into consideration to drive growth in new areas of Abu Dhabi local economy and facilitate greater commitment worldwide.

The open innovation framework is represented by the collaboration between universities and organizations (both industrial and services sectors). In the case of the Emirate of Abu Dhabi, the authors believe there is a critical need to have a new innovation dimension that is represented in research and development. This work is concentrating on the impact of research and development to advance the development of new technology services and best practices in one of the most active governmental organizations in Abu Dhabi, namely Abu Dhabi Police. This paper is divided in four sections, namely methodology, related research, data analysis, and conclusions and future work.

METHODOLOGY

The methodology followed for this piece of research to be successfully conducted in illustrated in Figure 1.

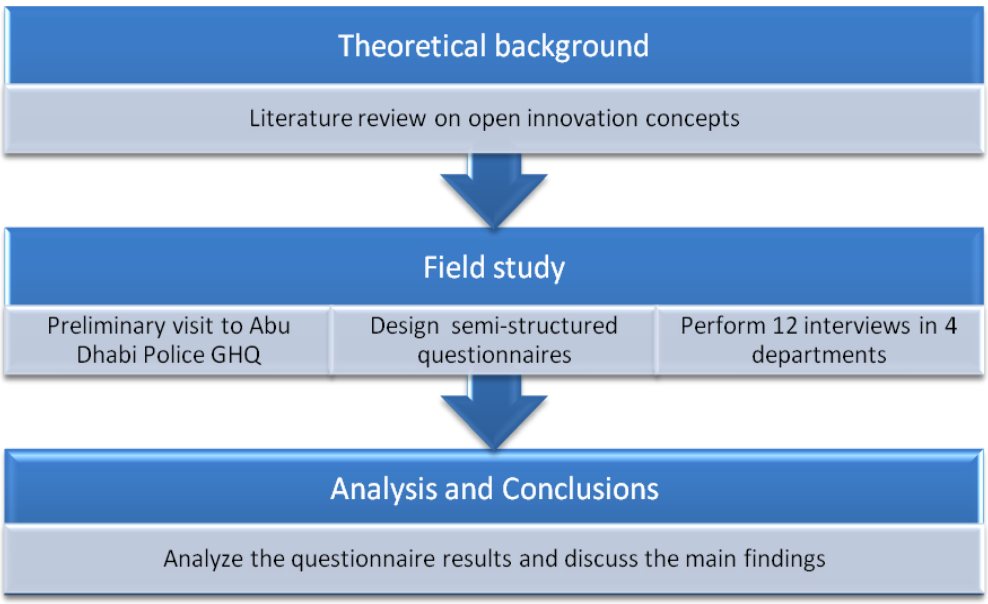


Figure 1: Research methodology followed.

RELATED RESEARCH

This section aims at providing an overall understanding of the open innovation concepts and explores themes, such as the elements of open innovation, the factors affecting open innovation and the role of Research and Development (R&D) in open innovation applications.

According to the open innovation model there are four main elements that shape the model in any firm or organization. Figure 2 shows the main elements of the open innovation which are:

1. Internal technology base. It consists of the science and the technology that are made and developed by the workers inside the company (de Jong et al., 2008).
2. External technology base. It is a source of the input for the open innovation model which comes from outside the firm. This technologies or ideas can enter the innovation process at different stages of the process (Chesbrough, 2003). These kinds of collaboration with other firms or universities help to increase the resource capabilities of the firms (Kzauhairo et al., 2010).
3. Technology spin-offs. The firms tend to license their projects and technology spin-off which they can sell or share it with other firms (Chesbrough, 2003).
4. Markets of open innovation. There are two markets in the open innovation model. The first one is the current market which is the market of the products or services that the firms supply to achieve their main goal. The second market is the new market that appears because of the innovation process. These markets contain the technology spin-off of the firms.

