



Implementation of Technical Innovation as a Corporate Strategy in DEWA – Power Generation Division processes

تنفيذ الابتكار كاستراتيجية مؤسسية لإدارة عمليات الابتكار في قطاع الإنتاج بهيئة كهرباء ومياه دبي

by

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Declaration

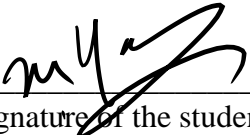
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Abstract

The purpose of this paper is to map out how an organization can translate innovation into business value. The organization that was chosen for the study is the Dubai Electricity and Water Authority. DEWA is one of the notable organizations when considering how it has used innovation as a part of its corporate strategic planning to become one of the most efficient organizations. DEWA is one of the few government organizations that have been appreciated for excellent service delivery. When considering how DEWA became an innovative company, it is necessary to examine the details of the organization's strategy and the guidelines that it uses to become an innovative entity.

In this study, the primary focus is to establish a background on what is innovation as a concept, examining particularly innovation management, and covering many aspects for both innovation and innovation management. Subsequently, how innovation is practiced and implemented within DEWA, with a specific focus on the Power Generation Division where many patents have been submitted so far. The findings indicate that the innovative ideas at DEWA are evaluated systematically with the goal of ensuring that they are aligned with the goals and objectives of the organization strategy, the Dubai, the UAE, and the global innovation index. Aligning the ideas with all these guidelines ensures that the organization is continuously moving in the right direction. However, internally it was noted that the Power Generation Division would need some improvements, especially concerning communication, motivation and awareness creation among its employees with regards to innovation.

ملخص

الغرض من هذه الورقة تحديد كيف يمكن لشركة ما أن تترجم عمليات الإبداع وتحولها إلى قيمة تجارية. الشركة التي تم اختيارها لهذه الدراسة هي هيئة كهرباء ومياه دبي. ديوا هي واحدة من المنظمات الجديدة بالذكر عند النظر في كيفية استخدام الابتكار كجزء من تخطيطها الاستراتيجي لتصبح واحدة من المنظمات الأكثر. ديوا هي واحدة من المنظمات الحكومية القليلة التي حظيت بالتقدير لتقديمها خدمات ممتازة ومستويات عالية من رضا المتعاملين. عند النظر في كيف أصبحت ديوا منظمة مبتكرة، فمن الضروري النظر لتفاصيل استراتيجية الابتكار فيها والمبادئ التوجيهية التي تستخدمها لتصبح منظمة إبداعية.

في هذه الدراسة، سيكون التركيز الرئيسي بإنشاء خلفية علمية عن مفهوم الابتكار، ودراسة متبحره لإدارة الابتكار، إلى جانب تغطية العديد من الجوانب لكل منهما. ومن ثم الاطلاع ومعرفة كيف تم ممارسة وتنفيذ الابتكار في ديوا، مع التركيز بوجه خاص على "قطاع توليد الطاقة" التي قدمت العديد من براءات الاختراع حتى الآن. تشير النتائج إلى أن الأفكار المبتكرة في هيئة كهرباء ومياه دبي يتم تقييمها بصورة منتظمة بهدف ضمان أنها تتماشى مع أهداف ومقاصد كل من المنظمة، دبي، الإمارات العربية المتحدة، ومؤشر الابتكار العالمي. التوفيق ومحاذاة الأفكار مع جميع هذه المبادئ التوجيهية تضمن أن الهيئة تتحرك بشكل مستمر في الاتجاه الصحيح. ومع ذلك، لوحظ داخليا أن "شعبة توليد الطاقة" تحتاج إلى بعض التحسينات، خاصة فيما يتعلق بالتواصل، التحفيز، والوعي بين موظفيها فيما يخص الإبداع.

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Table of Contents

Declaration.....	2
Copyright and Information to Users	3
Abstract.....	4
ملخص.....	5
Acknowledgement	6
Table of Contents.....	7
List of Figures.....	9
Abbreviations.....	11
Chapter 1.....	12
Introduction.....	12
1.1. Background.....	12
1.2. Problem Statement.....	15
1.3. Aims and Objectives.....	16
1.4. Research/Dissertation Organization.....	17
Chapter 2.....	19
Literature Review.....	19
2.1. Innovation	19
2.1.1 Innovation and Creativity.....	20
2.1.2 Types of Innovation	21
2.1.3 Factors Impacting Innovative Opportunities.....	24
2.1.4 Innovation Considerations, Challenges, and Failures	27
2.2. Innovation Management	30
2.2.1 Innovation Process within an Organization	30
2.2.2 Innovation Funnel Framework for Managing Innovation.....	31
2.2.3 Innovation Policies Implications.....	32
2.2.4 Impact of Innovation Policies on the Organizational Performance	33
2.2.5 Aspects of the Innovation Process in Electrical Power Generation	34
2.2.6 Methodology for Innovation Management in Power Generation	35
Chapter 3.....	38
Research Methodology	38

A. Innovation Management Case Study (DEWA) - Power Generation Division.....	38
3.1. DEWA Vision and Mission	38
3.2. DEWA Smart Initiatives	40
3.2. DEWA innovation Strategy	45
3.2.1 Innovation Agenda Themes	45
3.2.2 DEWA Innovation Strategy	52
3.2.3 DEWA Corporate Strategy Map	53
3.2.4 DEWA innovation goals and objectives	56
3.2.5 DEWA Enable Innovation	59
3.3. DEWA's Power Generation Division Innovation Processes	64
B. Research Survey Design for the Case Study	68
Chapter 4.....	71
Research Results and Discussion:.....	71
1) Management Support for Innovation at DEWA.....	72
2) Innovation Behaviors.....	78
3) Afkari Program	83
4) Innovation Department	87
Chapter 5.....	89
Conclusion and Recommendations.....	89
5.1. Conclusion	89
5.2. Recommendations.....	91
Reference List	94
Appendix.....	98

List of Figures

Figure 1	UAE National Innovation Strategy	11
Figure 2	Types of Innovations 1	19
Figure 3	Types of Innovations 2	19
Figure 4	Innovation Funnel	30
Figure 5	DEWA Smart Initiatives	41
Figure 6	Innovation Agenda Themes	43
Figure 7	DEWA's Corporate Strategy Map 2021	51
Figure 8	DEWA innovation goals and objectives	53
Figure 9	Innovation Framework / Ecosystem Overview	57
Figure 10	AFKARI Ideas Flow	58
Figure 11	Innovative Forces	61
Figure 12	Dubai 10X	62
Figure 13	10 Steps Continual Improvement Model	65
Figure 14	Managerial Category	69
Figure 15	Financial Resources Needed to Support Innovation	70
Figure 16	Impact of Innovation on Improving DEWA Performance	71
Figure 17	Innovative Culture for Support Innovation	71
Figure 18	Division encouragement to come up with innovative initiatives	72
Figure 19	DEWA Providing Family Culture	73
Figure 20	DEWA as a Success-Driven Organization	73
Figure 21	DEWA's Low Tolerance to Failure	74

Figure 22	DEWA Giving More Importance to Results than Processes	75
Figure 23	Satisfaction of Afkari Program and its Procedure	81
Figure 24	Afkari Transparency and Ease of Communication	81
Figure 25	Afkari Rewarding System	82
Figure 26	Time Required to Evaluate Employees' Idea	82
Figure 27	Motivational Impact of Afkari Campaigns and Initiatives	83
Figure 28	Evaluation Feedback for Ideas	84
Figure 29	A. Idea Submitting and B. Reason of Not	84
Figure 30	Innovation Department Facilitation, Support, and Activities Awareness	86

Abbreviations

DEWA	Dubai Electricity and Water Authority
MENA region	Middle East and North Africa region
NIS	National Innovation Strategy
UAE	United Arab Emirates
KPI	Key Performance Indicator
BSC	Balanced Scorecards
R&D	Research and development
SMEs	Small and medium scale enterprises
EV	Electric Vehicle
PV	Solar Photovoltaic

Chapter 1

Introduction

1.1. Background

Nations are effectively competing against each other, by using innovation as a driver for social and economic development. The definition for innovation is simply a drive to improve the quality of life by generating the creative ideas that lead to the development of new products, processes or services that are not only relevant but also effective within the current contexts of society (Bigliardi 2013). Innovation should also support social, economic and personal growth at one level or another (Bigliardi 2013). Most nations are currently seeking for innovative ideas that increase their competitiveness globally while also creating job opportunities for their citizens.

UAE has been on the lead of pursuing innovation, with worldwide recognition for these efforts and their impact as a main destination for businesses ('About DEWA' 2017). The focus on innovation and creativity by the UAE government is responsible for improving the country both socially and economically over the last few decades. With Vision 2021 the UAE leadership continuously encouraging for the spirit of innovation; "Innovation, research, science and technology will form the pillars of a knowledge-based, highly productive and competitive economy, driven by entrepreneurs in a business-friendly environment where public and private sectors form effective partnerships" (DEWA 2017).

The efforts made by the UAE government in relation to the innovation encouragement of the past few decades helped placed the country first in the MENA region. Furthermore, the UAE ranks 36th in the Global Innovation Index out of 143 surveyed nations (The Global Innovation Index, 2017). This can mainly be related to the country's significant attention in innovation,

research and development (R&D). This attention can be recognized and indicated by the billions that they invest in research and development for innovation and many others.

It should also be noted that the UAE is one of the few countries in the world that has a National Innovation Strategy (NIS). This strategy was launched by H.H. Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE, and ruler of Dubai. The aim of the strategy is to aid in maintaining the leading position of the UAE in the MENA region and to help push the country to a leading position globally as well. Beyond that, UAE is currently working towards becoming one of the most innovative nations in the world. It is considered a pioneer of the National Innovation Strategy in order to take charge of and develop innovation in the UAE to greater heights by creating a culture of innovation not only in the country's companies but also between the individuals, the national, as well as governments (DEAW 2017). Currently, the NIS is focusing on identified sectors in every organization within the UAE with the goal of creating environment that enables and encourages innovation and to recognize and reward companies and individuals who support, encourage and enable innovation within their respective areas. Figure1, shows the key pillars of NIS Network Structure:

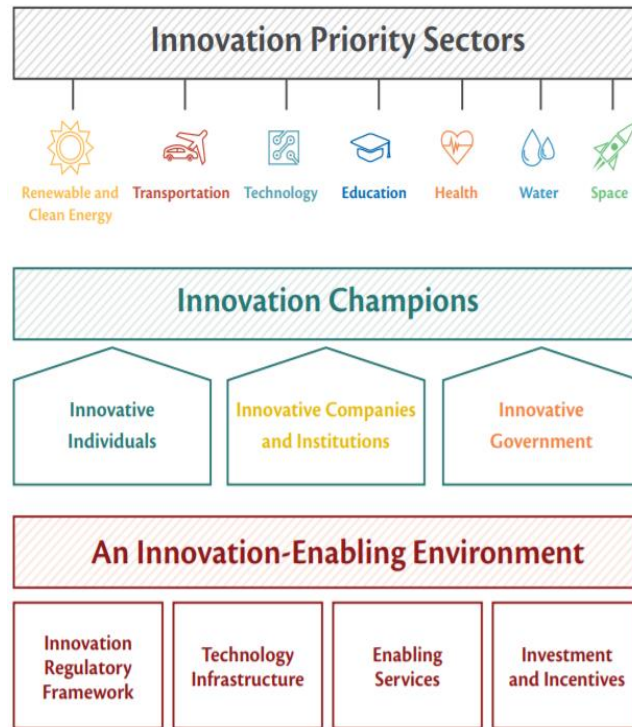


Figure 1, UAE National Innovation Strategy
(UAE Ministry of Cabinet Affairs 2015)

Currently, every organization within the UAE is obliged to adapt innovation as one of the main criteria and assessment tools that is used within the UAE government excellence system. This means that for an organization to be considered as competent and effective within the UAE, they must include innovation as a part of their culture. In the UAE government excellence system; companies are evaluated against three main pillars. These include Vision Achievement, Innovation, and Enablers. By evaluating organizations against these measures, the government ensures that each organization within the private and public sectors is motivated to align with the strategic objectives that are aimed for sustainable practice as one of the approaches for innovation.