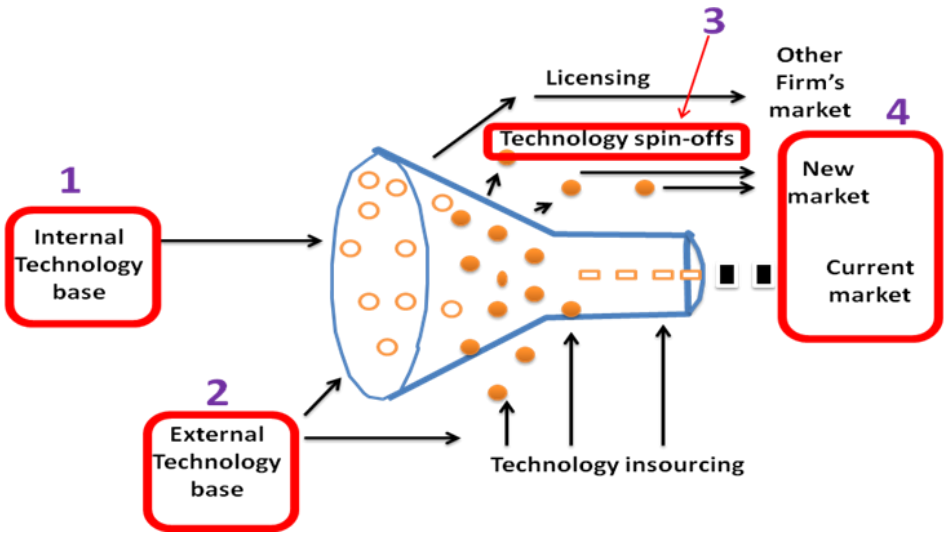


Figure 2: Open innovation elements.

The factors that affect open innovation are as follows:

1. The organizational structure and levels of hierarchy (Chesbrough and Appleyard, 2007).
2. The organizational culture.
3. Assessment and change management strategies (Lichtenthaler, 2008).
4. Innovation experiments (Sorensen, Mattsson and Sundbo, 2010).

External collaboration is considered to be effective for achieving high R&D performance. One of the most important types of collaboration is collaboration with universities. Collaborations with universities are considered important to achieve high-level academic performance, as they develop social capital that allows for the sharing of core knowledge necessary for achieving R&D and innovation performance (Kzauhairo et al., 2010). Furthermore, collaboration with local business organizations (suppliers and venture firms) contributes to the laboratory's development performance. Collaborations with suppliers have a great impact towards the development. The involvement of suppliers at early stage of innovation has many benefits because such involvement includes gaining competencies, sharing risks and lunching

product more rapidly. Also, collaboration with local venture firms is important because collaborating with such firms may help in gaining complimentary knowledge and information related to new product development. Internal R&D is also important due two reasons (de Jong et al., 2008):

1. The R&D can still be a source of better performance as was in the close model.
2. The R&D is necessary to obtain and maintain the absorption capacity that is needed to tap from external sources.

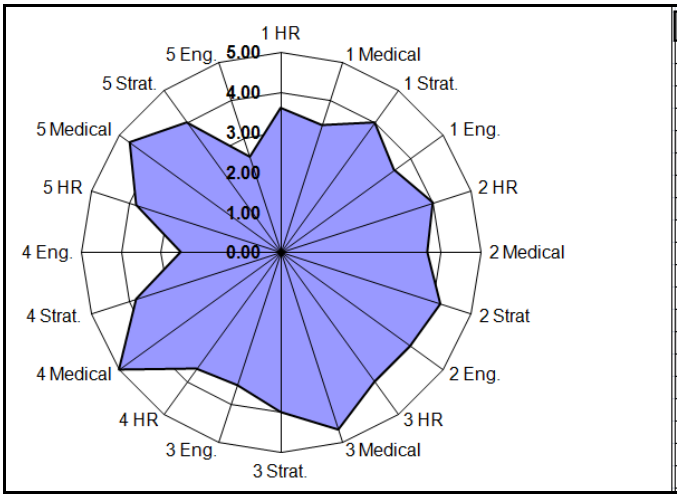
DATA ANALYSIS

This section presents the data collected from the field study which the authors carried out. Twelve face-to-face interviews with four departments in Abu Dhabi Police GHQ, namely Human Resources, Medical Services, Engineering Projects and Strategic and Development departments were conducted. Each department is represented by three interviews where the range of experience for the participants is between 4 to 40 years. Below are some interesting remarks, facts and outcomes that are figured out after conducting the interviews based on the questionnaire developed in this paper. Some of the results are represented by column charts and others by radar charts. The result of each department is taken by the average of three interviews in each department and the overall result represents the average of all the departments' results.

Figure 3 shows the process of innovation, which consists of 5 steps. A question about this process was asked during the interviews which addresses the need of support in each step of the innovation process.

Figure 3: The process of innovation.

The results of asking about the need of support at each particular stage of the innovation process in each department are shown in Figure 4, where '1' reflects that the department needs less support, while '5' indicates the need for more support.