The Dubai Electricity and Water Authority is a pioneer organization in the UAE when it comes to innovation. This organization is the main supplier of electricity and water services in

Dubai and over the past few decades, it has received many awards and recognition for the impressive steps that it has taken towards effectiveness in its service delivery. DEWA has also built an impressive reputation for itself internationally by being one of the few public sector organizations that record impressive levels of customer satisfaction. This is even more impressive when one considers that the energy and water distribution sectors are struggling in many countries and thus often left to be managed by private sector. DEWA is considered a successful organization because innovation is one of its strategic objectives (DEWA 2017). To ensure smooth integration into its corporate culture, the objective of innovation has been embedded into each one of the organization's division strategy through the divisional KPIs, and thus these divisions incorporating innovation into its Balanced Scorecards (BSC) system.

1.2. Problem Statement

Managing innovation involves easing the conversion of ideas into realistic and tangible benefits. People are generating new ideas all the time, but the thing that separates success from failure depends on the ability to transform these ideas into values. The purpose of this paper is to examine how successful ideas can be transformed into business value. Also, the significance of this research depends on the need for organizations to implement innovation effectively. Innovation is not simply a set of concepts that are implemented once and then forgotten. Innovation is defined as a practice that involves finding new ways to solve existing and expected challenges within a given context. One might expect that innovation would be successful in any contexts. However, the reality is that new ideas in themselves are not the solution to success. The management within a particular organization must have a plan for adopting the innovation and implementing it in their organization to find out whether the innovative idea would be benefit to their business. As the world continually developing, innovation becomes more competitive and

the problems associated are more difficult than expected. This makes innovation even more essential for the sustainability and survival of any organization in both public and private sectors.

In the UAE, innovation is one of the core aspects not just for the government but also for the private sector. The high level of competition in the region requires companies to be more innovative to compete with the rest of the world, which leads to find investment opportunities that strengthen the region's economy and power. Innovation becomes a strong pillar of an entire economy in UAE and innovation management is the enabling factor that makes it to be so. It is obliged to be adapted and practiced among organizations in the UAE. This explains why the UAE ranks so highly in global innovation, with billions of AED invested in innovation annually. Innovation, research, science and technology are the pillars on which the Emirati economy develops. The main question in this case is how they have found so much success. How has the UAE government managed to benefit so much from innovation. Some organization might implement innovation through adapting various processes, but by considering innovation as corporate strategy would it be successful path as DEWA done. This study specifically focuses on DEWA and how they manage and implement innovation to benefit the organization besides evaluating their effectiveness.

1.3. Aims and Objectives

The aim of this paper is to demonstrate an understanding in the concept of innovation management and its implementation within an organization. It focuses on the details of adapting innovation as corporate strategy in terms of how it effectiveness as well as steps that should be considered and taken in order to ensure its implementation is successful. Having innovation as a corporate is considered as one of the important components for successful implementation of innovation management and the paper aims to examine that in details. One more purpose for this

paper is to highlight what innovation really means to DEWA and how it has managed to attain such high standards of quality using innovation as one of its main corporate strategies and objectives. The paper will be mainly focused on Dubai Electricity and Water Authority's Power Generation Division with following objectives to achieve:

- Evaluate the benefits and validation of incorporating innovation into organizational strategy, and how can it be aligned and adapted.
- Investigating how well DEWA has managed to adapt and incorporate innovation to establish an understanding and come up with recommendations that might be considered by other companies.

1.4. Research/Dissertation Organization

The dissertation is divided into five main chapters as following:

Chapter 1: Introduction to the dissertation, which includes a background about the topic, problem statement, along with the aims and objectives of the paper.

Chapter 2: Literature Review, which contains in depth description about innovation, factors influence innovation opportunities, types and characteristics of innovation with some considerations, challenges, and failures to this concept. The second part of the literature review is about innovation management. It covers innovation processes, framework, and innovation policies implications and its impact on performance. Moreover, it comprises methodology and aspects of innovation management and process in Electrical Power Generation.

Chapter 3: Research methodology, a case study of DEWA and Power Generation Division's Innovation Management Implantation as corporate strategy. This chapter starts with introduction about DEWA and then presents DEWA vision, mission, smart initiatives, and innovation strategy, and follows by Power Generation Division's Innovation Aspects.

Survey is the second part that includes measurable survey with discussion to determine and examine the innovation implantation within the Power Generation Division of DEWA and presents discussion on the findings.

Chapter 4: Conclusion and Recommendations, based on the findings of the dissertation from the literature review and the survey.

Chapter 2

Literature Review

2.1. Innovation

In the 2015 edition of Harvard Business Review, Gary Pisano wrote an article titled “You Need an Innovation Strategy”. In this article, the author argues that without an innovation strategy, any efforts at innovation become pointless (Pisano 2015). Before getting into this argument, firstly must define innovation with the aim of finding its connection and the reason for its dependence on business strategy.

According to Mckeown (2014), innovation may not necessarily be a result of a new scientific discovery but it always involves using existing knowledge within new contexts where they were never applied before. Besides, innovation is simply the creation of new valued proposals within the organization either by offering new products and services, taking on some new operational practices that could be technological, organizational, or customer focused, or even formulating a new set of skills or abilities that redefine how work is done within that given organization (Mckeown 2014). This means that the fundamental principle of innovation lies in the application of existing knowledge to a problem where it wasn't seen as a possible solution in the first place. This introduces the risk involved in innovation. Most innovative ideas are considered high risk until they are employed and proven successful, with high returns. In the end of the 20th century, Amabile (1996) defined innovation as a successful implementation of creative ideas. This means that in order to be considered an innovation the creative idea must be implemented successfully, with or without risks, despite the outcomes.

Innovation is often considered to be the foundation of development and solution of challenges faced within the organization. Pisano (2015) claimed that innovation must create value within the organization once it is implemented. On other words, innovation can be appreciated when it saves the customers money, improves their health, provides sustainable, long term benefits such as clean water, or generally provides a more permanent solution to an existing problem in a way that carries obvious benefits for the affected stakeholders. Using this viewpoint, it can be appreciated that innovation does not just set companies apart within the competitive markets but by creating value for the customers, innovation ensures improvements in the quality of life as well.

2.1.1 Innovation and Creativity

De Jong and Others (2013) warns that innovation should not be confused with creativity. In fact, creativity only makes up about 10% of the entire innovation process. Coming up with a new idea is not necessarily difficult, but most companies fail when it comes to actually implementing that idea and using it to add value to the business. This means that the creative part of innovation is not even close to being the most important part required for success. Although anyone can come up with a brilliant idea, it is only those who execute it successfully that can gain from that idea. Creativity in this case is similar to the inspiration that draws out the idea, while the execution becomes the actual effort required to make an idea real and making it relevant to a certain organization. Innovation in this regard is the combination of creativity and effort. Hewlett, Marshall and Sherbin (2013) present the same thought when they argued that creativity is subjective while innovation is objective. The fact that creativity occurs differently in different individuals and groups makes it difficult to define or characterize. People come up with new ideas all the time, with different contexts and inspirations. However, innovation is

standardized based on the features involved in developing the idea into a valuable change or development. Creativity could literally refer to anything, but when defining innovation, one must consider whether a certain idea was executed successfully, Creativity simply stops at the birth of an idea. The definition of creativity in this case is based on the mental processes involved with coming up with a great idea. Therefore, one may note that creativity could be a surprise moment in an individual's train of thought or a product of careful and continuous thoughts within a group. Either way, it is important to appreciate that creativity is the starting point for innovation. A new idea that is valid as a solution to an existing problem is the creative aspect of innovation. The rest of innovation, which is responsible for up to 90% of innovation, is execution. Thus, creativity creates innovation if it is combined with an effective execution strategy.

2.1.2 Types of Innovation

Innovation can be incremental or radical depending on how it is implemented. Most organizations choose incremental innovation because it gives them a lot of time to change from their old ways towards the new ways. However, incremental innovations are considered more expensive in the long term. The longer it takes to go through the change phase, the more the organization has to wait in order to gain the benefits of the innovation. On the other hand, radical innovations are not always guaranteed by considering that innovation always carries risks. Radical innovations can be very holistic such that if they do not succeed they can suffer serious losses and damages to the organization. However, if the innovation works out successfully, the implications could be far-reaching.

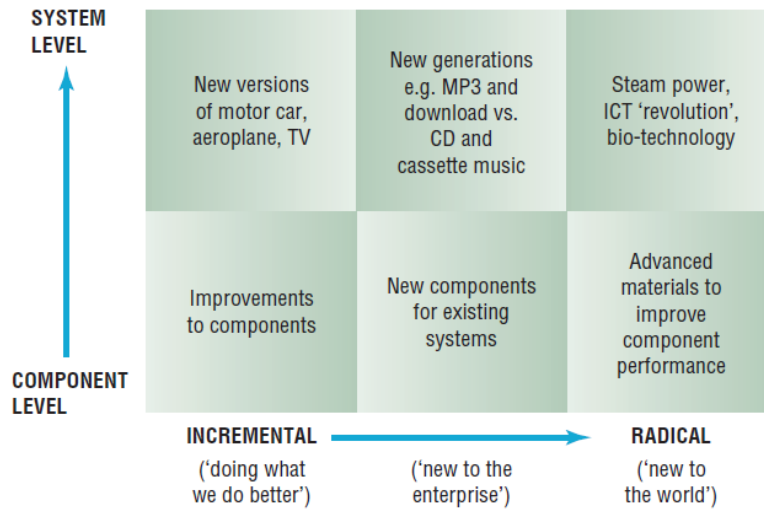


Figure 2, Types of Innovation 1
(Tidd J. and Bessant J. 2014)

Some of the more common types of innovations include technological innovation, business model innovation, process innovation and organizational innovation. Although all these involve finding new solutions to existing problems, they all have different characteristics as discussed below:

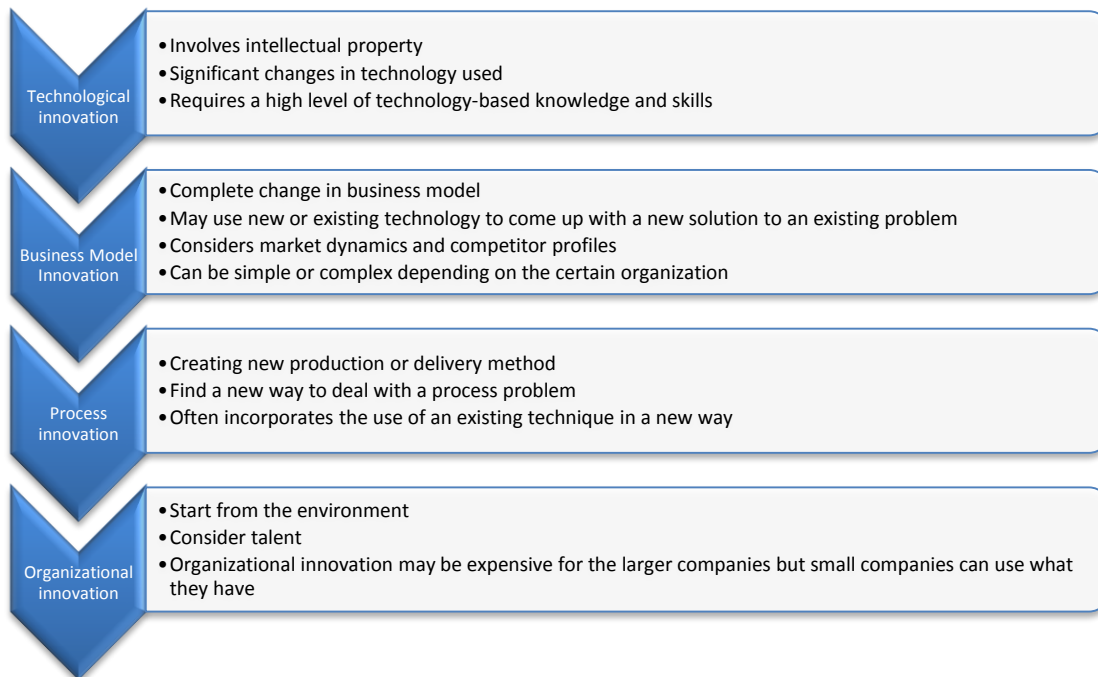


Figure 3, Types of Innovations 2

1. **Technological Innovation** - Montgomery and Perry (2011) defined technological innovation to include the creation of new products and processes or the implementation of important changes to products and processes within the market. This indicates that the first component of technological innovation is that it is applied onto product and process innovations. The technological changes help to create value for a certain product or process, thus enabling it to make a difference to the customers or a certain organization.
2. **Business Model Innovation** – According to Markides (2014), business model innovation is an act of discovering totally new and different business model to be used in an existing business. Businesses run based upon business models that are formulated to create value for their stakeholders. But sometimes it may be noted that the existing business model is not the best that a certain business can use. In such a situation, there is a need for the business to change its business model. However, the reality is that business model innovation is not easy to be implemented. When the business discovers a new business model that will work better for them, preferably through their own creation rather than by copying from other organizations, it can be stated that they have achieved a business model innovation.
3. **Process Innovation** – The Innovation Policy Platform defines process innovation as creating a new production or delivery method or simply making significant improvements to an existing one. Montgomery and Perry (2011), then adds that process innovation often involves significant upgrades in the techniques, equipment and software used in a certain production or delivery methods. Thus process

innovation mainly focuses on adding value to the product or service by making the production process better in a number of ways. This may include making the process cheaper, more efficient, a higher quality or even faster than before. In the service industry, one of the process innovation examples might be the use of employee motivation to increase customer satisfaction. By making the employees happier about their job, managers in the hospitality industry have been able to improve the customer satisfaction for their establishments.

4. **Organizational Innovation** – Dahlgaard-Park and Dahlgaard look at organizational innovation as a major requirement for the modern organization. Furthermore, they eliminate the illusion that organizational innovation requires too much expenditure in R&D. According to these authors, the common examples of organizational innovation involves companies that invested millions of dollars in research prior to their innovation but there are more basic components that an organization can address when creating their own unique features. Some of these components include the environment within which the company's employees work. By creating an environment that is open to new ideas and encourages people to make mistakes, an organization is able to foster a culture of innovation and this will eventually pay off.

2.1.3 Factors Impacting Innovative Opportunities

There are many important factors that have an impact on innovation opportunities, and determine which kind of innovation to pursue is discussed as following:

1. **Type of sector** – The Chartered Institute of Management Accountants (2007) found that the type of sector determines the kind of innovations that an organization seeking for. The service sector, for example, has recently aimed to

include innovation process. By improving their processes, companies in this sector have been able to create value for all their stakeholders. This means that it is very important for a company to obtain the importance of their desired innovation within the sector that it operates in.

- ii. **Size of Firm** – The relationship between the size of the firm and the kind of innovation opportunities that it is likely to get is often argumentative. Ideally, larger organizations would have more innovation opportunities due to their large budgets for R&D, besides the desire for growth and development internationally towards market domination. However, research findings indicate that small firms carry out just as much successful R&D due to their need for advanced innovations as that enable them to compete against giant companies in the same field (The Chartered Institute of Management Accountants 2007). Therefore, the size of the firm does not have to be a limitation, but it can instead be used as an enabler in innovation opportunities.
- iii. **The country and region** – WBCInno Consortium (2014) suggests that location has no impact on innovation. However, this viewpoint is denied by the Love (2011) who believes that the country and region determines the likelihood that a firm will engage in innovation. Innovative opportunities are often driven by competition and the potential of great returns on the investment. This means that the environment in a region must favor innovation in order for the concept to be encouraging enough for the companies. Thus, the governments all over the world have an essential role to consider this aspect. Countries that fail to encourage innovation in their business sector end up with companies that are less productive.

However, each firm must find ways to include innovation into its corporate objectives regardless of location and basically because not all innovation is costly.

- IV. **The stage in the industry life cycle** – When a business is at the start of its life cycle, innovation is not only a welcome idea but also an easier opportunity to pursue. As the company invests more in research and development, they are also more open to new ideas related to their processes and desired outcomes. However, the truth is that not many organizations take on the risks as an early stage. They desire stability and success first before investing further in their respective industry. As a result, these companies miss on impressive opportunities for innovation only to pursue them later on at a mature stage (Shapiro 2013).
- V. **Government regulations** – It is often argued that capitalist governments are ruled by their large corporations in their countries, and as such, their regulations are often meant to favor or protect the existing industries. Considering that innovation is often new, and it carries a large amount of risk for the established industries that would become competitive, it is natural for political regulations to be a threat to innovation. By stifling innovative ideas, governments are essentially protecting the existing business models. Shapiro (2013) precisely argues that governments that do not support innovation stifle their own economies, but those that do support end up straining their relationship with the old businesses. Without the political support of the government, regulations are likely to not only limit but also heavily prevent innovation. Thus, innovators succeed and grow in governmental environments that encourage and even motivate innovation through sponsorships and other things.

VI. **Leadership** – Innovation is mainly about acknowledging that there are endless possibilities, and thus a willingness to take the risks involved with finding these possibilities. This is actually what distinguishes leaders within the context of innovation. When leadership supports innovation, the people being led have the confidence to reach into the market and explore new ideas with the goal of adding value to their products or services to satisfy their clients. Llopis (2014) argues that it is the work of the leader to gather the right team that will foster and sustain innovation within the organization. This means that the leader must be able to identify the necessary talent and keep the team engaged and motivated to enable innovation. Organizations that lack this kind of leadership are less likely to have innovation, especially considering that innovation is often a product of team effort.

2.1.4 Innovation Considerations, Challenges, and Failures

There are some challenges incurred with innovation, which either lead to a success or failure depend on how the organization is dealing with:

- a) **Organizational diversity** – According to Beers and Zand (2014), diversity in research and development leads to enhanced performances based on the effects and advanced variety in knowledge intake. In this way, having different people with different backgrounds and experiences simply makes it easier for an organization to innovate. Whether it is functional diversity, geographical diversity or even cultural diversity, these authors definitely indicated the positive outcomes that the organization is likely to experience. However, the reality is that most organizations seem to expect innovation to come from one functional innovation

group or a particularly inspired individual (Playford 2016). This practice leads to limited efforts towards diversity in the innovation teams and thus stifling the potential of the company.

- b) **Employee empowerment and motivation** – According to Anis (n.d.), Organizations that do not empower their employees to innovate are less likely to experience innovation. This is because employees generally need to be empowered and motivated in order to go the extra mile and develop great ideas. Employee empowerment in this case involves giving the employees some free time to come up with new ideas and generally test out their thoughts as it relates to the projects they are working on. Many organizations are concerned about the perception that providing time flexibility is really just wasting time thus they stifle the employees by giving them deadlines and predefined schedules for completing their tasks. In terms of motivation, it may be important to encourage innovation to make it more competitive for the employees. Most organizations do neither of these thus failing to empower and motivate their employees towards innovation.
- c) **Innovation strategy** – Having an innovation strategy provides a road map for the company about the innovation needs. An innovation strategy defines a clear direction for all the innovation needed within the company. This means that despite the idea that people should have the freedom to innovate; innovation truly works best when it is constrained. Giving direction in this case ensures that the organization knows what needs to be focused on as they generate great ideas as. The greatest challenge to innovation in this regard is the belief that thinking outside the box is the only strategy required for innovative thinking. Thinking in

more conventional terms in this case is more effective because directed creativity is more productive than disorganized creativity Anis (n.d.) states.

- d) **External collaboration** – Innovation is often considered as a competitive quality within any industry. Companies work hard to ensure that they are innovative and thus capable of competing with their competitors. However, the reality is that innovation is more effective if it's conducted in collaborative environments. Internal collaboration enhances diversity within the innovation function but external collaboration is much more effective in driving bigger innovations (Playford 2016). The ideal innovation system includes numerous stakeholders within a given industry and it often includes working with competitors, industry partners, and even customers in order to achieve the desired level of innovation. Unfortunately, not many organizations appreciate the need for an external collaboration and ultimately this limits their ability to succeed within innovation.
- e) **Innovation measurements and benchmarking** – Kasper and Clohesy (2008) argue that measuring innovation is one of the ways to ensure that innovation is actually taking place within an organization. Measurement in this case enables monitoring and improving the organization's innovation function by determining what is working, and what is not when it comes to how the company is innovating. Without measures and benchmarks, the organization is likely to value innovation based on the outcomes of the innovation system instead of the features of the system (Kasper and Clohesy 2008). When companies only measure outcomes, they fail to appreciate the efforts of the innovators. This discourages innovation by limiting the focus to activities and ideas that are visible in the short

term rather than innovating in ways that will encourage the organization in the long term. Thus, it is important for organizations to formulate a measurement and benchmarking strategy for their innovation to focus on the features of innovation and effectively appreciate the innovators.

2.2. Innovation Management

2.2.1 Innovation Process within an Organization

Maier, et.al, (2012) recognized that there are four main questions within organizational innovation that should be practiced. The first step involves asking ‘why’ innovate. Innovation in the public sector involves survival and success, and any organization that does not innovate is likely to lose importance within a short time. In that regard, finding the benefits and purpose for innovation puts the organization on its way through the innovation process. Once the purpose is clearly defined, the company can ask the second question; ‘what’ to innovate. Asking this question enables the formulation of an innovation strategy that gives direction to the entire process. Considering that the world is dynamic and continuously changing and there are always new problems that need solving, the answers to the what question are not meant to limit creativity but instead to open up the organization to new possibilities. The third question is then ‘how’ to innovate. The how question enables research and discovery as the organization attempts to close the gap between what they know and what they need to know. Most R&D departments and research centers are created to answer this question. Once the organization understands how it can innovate, it is in a better position to implement the desired changes. Finally, the last step proposed by Maier et al. (2012) involves the question ‘who’ to innovate. Government organizations should empower every one of their employees to have new ideas that could lead to

innovation. When creativity becomes a part of the daily operations, new ideas are easy to come. Instead of having a special innovation team, everyone should be encouraged to come up with new ideas.

Neese (2017) suggests another five steps for innovating within an organization. The first step is idea ‘generation and mobilization’. In this step, ideas have to be mobilized out of the normal duties of the employees, in order for the employees to have some time to work on developing new ideas. The second step involves ‘advocacy and screening’. In this step, the new ideas have to be evaluated and justified so that it can get through to the upper management. Advocacy is done by the owners of the new idea while the screening is done by the management. In the third step, according to Neese (2017), the idea is ‘tested through an experiment’ or a pilot program to establish its feasibility and performance within real contexts. Ideas that pass the experimentation step then go to the ‘commercialization’ step where they are converted to a product or service that have of great value to the business and the customers. Commercialization prepares the idea for ‘diffusion and implementation’, which is the final step in the process. Within an organization, once the idea has been developed all the way to commercialization, it must be shared all through the organization and the market based on the needs of the customers.