Results	Code	Topic
3.60	1 HR	Idea Selection in HR
3.33	1 Medical	Idea Selection in Medical
4.00	1 Strat.	Idea Selection in Strategic
3.50	1 Eng.	Idea Selection in Engineering
4.00	2 HR	Research, technology development in HR
3.67	2 Medical	Research, technology development in Medical
4.20	2 Strat	Research, technology development in Strategic
4.00	2 Eng.	Research, technology development in Engineering
4.00	3 HR	Implementation in HR
4.67	3 Medical	Implementation in Medical
4.00	3 Strat.	Implementation in Strategic
3.50	3 Eng.	Implementation in Engineering
3.60	4 HR	Market introduction in HR
5.00	4 Medical	Market introduction in Medical
3.80	4 Strat.	Market introduction in Strategic
2.50	4 Eng.	Market introduction in Engineering
3.80	5 HR	Servitisation in HR
4.67	5 Medical	Servitisation in Medical
4.00	5 Strat.	Servitisation in Strategic
2.50	5 Eng.	Servitisation in Engineering

Figure 4: The need of R&D support in Abu Dhabi Police.

According to Figure 4 the Human Resources, Strategic and Development and Engineering Projects and Medical Services departments show above the average result in the first step of the innovation process, which is "Idea Selection". This means that new and innovative ideas are explored by the employees and some external sources, such as workshops and conferences. Also, short and training courses that the universities provide for the organizations' employees are another source for new ideas. Furthermore, the employees are encouraged to explore their innovative ideas. Part of encouragement is acknowledged by issuing an award to the best innovative idea. At the same time the organization believes that they need external innovative ideas because their view is that they could benefit from others' knowledgeable ideas and let the others benefit from their own.

All the departments need support in the "Research and Technology Development" step. The departments believe there is a need for support from Research base organizations, such as research centers, as their capability is limited in this area because the employees are more focused on applications and implementations. Therefore, the departments aspire to achieve the best research and technology development to their projects in order to provide the best output from their projects. The Medical Services department needs help in the case of research because their priority is to provide the medical services to the employees and their families rather than doing researches. The Human Resources and the Strategic and Development departments need more support in the area of Research and Technology development. These two departments believe that their fields are soft aspects that needs deep thinking and should be updated rapidly. Moreover, the departments faced some barriers during their previous R&D projects where they outsourced some parts of their projects, such as updating software and developing equations that gives some specific results. Therefore, they believe that they should have policies that support the R&D within the organization. Furthermore, Figure 4 shows that the Engineering Project department needs immense support in the area of Research and Technical Development because their main priority is to provide all the required data for their projects through researches in order for the relevant information to be then forwarded to external companies. The next step is to select the most suitable company based on specific criteria (e.g. cost, facilities); the selected company is the one which is going to implement the project.

Three of the departments need a big amount of support in the implementation step which is very important in the innovation process. The Human Resources department needs support in this step due to the diversity in the education level and job responsibilities among the employees in these departments. An example of this issue was noticed when trying to implement a project regarding core competencies and various employees failed to provide the accurate data; this led to misunderstandings and complications in the implementation. The Medical Services department needs the most support in the implementation area because the innovative and effective ideas already exist, but the issue is that the department is focused on the service provision to the patients. In addition, due to the lack of infrastructure, the majority of their projects are conducted outside the department with external organizations. Also, the Strategic and Development department needs support in the same area because their typical projects are based on the interaction with different departments; thus, they face the challenge of managing a wide variety of tasks and responsibilities. Moreover, the implementation step needs little support in the Engineering Project department because in this department they just select the best project and study it and then they choose the best external companies to implement it.

Market Introduction, which is the fourth step of the innovation process, needs to be supported in some departments. The Human Resources and the Strategic and Development departments need some support in the market introduction area because of the work environment, which is a police environment where it

is not easy to introduce a new system or technique to the employees. The Medical Services department does not achieve a good score in this step because they are not focused on introducing new medical projects and most of the department's visitors are healthy and do not suffer from harmful diseases. On the other hand, the Engineering Project department does not face any issue at this step because all the projects are outsourced to specialist companies.

It can be noticed from Figure 4 that some departments need help on the fifth step of the innovation process, which is Servitization. Figure 4 shows that the Human Resources and the Strategic and Development departments need some support in the Servitization area. However, the Medical Services department needs more support compared to the others because of their priority in serving specific people and providing services for specific diseases. The Engineering Project department is doing well in this step due to mainly two reasons. Firstly, this step is outsourced to external companies and secondly, the employees are well educated and able to deal with problems.