2.2.2 Innovation Funnel Framework for Managing Innovation

De Jong and Others (2013) explored and made several observations for innovation funnel framework that illustrate the development and filtration of ideas for innovation to take place. First, a certain organization must be well equipped with information on the market as well as the technology involved. This is what is at the funnel’s mouth in the framework, and it is referred to as the intelligence. It would be impossible to innovate without prior information on the existing problems and applied solutions. The second consideration in this framework is that innovation

requires openness or freedom so that the employees can exercise their creativity without tight constraints or fear of failure. Lastly, the framework proposes fast conversion of ideas into value for the consumers by integrating all the innovation into the product or process as relevant to the organization. For this the organization must be willing to invest in the ideas of their personnel, which means they should support innovation without being so focused on cost that could stifle creativity. Innovation, as discussed earlier in this study, is only considered present if the ideas have been translated into something that is of value to the company or to the consumer. Thus, when an organization fails to support and adapt new idea, they have failed to innovate.

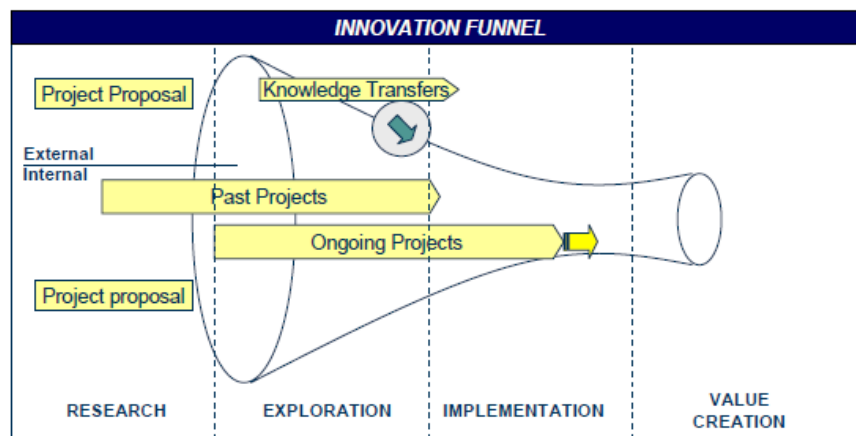


Figure 4: Innovation Funnel

(Davila T. and Cooper R. 2010, p. 37)

2.2.3 Innovation Policies Implications

According to Lor (2015), innovation policies have gained popularity over the past two to three decades. Policies that are meant to encourage and support new ideas generally called as innovation policies. However, it must be noted that an innovation policy has to go beyond supporting the creation of these new ideas. Unlike an invention, innovation does not stop at coming up with the idea but rather depends on the ability of the involved parties to develop, test, commercialize and diffuse the idea in a way that adds value to the stakeholders. Thus, functional

innovation policies in the present contexts are those that not only encourage the creativity of the innovators but also support them to the final step of the innovation process. Lor (2015) further suggests that an innovation policy must consider why innovators fail to transfer their ideas into practical settings and support the attempt to transfer these ideas successfully. Thus, any other policy that is partial to the process of innovation does not qualify as an innovation policy.

2.2.4 Impact of Innovation Policies on the Organizational Performance

Olughor (2015) investigated the relationship between innovation and performance for Small and medium scale enterprises (SMEs) in Nigeria and found that firms that implemented innovation generally demonstrated better performance. In this study, the author proposes that innovation gives the company a competitive advantage with which they can navigate the competitive industries that they operate in. Previously, Bigliardi (2013) had established through an investigation of SMEs as well, that innovation has a direct impact on the financial performance of a company. SMEs that implement innovative ideas successfully experience improved financial performances when they increase their innovation activities, drawing a direct correlation between the two variables. Ndesaulwa and Kikula (2016) further state that organizations that practice innovation generally perform better than those that do not. As such, one could argue that the performance of the enterprise generally depends on their ability to not only come up with new ideas but also to commercialize these ideas and use them to add value to the stakeholders. Rosli and Sidek (2013) however caution that each firm must be able to evaluate the possible impact of innovations within their environments. Considering that each innovation is different from each organization, there is a need to ensure that the strategic objective of innovation does not negatively affect other objectives within the organization.

2.2.5 Aspects of the Innovation Process in Electrical Power Generation

Joel (2014) argues that the greatest innovations in the energy industry involve removing barriers to electricity generation to rework the industry that become outdated. With more people getting access to electricity, the energy industry suffered from stunted growth, where seemingly there was no room for further development. However, with the climate changes and challenges of the 21st century these views have significantly changed. The energy industry is now looking towards sustainability for both the planet and the industry. The main aspects of innovation in this regard include emission reduction, renewable energy, controlled consumption and improved accessibility. In the UAE, more focus in the recent years has been directed towards clean energy as a replacement for oil and gas. Emission reduction is in line with the need of the organization to comply with the carbon emission limits, which been encouraged worldwide as a solution to the climate change. Renewable energy has also been pursued to ensure that the country no longer depends on oil and gas in case the reserved fuel depleted. Having other more alternatives resources like solar and wind means that the country will continue to develop even if their fossil fuels are depleted. To limit the country's dependence on fossil fuels, most of the innovation is directed on reducing consumption and creating supply from renewable energy sources such as solar and wind energy. DEWA had so far working toward these aspects with many solar energy initiatives, besides encouraging their customers with energy consumption reduction. All these innovations serve the organizational goal of ensuring a clean and sustainable future not just for the company but also for the people of the UAE and the world.

2.2.6 Methodology for Innovation Management in Power Generation

Within the power plant, a major innovative concentration would be technological, with the employees seeking ideas on how to improve the efficiency of their product in the market. At DEWA, the use of solar panels to harness extra electricity was enabled and many other innovative ideas have been implemented. To accomplish such a revolution in power generation, Joel (2014) proposes ten known categories of techniques that can be used;

- 1) Knowledge Management Techniques – these are the techniques used to acquire, audit and improve knowledge within the organization both continuously and systematically. Knowledge management techniques also enable including all the talent within the company towards the creation of impressive and relevant ideas to be implemented for better performance.
- 2) Interface Management Techniques – these techniques involve managing the knowledge that already exists within the organization so that it can be effectively used in decision making. The techniques involved integrated development of ideas so that all those involved in the process can participate in decision-making from a basis of full knowledge.
- 3) Business creation techniques – these techniques help businesses to develop innovations rather than being limited to their existing ideas and processes. The techniques commonly used include virtual incubators, entrepreneurship process, business plans and spinoffs. All these enable the business to take risks and pursue new ideas without necessarily losing their existing line of business.
- 4) Innovative Project Management Techniques – These techniques determine the success of the project. They include pre and post implementation plans that are

intended to help the management through the innovation process without losing focus on the set goals and objectives.

- 5) Market Intelligence Techniques – these include the techniques used to not only understand the competition but also the targeted market. Market intelligence enables an organization to fully appreciate the market within which they operate so that they can best serve their end consumers. Business intelligence and customer service are the main components of market intelligence.
- 6) Human resources management techniques – these include techniques that enable the management to find and recruit the best talent within their field of interest. Online recruitment is one of the most invaluable techniques currently used as more professionals rely on social media platforms like LinkedIn to advance their careers and seek out new challenges.
- 7) Process Improvement Techniques – these are possibly the most common of the innovation management techniques. They involve total quality management and other ideas meant to improve the business process in a way that benefits the organization's stakeholders.
- 8) Cooperative And Networking Techniques – these techniques focus on the ability of the organization to gather their resources as needed through collaboration, team building, and so on as well as supply chain management among other things. The ability to work together within the organization as well as externally increases the organization's ability to generate better ideas.
- 9) Creativity Development Techniques – These techniques are used to nurture creativity by encouraging innovators to share their ideas within the organization.

Such techniques include lateral thinking in order to support even the strange ideas provided they have the potential to be developed into something better.

10) Design Management Techniques – these techniques help to ensure that the products or services being designed will meet the requirements of the market. As such, it involves components such as prototyping and value analysis and is often a part of the product development process.

Chapter 3

Research Methodology

A. Innovation Management Case Study (DEWA) - Power Generation Division

The Dubai Electricity and Water Authority is a great example to study an innovation management implantation within a government organization, and specifically Power Generation Division. This is because the division has been leading the organization in adding value to business through innovation ideas. An innovation survey was established based on the literature review and evaluated and improved more and more through innovator specialist in DEWA Innovation Department. Then, it was conducted to determine the state of innovation within the Power Generation Division of DEWA with interest in:

- Establishing level of implantation and innovation culture
- Measuring its behaviors, impact, and management support
- Assessing Afkari program as innovation tool, and how many employees aware about the innovation practices and policies.

Attached in Appendix A the questions represent above aspects. However, prior examining the survey firstly will establish an understanding about DEWA, by looking into its vision and mission, smart initiatives, and its implementation and strategy with regards to innovation.

3.1. DEWA Vision and Mission

The Dubai Electricity and Water Authority (DEWA) is the public service utility that is mainly responsible for providing electricity and water to Dubai, UAE. It was founded in the

1992 by Sheikh Maktoum bin Rashid Al Maktoum, after merging both Dubai Electricity Department and Dubai Water Department. Prior the merge, these two departments were operating separately and were established in 1959 by sheikh Rashid bin Saeed Al Maktoum, former ruler of Dubai (DEWA, 2017).

Currently DEWA has more than 9,000 employees and provides electricity to over than 600,000 customers. The improvement in production of both power and water is remarkable. In the past, it had a total capacity of 1000MW of electricity and 47 million imperial gallons of desalinated water per day. However, nowadays DEWA total capacity increased up to 10,500MW of electricity and 640 MIGD of water. The growth is raising more with diversity of resources rather than dependence on conventional resources of fossil fuel. Mohammed bin Rashid Al Maktoum Solar Park one of the initiatives toward renewable energy besides many smart initiatives will be introduced later on.

According to DEWA's strategic direction plan (2016), it currently functions with the following aspects:

“Vision: A sustainable innovative world-class utility”.

“Mission: We are committed to the happiness of our stakeholders and promoting Dubai's vision through the delivery of sustainable electricity and water services at a world-class level of reliability, efficiency and safety in an environment that nurtures innovation with a competent workforce and effective partnerships; supporting resources sustainability”.

“Motto: For Generations to come”.

“Our Values: Stakeholders Happiness, Sustainability, Innovation, Excellence, Good Governance”.

Currently DEWA in general has three major innovative projects that are in progress, with each one of them being a combination of a technological innovation and a process innovation (DEWA 2017). With these projects, DEWA has been able to transform the Dubai energy sector and consequently elevate the quality of services that the organization offers the customers. To start with introducing these innovative projects and then analyzing deeply their innovation processes along with examining the conducted survey in Power Generation Division.

3.2. DEWA Smart Initiatives

It is notable that the DEWA has implemented innovation that is both technological and process based. In order to recognize how these innovations fit into either category, examine those initiatives in detail will help to do so. The first innovation is the Shams Dubai project, which involves the use of solar panels to generate electricity for buildings in Dubai. Another innovation is the EV Green Charger, which includes infrastructure and charging ports for the city's electric cars. The last innovation is the Smart Applications via Smart Grid and Meters Initiative, which was created to help Dubai changes to the smartest city in the world.

- A. **Shams Dubai:** Shams Dubai is a solar energy initiative that was started by DEWA in 2015 as part of the city's efforts towards sustainable energy ('DEWA' 2017). The project involves the installation of solar photovoltaic (PV) panels in industrial and commercial buildings with the aim of supplementing the city's production of electricity. The main goal was to cut down the dependence on conventional energy produced by fossil fuels. The buildings that have the PV panels are enabled to save on energy costs without necessarily losing the reliability of the DEWA main grid. The owners of the buildings are thus able to save on energy costs by relying more on solar power, while also contributing to the city's

total energy production. In the Shams Dubai project, these small solar photovoltaic stations are connected to the grid such that the buildings not only supply their extra energy to the rest of the city but also benefit from the reliable power supply of the DEWA main grid in case the solar photovoltaic system malfunctions. The only challenge up to now is that the project does not yet involve residential buildings.

The Shams Dubai project is both a technological and a process innovation. Solar panels are not a new technology. However, their use as a supplemental source of electricity on a large scale is something that has never been attempted until now. DEWA was able to use an existing idea to improve the organization's ability to deliver low cost energy to the people of Dubai without compromising on the reliability of the distribution. Solar panels are reliable but not as reliable as DEWA's main grid system. By combining the solar power production with the mains electricity, the organization was able to improve service delivery significantly while also adding value to the customer by making power cheaper. Building owners who have installed the solar photovoltaic panels are able to save up to 50% in energy costs while contributing a total of 279 kilowatts to the main grid ('DEWA' 2017). It should be noted that for buildings with larger and more stable loads like warehouses and factories, the Shams Dubai project enables saving up to 90% of energy consumption by depending more on solar energy and only using the main grid electricity as a backup source when needed.

The technological component in this innovation is depending on the ability to merge the use of solar energy smoothly with the continued connection to the main grid. Customers no longer have to worry about the reliability of their solar panels, and they do not have to keep changing their connection from one energy source to another. The automated switch

from solar power to grid electricity required some technological innovation. It should also be noted that the component level in this innovation was incremental because the organization simply introduced a new component to an existing system. Solar energy has been in existence for years but it is only with Shams Dubai that it is being used as part of the city's main grid to supplement the generated electricity.

- B. The Electric Vehicle (EV) Green Charger: By December 2015, 100 EV Green charger stations had been set up around Dubai for electric vehicles, setting Dubai on its way toward becoming the smart and happy city that HH Sheikh Mohammed bin Rashid Al Maktoum had wished for ('DEWA' 2017). The purpose for these green chargers was to encourage the use of electric vehicles in Dubai since they would now be easier to maintain. There are both public and private options for the charging port, making it possible for organizations to have them installed and maintained as a way of encouraging their employees and customers to join the green revolution in Dubai. While electric cars and their charging ports might not be a DEWA innovation, making the green chargers available is the organization's way of encouraging the use of clean energy sources. DEWA needed to find a way to ensure that the people with electric cars could access electricity wherever they are so that they do not feel the need to go back to the conventional cars where they can access petrol stations from any part of the city. The process innovation in this case is depending on the customers' ability to access electricity for their cars. DEWA made it easier and more cost effective by ensuring convenience and effectiveness. With the EV Green Charger, DEWA implemented a radical innovation by adding on an advanced component to the electric car system. The EV chargers specifically revolutionize the convenience of the electric car by making it easier to maintain, and improving the cost effectiveness and reliability of the EVs.

C. Smart Applications: Part of the problem in the UAE's energy sector has been high consumption, which has been growing at a rate of 5% per year ('DEWA' 2017). One of the solutions to this challenge is to reduce domestic consumption, considering that the government has already implemented policies to reduce consumption in commercial buildings. To aid the solution, DEWA came up with the Smart Applications that enable the users to monitor their energy consumption so that they can make adjustments as needed. The Smart Applications not only allow the consumer to see their current consumption, but also their history so that they can make note of their consumption trends and possibly determine what changes they can make to cut down their consumption. By the end of January 2016, over 200,000 smart meters had been installed ('DEWA' 2017). The smart meters replace all the other traditional meters that were previously used. They also connect to the smart grid, meaning that a user is able to connect all of their electricity accounts and monitor them from one device. Thus, the customers are able to see how much electricity they are using at home and in their businesses instead of having multiple accounts with DEWA. The innovation in this case is also radical since it involved eliminating the traditional meters and enabling consumers to integrate their accounts for easy monitoring and management.

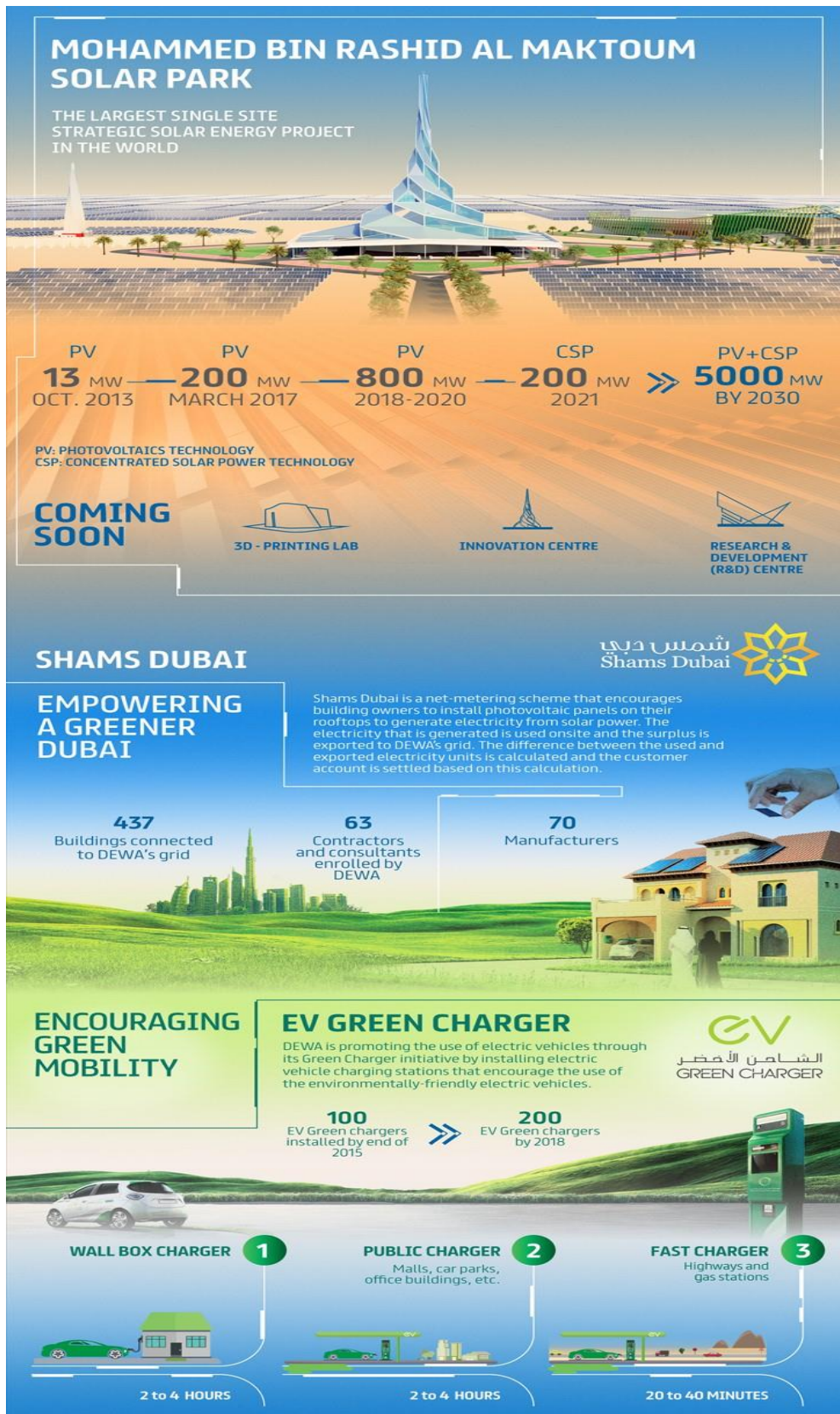


Figure 5: DEWA Smart Initiatives
 (DEWA Innovates 2017)

3.2. DEWA innovation Strategy

3.2.1 Innovation Agenda Themes

To successfully develop innovation as part of the organizational culture, the management must create a strong innovation strategy that is followed by the various divisions and departments such that all changes are aligned with the company's overall goals and objectives. At DEWA, the innovation strategy is depending on the organization's vision as well as on the goals and objectives of Dubai, the UAE and the rest of the world. Furthermore, DEWA ensures growth and development as well as sustainability not only within the UAE or the Middle East but also across the globe. It is also important to note that innovation at DEWA is 40% of the organizational strategy. This means that DEWA is trying to be innovative by producing and supplying water and electricity to the residents of Dubai, in order to contribute and drive the UAE towards being a global leader in innovation. Moreover, DEWA must actively engage in innovative behavior in order to grow and remain competitive in the business world. However, for the innovative strategy to work as expected and achieving their set goals and objectives, it has to be aligned with the strategies of the higher powers and standards like what DEWA following in order to enable the organization to ensure growth and development as well as sustainability, not only within the UAE or the Middle East but also across the globe.

a) Global Innovation Index:

The international standards of innovation as set by the global innovation index factor concepts such as research and development, strategic partnerships, human capital and knowledge management as well as an infrastructural overhaul and a sustainable clean energy mix. Each one of these concepts is used as a measure to evaluate the performance of the

world's nations. In this way, the UAE is committed to measuring these set standards as included into the national innovation strategy.

b) UAE National Innovation Strategy:

The UAE Vision 2021 and National Agenda provides a blueprint for the comprehensive national innovation strategy by not only presenting a clear vision but also laying out a quick and easy pathway through which the nation will get to the selected destination within a tight timeline (Vision 2021 2017). Within the innovation strategy, the government is seeking to make UAE one of the most innovative nations globally. To achieve this goal, there is an innovation framework made by the government to guide all government establishments towards advanced levels of innovation, with DEWA being one of these establishments.

Some of the key themes addressed under the UAE Vision 2021 and National Agenda are similar to those highlighted in the global innovation index. These include research and development, strategic partnerships, human capital and knowledge management as well as an infrastructural overhaul and a sustainable clean energy mix (Vision 2021 2017). Other themes addresses are creating and maintaining energy security, creating, funding and supporting an innovation platform, encouraging and maintaining service excellence and as well as ensuring operational efficiency throughout the government and its establishments. To enable these achievements, the UAE government has many essential policies used to create the government's innovation framework. The UAE's strategic innovation policies focus on the creation of a national environment that not only supports but also encourages innovation within the various organizational contexts (UAE Innovates 2015). Besides, the UAE's strategic innovation policies are aimed to ensure that innovation becomes entrenched

into the Emirati culture as a main work ethic adapted within all public and private organizations in the UAE.

One of the strategic pathways identified to help the UAE attain their innovation objectives is education. Innovation, like creativity, was once considered not teachable concept which is only developed through practice within the work environment. However in the present times, innovation is a part of the education system. Currently, students are taught how to create new ideas within different settings as a way of training their creativity and teaching them how to actualize these new ideas by following an execution framework in collaboration with their teammates and supervisors (UAE Innovates 2015). Making innovation a priority in education within the UAE ensures that the country's workforce will be equipped efficiently with the necessary skills for sustainable innovation in different possible contexts.