Figure 5 shows the degree of collaboration for each department collaborates with other external resources which is one of the most important parts in Open Innovation.

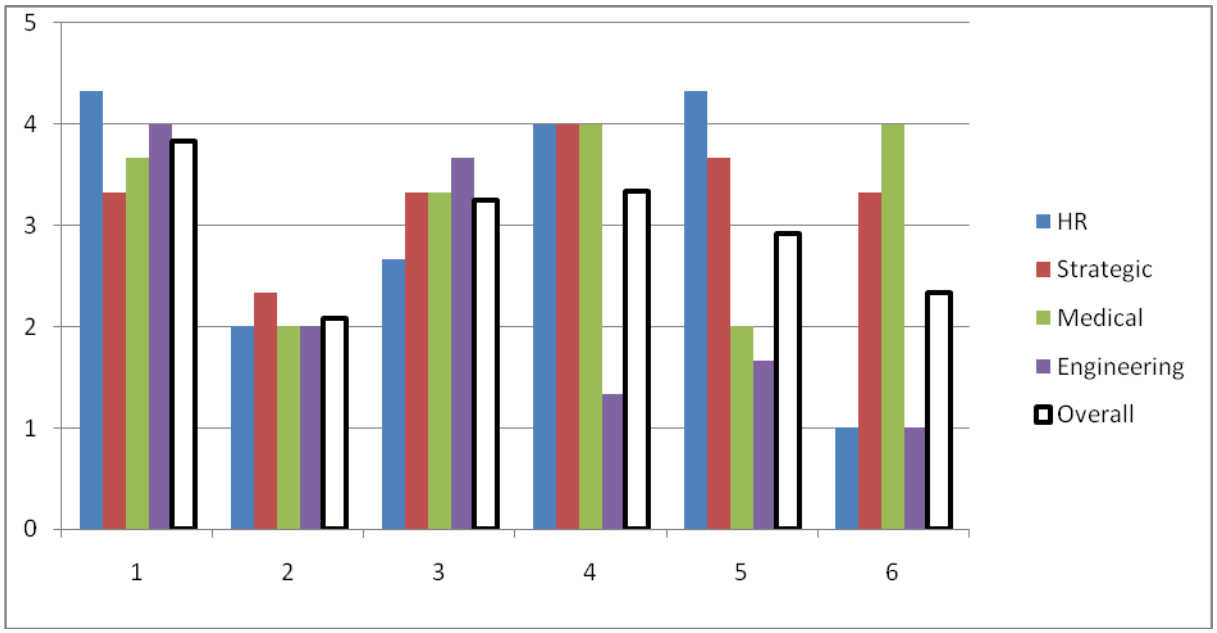


Figure 5: Collaborating with organization, universities and research centers.

Collaboration with Universities is an important aspect that supports the Open Innovation process. It can be noticed in Figure 5 that Abu Dhabi Police is collaborating with many national universities in United Arab Emirates. A good example of these collaborations is the collaboration between the Medical Services department and Sharjah University, where they conduct new researches and training courses and they work in some researches together. Also, the Human Resources, Strategic and Development and Engineering Projects departments are collaborating with U.A.E. University and Higher College of Technology where they share ideas and plans in some researches and also the universities are responsible to provide courses and researches regarding the latest technology for Abu Dhabi police employees. Moreover, Abu Dhabi police is not collaborating with international universities as much as they collaborate with national universities.

Collaboration with other external organizations is also important in Open Innovation. Abu Dhabi Police is working with many national organizations but not as much as the Open Innovation model requires. The Strategic and Development department is working in partnership with Abu Dhabi government in order to support and follow the strategic plan of Abu Dhabi. Also, the Medical Services department is collaborating with the Ministry of Health where they work with many national hospitals to provide the best services possible in U.A.E. At the same time Abu Dhabi police is also working with many international organizations where they collaborate with England Police, Singapore Police, New York Police and Scotland Police in all the fields and they exchange ideas and hold expert discussions with them. Although all the departments are collaborating with international organizations and police worldwide, the Engineering Project department showed less attention to the collaboration with international organizations.

Research Centers are very important for any research. According to the Open Innovation Abu Dhabi police showed an unexpected result in collaborating with research centers where they scored less than the average in this kind of collaborations. The Human Resources and Strategic and Development departments are paying annual fees for the Emirates Researches and Strategic Studies Centre, which is a national research centre, to provide the departments with any needed help in the R&D project and the centre is also providing surveys that evaluate the employees' satisfaction. The other two departments do not collaborate with a specific national research centre. Furthermore, the Medical Services department is the only department which collaborates with international research centers, such as with medical research centers in Germany and the UK.
Figure 6 shows the main barriers the employees encounter when they are interested in pursuing R&D in Abu Dhabi Police GHQ.