A social development system intended to improve the quality of life within the UAE can also be considered as a pathway towards a better score on the global innovation index. As a nation, the UAE is known for creating strong social welfare systems. Emirati workers are in fact paid higher than their immigrant, with the high ranking jobs being reserved for Emiratis under the Emiratization initiative. Employees who have a positive view on life and especially in their career are more willing to invest their energies into the organization that they work for (De Jong and Others 2010). Thus, the UAE government through their vision 2021 seeks to create Emirati society a happy and satisfied worker who can focus on their jobs and thus be more innovative (Vision 2021 2017).

c) The Dubai Innovation Strategy:

As a city, Dubai is considered to have one of the most profitable job markets in the world. However, with a growing population and economy this city had to face some significant threats to their sustainability thus emphasizing more on clean energy and restraint of energy consumption. The main aspects of the Dubai innovation strategy include creating a clean energy mix and ensuring environmental sustainability (UAE Innovates 2015). To accomplish the ambitions adopted in the Dubai innovation strategy, the Dubai government has been working on some initiatives within ten specific sectors including health, technology, transport, education, tourism, hospitality, water and space, renewable energy and government services.

The Emirate of Dubai is currently using some specific pathways to attain their innovation goals. First, the emirate has been building a cross-sectional partnership network to enable the various organizations to not only share the costs of an infrastructural overhaul but also learn from one another and change the current work culture. Currently, most people in Dubai would preferably be employed by the government and not in the private sector despite the fact that the salaries for Emiratis are higher on either side (Vision 2021 2017). A cross-sectional partnership enables the various private and public organizations to work together towards ensuring that the locals appreciate both the private and public sectors when looking for employment opportunities (Ali 2014). These partnerships also enable easier funding for innovation with a focus on specifically industrial research and development.

Other than the partnerships, the Emirate of Dubai has also developed an innovation framework based on result-oriented innovation to ensure that stakeholders like investors and managers are not placed in an uncertain situation. Innovation is often a risk that an organization has to take, however, when the innovation is result-oriented, there are a set of

limitations that are considered to support the execution of a given idea. Managers and investors, in this case, are expected to encourage and engage innovators without necessarily committing their entire capital base and leaving the company insecure (Jones and Seraphim 2008). Preferably, the management reserves the right to evaluate an innovative idea based on its potential results before approving its implementation. This particular framework saves many companies from significant losses considering how many new ideas are regularly created and how many of them may not guarantee excellent results for the companies that they are created for.

Another primary concern for Dubai is resource management, where the city seeks to maintain the sustainability of their resources by managing consumption and finding renewable sources. Conversely, the city's innovative strategies are directed towards securing the future with a focus on the environment and the energy sector (UAE Innovates 2015). As such, the innovative ideas that are getting more attention in this Emirate are those that have a promising outcome that is related to the highlighted interests; the sustainability of the environment and the energy sector. However, this does not mean that Dubai is not looking at innovation from other angles such as concerning population growth and economic development. Instead, the sustainability of the environment and energy sector is considered as the most significant factor of Dubai's future. Without a source of clean energy, the climate changes predicted to affect the Middle East along with the rest of the world could leave Dubai uninhabitable before the end of the century.

To enforce these innovation strategies, the government of Dubai has a lot of operational frameworks and initiatives including Smart Dubai, Dubai Plan 2021, DGEP, DGMS, DIES 2030 and DCES 2050 (UAE Innovates 2015). Smart Dubai is an initiative by the Dubai government to

make Dubai a happy city. The initiative was created and implemented in partnership with DEWA and it is mostly about improving the living experience in Dubai.

1. Under Smart Dubai, the government gets to invest in technological innovations that help to make government services efficient and effective. The main goal of this initiative is to make all of Dubai's people happy by 2021.
2. The Dubai Plan 2021 is also an initiative focuses on future and aims to improve certain specified aspects of living in Dubai including the environment, the experiences and the society. As an initiative that's based on innovation, Dubai Plan 2021 specifically seeks to make the people of Dubai more comfortable and more capable of fully taking advantage of their opportunities for personal, social and economic growth.
3. The Dubai Government Excellence Program is another future focused initiative that was started by HH Sheikh Mohamed Bin Rashid Al Maktoum. The aim of this initiative is to enable excellence in the service delivery of all government departments in Dubai. The program involves expert analyses and consultations as well as acknowledgement and appreciation of government employees who fulfill or exceed the set expectations of the Dubai government.
4. The Dubai Integrated Energy Strategy 2030 is another one of the Dubai government's impressive initiatives aimed at enhancing the lives of Dubai people through innovative solutions that boost the city's sustainability. DIES 2030 is about securing a continuous supply of energy while growing the city's capacity without necessarily risking the future of the planet. With this strategy, the government aims to place Dubai at an economic progress.

5. The Dubai Clean Energy Strategy 2050 is an initiative aimed at making Dubai dependent on clean energy sources by ensuring that at least 75% of the city's energy comes from clean sources and DEWA plays an integral and giant role on it. During this project, the Dubai government will have invested over AED 600 billion, with a larger portion of the money being spent on technological innovation. Under the DCES 2050 Dubai's output will exceed their consumption since most of the consumed energy will be coming from renewable sources.

Through all these guidelines, the Dubai government can guide both the public and private sectors regarding the scope and direction of innovation, while leaving the respective organizations to set their specific innovation strategies in order to align with the goals and objectives of the Emirate.

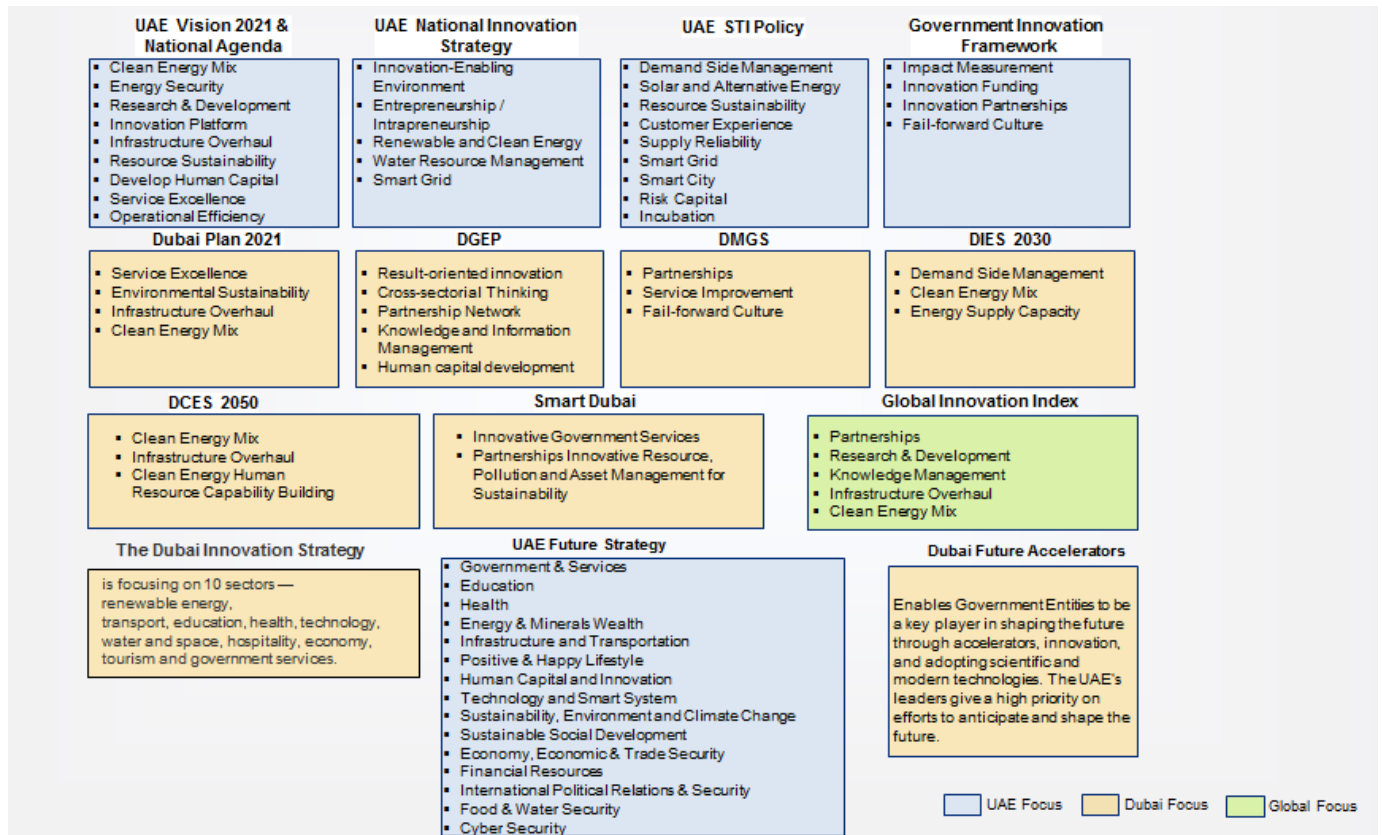


Figure 6, Innovation Agenda Themes
(DEWA Innovates 2017)

3.2.2 DEWA Innovation Strategy

DEWA's vision is to become a 'sustainable, innovative, world-class utility.' Therefore, DEWA's innovative efforts are directed towards sustainability and excellence while delivering their services. To be sustainable, the organization must focus on the needs of their customers as well as the state of the environment and the markets that they serve. The needs of DEWA's customers are continuously changing, from simply wanting a source of energy to wanting clean energy that is not only inexpensive but also easy to manage. Therefore, any innovations adapted by the organization have to take on the same direction as the changing needs of DEWA's consumers along with aligning to the Emirate's strategy.

The sustainability of the environment is now a hot issue, prompting the focus on environmental conservation through resource management and controlled use of environmental pollutants. To pay attention for these concerns, DEWA is interested in innovative ideas that enable them to contribute to the sustainability of the environment by ensuring efficient management on consumption of energy and a higher dependence on renewable energy as a way of moving the nation away from their current dependence on oil and gas.

As for the markets, DEWA had to accept the fact that oil and gas reserves are being depleted fast and that the growing population of the planet translates to higher energy demands in the future. Thus, to avoid being in the situation of a future energy crisis, the organization had to think of reducing energy consumption to managed levels while also seeking alternative sources of energy. By refocusing their priorities from oil and gas to renewable energy, the organization will be able to ensure accessibility to energy even when oil and gas are no longer easily available at reasonable prices in the Dubai markets. To appreciate this organization's

innovation strategy, however, one must consider their corporate strategy map and their internal mechanisms as defined under DEWA strategic innovation goals and objectives.

3.2.3 DEWA Corporate Strategy Map

As a part of DEWA's corporate strategy map, strategic innovation is listed under the organization's internal processes. There are five significant internal processes applied at DEWA to provide direction concerning company innovation. 'Practical research, development, innovative solutions, and technologies' mean that DEWA is dedicated to funding and supporting research in relevant fields of practice, while also creating an innovative corporate culture where employees are encouraged to come up with innovative solutions to the challenges they face during their work. DEWA, like many other modern companies who is adopting innovation, uses its corporate policies to create an ideal work environment where new ideas are celebrated and often rewarded.

The next internal process is enabling 'Smart City'. Smart City is an initiative of the Dubai government related to improving the living experience and invests in technological innovations that help to make Dubai a happy city as discussed recently. DEWA supported this initiative and process by using smart grids to manage energy consumption. DEWA had to replace the grid system in the city so that people can connect all their establishments for easy monitoring and management of their energy consumption with the hope of reducing how much energy they were using on a regular basis(Vision 2021, 2017).

'Effective demand side management' is another internal process was about managing consumption rather than just being the supplier of energy in the city. Helping the customers to reduce their energy consumption is a move that would have been considered as bad business for

other energy distributing organization (Sartori and Scalco 2014). For DEWA, the concern was beyond the number of energy units supplied per customer per year. It had to pay attention to sustainability based on the fact that the population is growing along with the energy needs of the city while the resources are depleting faster. For that reason, the organization had to find a way to manage the demand side to slow down consumption and provide alternative sources of energy, as was the case with the solar panels in Mohammad Bin Rashid Solar Park and green buildings.

A 'sustainable and diversified energy mix' includes the use of both the conventional sources of electricity as well as renewable energy. DEWA is working towards a higher dependence on renewable energy as a way of ensuring sustainability in the face of declining oil and gas reserves in the country and the world. As a process in DEWA's strategic innovation, diversifying the energy mix involves not only coming up with alternative ideas to generate energy but also incorporating these ideas into the existing DEWA business model. Currently, the customers are convinced in Shams Dubai initiative to equip their homes and building with solar panels and connect them to the grid so that they can supply their surplus electricity to others on the smart grid. Therefore, DEWA benefits by creating a more significant capacity without having to invest in the conventional and environmentally harmful production for more electricity.

A 'diversified investment portfolio' is meant to ensure that DEWA remains sustainable in the event of a collapse in the oil and gas market. For many years, Dubai along with the rest of the Emirates in the UAE and the Gulf region was entirely dependent on the oil and gas industry for their economic growth and stability. However, in the recent past there has been some concern regarding the sustainability of such an economy considering that oil and gas are not permanent resources. Investing in other industries and moves towards renewable energy sources like the

sun, wind and others, will ensure that the organization stabilize in the face of economic changing.

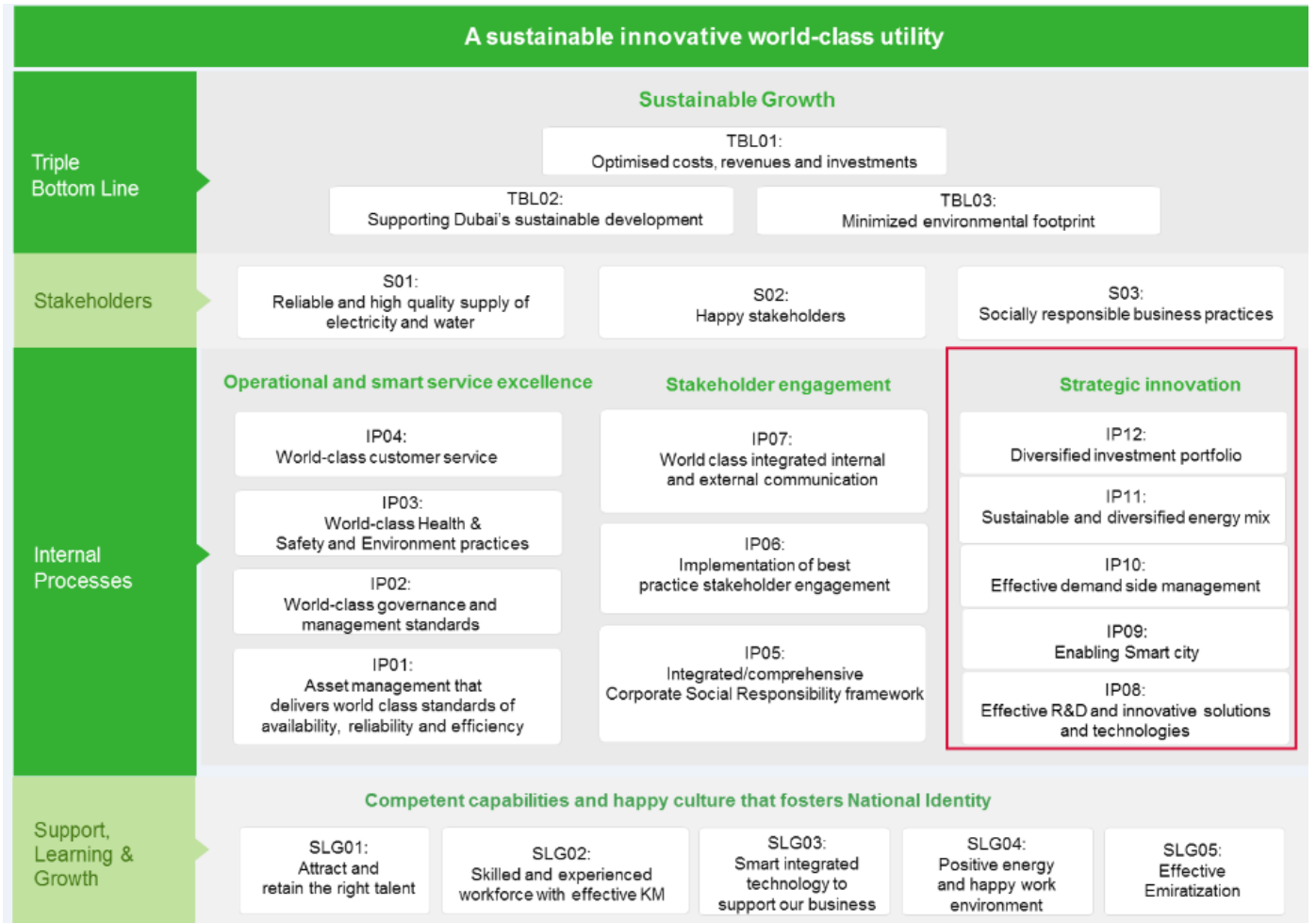


Figure 7: DEWA’s Corporate Strategy Map 2021
(DEWA Innovates 2017)

3.2.4 DEWA innovation goals and objectives

DEWA has five innovation goals. The first one is to increase the overall happiness of their stakeholders by creating shared value in all of their operations. DEWA's stakeholders include investors, employees, and customers as well as the people of Dubai and the UAE at big picture. To ensure their happiness, the organization has to commit to the concept of shared value by considering how each one of their operations affects each stakeholder (Vision 2021 2017). Thus, each innovation within this organization must have a positive outcome for the employees, the management, the investors, the government and the consumers as well as the communities within which DEWA operates.

Revenue increase and diversification is another goal that drives DEWA's innovation practice. New revenue streams ensure that the company remains profitable even in the face of an energy crisis. Supplying electricity is no longer enough for the long term sustainability thus the need to identify future or present problems that require DEWA's expertise to provide a feasible solution. By encouraging the employees to find new revenue streams to diversify the organization's investment portfolio, DEWA ensures that it will remain in business regardless of what the future holds to oil and gas. Growing the revenue from current business lines suggests getting new ways in order to make more money from existing business processes. The innovation involved along these lines is by optimizing input to increase output. The aim of optimizing input and output is to ensure that the organization more efficient and thus more attractive as an investment.

The third innovation goal is cost reduction. Every good performing organization in the business world has to operate within set cost parameters to retain a sustainable profit margin within their respective industry (Sartori and Scalco 2014). It is also an essential consideration

that profit margins are not prioritized over quality. Thus, innovation at DEWA is focused on supporting quality along with efficiency by reducing waste and finding ways to shorten the process of service delivery from the production plant to the end consumers. For example, DEWA found a way to make consumers generate their electricity through Shams Dubai project where building owners install solar panels to supplement their energy needs.

Reducing DEWA's ecological footprint is also a goal that drives the organization's innovation. Reduced carbon emissions, efficient energy consumption by company administration, and many other green initiatives embraced within DEWA are all tended towards making the organization's business more considerate to the current state of the environment. Thus, innovative ideas that play a role on the reduction of DEWA's ecological footprint are considered critical to the overall objectives of the organization and are in line with the global, national and local interests with respect to environmental sustainability.

Security is also another DEWA's innovation goal. DEWA's supplies and operations business processes must be safe and secure. For example, all the operations under natural gas require security to avoid losses, danger, and others. Similarly, the organization must be able to protect their patents and assets as well as technological inventions and other things. Innovations that promise to enhance security at DEWA are also received good attention, especially in the face of intellectual property disputes and security of all other processes.

Based on the goals discussed above, one can note that six primary innovation objectives drive DEWA. These include innovation in operations, stakeholder happiness, technology, business model, enable innovation, and sustainability. Under each of the objectives, numbers of tracks beside some tools have been identified to help inspire DEWA employees to recognize opportunities at a larger scale. Under operations, some of the identified tracks in order to

improve operational performance and related KPIs include supply chain rationalization, workforce planning and the optimization of skills, resources as well as efficiency within the organization. For stakeholder happiness and satisfaction, the organization creates shared value by basing their decisions on the happiness of their employees, customers, investors, suppliers and the government. Under innovation in technology, DEWA aims to enable digitization of Dubai through smart city initiatives and other technology in areas like cyber security. In business model innovation uses to drive diversification, identified tracks include portfolio diversification, energy generation and energy distribution. As for sustainability as an objective to improve sustainability of energy and water demand and supply, DEWA has identified demand side management and a reduction in carbon emissions as the main tracks. Another key objective of the organization is to encourage employees to innovate is enabling innovation; some tracks include knowledge management, processes, partners, and rewards.

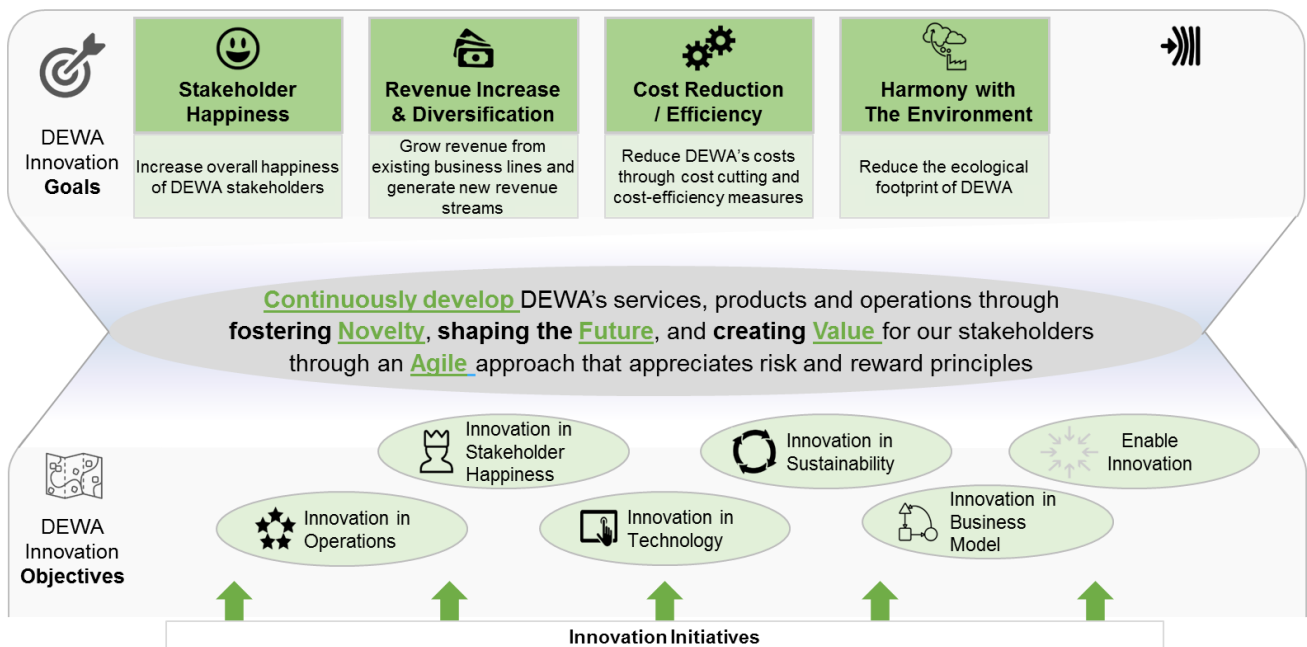


Figure 8: DEWA Innovation Goals & Objectives

(DEWA Innovates 2017)

3.2.5 DEWA Enable Innovation

DEWA has a four step innovation framework that they follow to support and encourage innovation. The four step system includes opportunity generation, evaluation and selection, adoption and implementation.