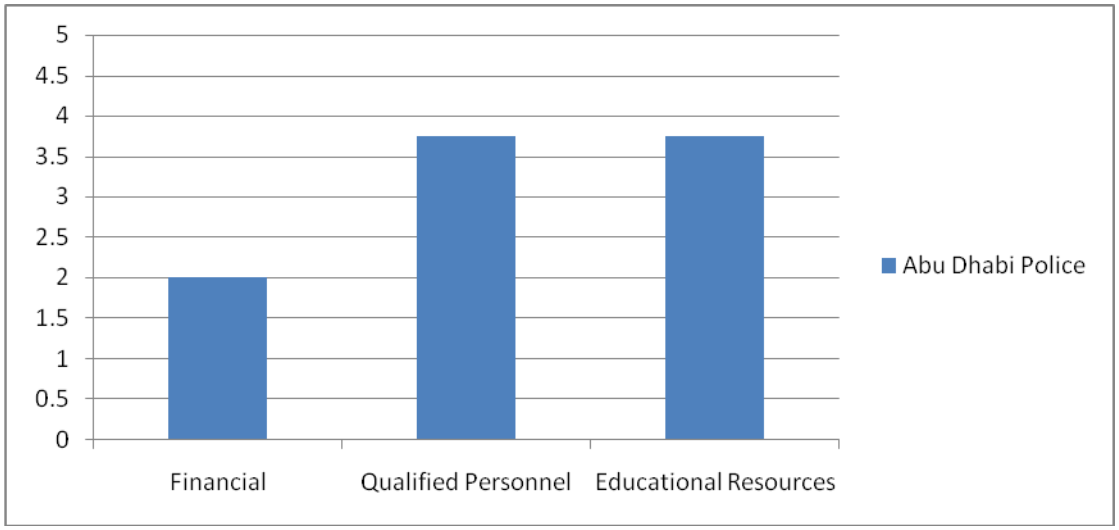


Figure 6: Main barriers the employees encounter when they are interested in pursuing R&D.

It can be noticed that the main issue is the lack of qualified personnel and educational resources, while financial barriers seem to be very low. This may happen due to the fact that the personnel were not employed to perform R&D activities; thus, they may not be qualified.

CONCLUSIONS AND FUTURE WORK

Open innovation is widely used by many firms nowadays. It has a great impact in the field of manufacturing where it aids the firms to develop products and new technologies. The main important practice that supports the process of open innovation is the external collaboration with universities and other firms and organizations. External collaboration is considered to be effective for achieving high R&D performance. In general, the paper results are also considered value added to the business since the benefits of open innovation extend beyond financial performance and also include social impact and strategic importance to the national and regional economy of Abu Dhabi and UAE overall.

ACKNOWLEDGEMENT

The authors would like to express their gratitude to H.H. Lt. General Sheikh Saif bin Zayed Al Nahyan, Deputy Prime Minister and Minister of Interior of UAE, and Abu Dhabi Police General Headquarters (ADPGHQ) for supporting this research under grant number 33/11/847. Also, the authors would like to thank all the participants from Abu Dhabi Police GHQ who participated in the field study.

REFERENCES

Almirall, E., & Casadesus-Masanell, R. (2010). "Open versus Closed Innovation: A Model of Discovery and Divergence." *Academy of Management Review*, 35(1), 27-47.

Chesbrough, H.W., & Appleyard, M.M. (2007). "Open Innovation and Strategy." California Management Review, 50(1), 57-76.

Henry W. Chesbrough, (2003), (The Era of Open Innovation)

Jeroen P.J. de Jong, Wim Vanhaverbeke. Tarmo Kalvet, Henry Chesbrough,(2008). "Polices for open innovation." *Vision Era.net.*

Kazhuhiro Asakawa, Hiroshi Nakamora and Naohiro Sawada, (2010). "Firms Open Innovation Policies." *Laboratories' External Collaborations, and Laboratories' R&D Performance.*

Lichtenthaler, U. (2008). "Integrated Roadmaps for Open Innovation." *Research Technology Management*, 51(3), 45-49.

Sorensen, F., Mattsson, J., & Sundbo, J. (2010). "Experimental Methods in Innovation Research." *Research Policy*, 1-10.