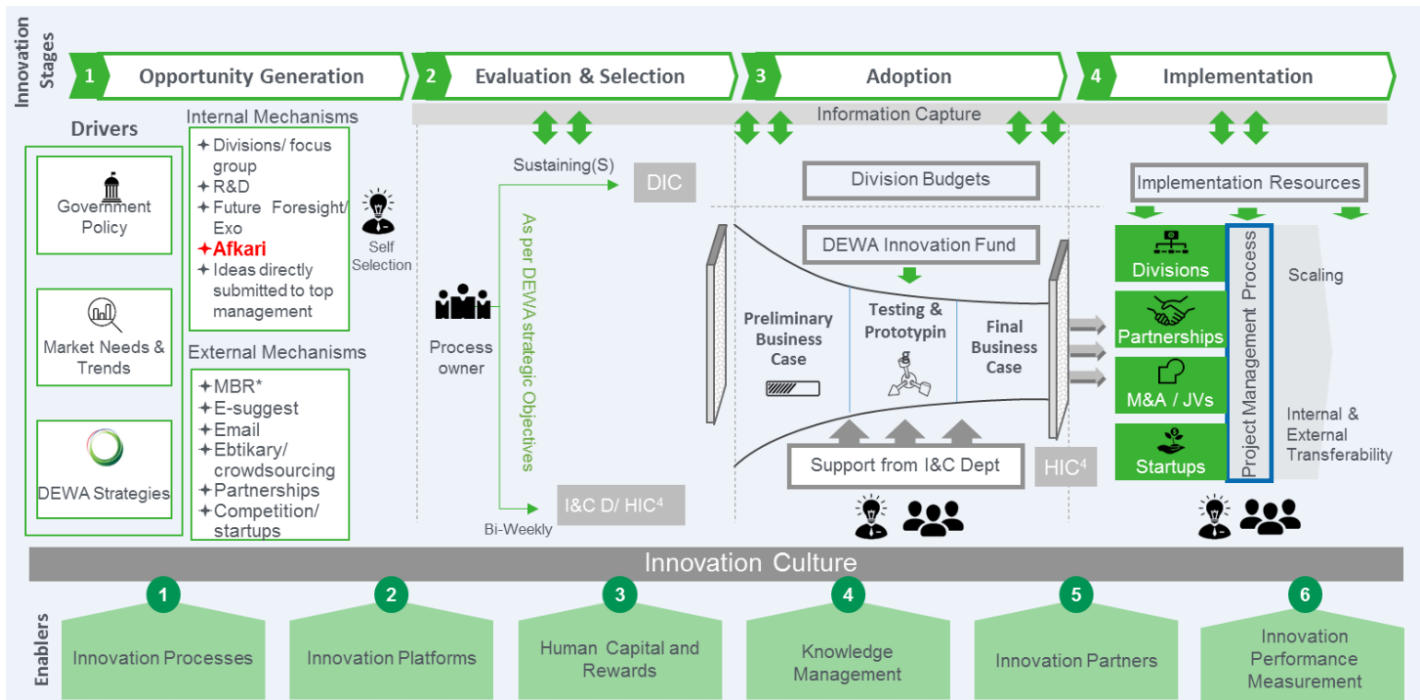


Figure 9: Innovation Framework / Ecosystem Overview

(DEWA Innovates 2017)

1- Under opportunity generation, it includes government regulations, organizational strategies and market needs as DEWA’s innovation drivers. The organization also has both internal and external mechanisms through which the opportunities are generated. Under internal mechanisms, DEWA has various divisions and focus groups that are driven by specified objectives and goals, aligned to them, and encouraged to innovate within their specific fields of operation, with consideration for the innovation strategy applied in DEWA. DEWA also has a research and development department that is carefully committed to new ideas which are relevant to the vision of the organization. The organizational management also encourages the

submission of views and future foresight throughout the organization. One more internal mechanism is Afkari.

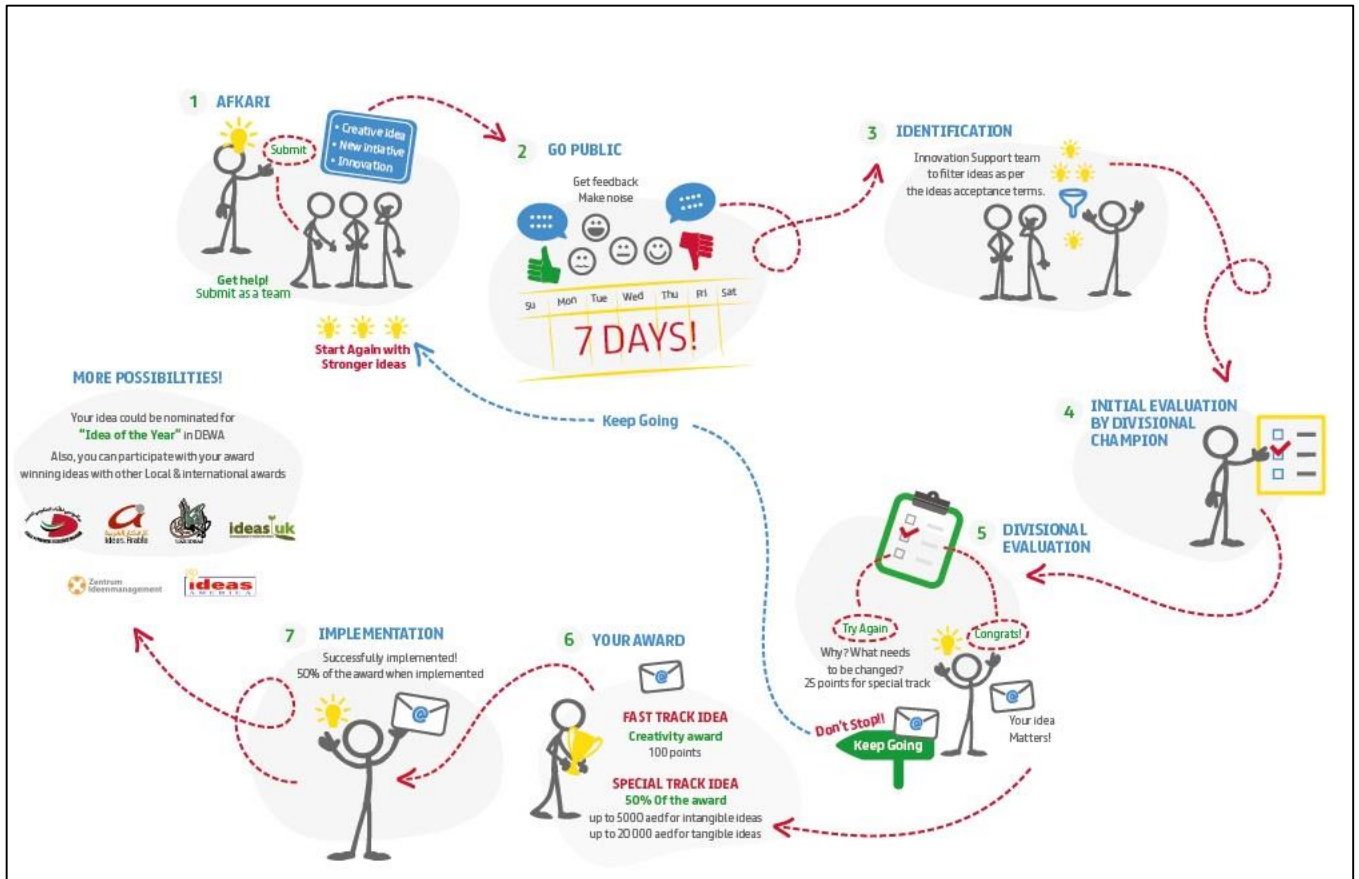


Figure 10: AFKARI Ideas Flow
(DEWA Innovates 2017)

Afkari is an internal program that encourages employees to submit ideas that meet the organization’s criteria to get recognized and rewarded upon the implementation of the innovative design. Under this program, employees are encouraged to come up with creative concepts that could help DEWA to improve its processes, operations, services, products, markets, and management practices. Thus, DEWA encourages innovation and opens it up to all employees, hence making one of the driving forces behind the organizational performance. Under the Afkari ideas flow, there are 7 steps between coming up with an idea and having it implemented. The

first step, which is coming up with the idea, may involve a single employee or a group within the organization. Once the idea is developed, the program encourages going public in the website and getting feedback. The third step is when the ideas are evaluated by the innovation support team and then sent to the divisional champion for the fourth step. The divisional champion evaluates further to determine whether the idea will be pursued or not, and only the best ideas get past the fifth step. The innovator is awarded on the sixth step and an implementation plan put in place in the seventh step. It might go further to win more award and be nominated and recognized on DEWA, Dubai, or international level. This program leads to achieve one of the main DEWA's KPIs which is the number of patents and innovative projects carried out within a given period.

The external mechanisms that enable innovation at DEWA include partnerships and competitions for innovative ideas, suggestions from Mohammad Bin Rashid Smart Majlis initiative and open email, E-suggest that allow the public to contact the organization efficiently. By being open to external influences, DEWA can work with the public to improve their operations.

2- The evaluation and selection phase of innovation at DEWA then involves the Division Innovation Committees present in each division, the Innovation and Creativity Department and the Higher Innovation Committee. In this phase, the innovative ideas are examined in four stages. The first stage involves the availability of recourses. Here, the responsible committee examines the advance steps after the implementation of an idea. For example, if a person purposes to cut down the cost of producing electricity through investment in affordable solar panels, the solution would be to look for cheap and powerful solar panels. Besides, another variable would be to examine for how long can the solar panels last and for how long the

company will be able to get the panels at that lower price. All these questions are meant to make sure that the idea is not just a short term advantage but that it can be sustained profitably in the long term. The second stage involves questioning the feasibility of implementing the idea. Feasibility, in this case, refers to the ability of the organization to execute the idea. Some ideas only sound good on paper, but they cannot be brought to life. This could be because the implementation is unreasonably expensive or has little impact on the organization regarding solving an existing problem. The feasibility of an idea determines whether the idea will be pursued by the organization and it may involve simulating the idea with the aim of giving the most realistic evaluation. In the third stage, value addition is carried out. Value addition involves enhancing the idea through research and development in order to use it as a competitive advantage. Value addition often involves the original owner of the idea in collaboration with other industry experts, working together to make the idea even better. The last stage then involves testing the novelty of the idea by going across the market to determine whether the idea is already under implementation elsewhere. In the event that the organization finds that they have the idea first, a patent is filed to retain ownership of the new technology, service, product or process as required.

3- The adoption phase of innovation at DEWA involves finding the funding and conducting all the preliminary market analyses. Therefore, the organization gets to engage in testing and prototyping, to ensure that the idea that will be executed meeting the market needs and expectations. Similarly, it is under the adoption phase that DEWA Innovation Fund, along with the Division budgets, are appointed for resources that will be required during the implementation phase. As DEWA has an innovation fund and a consistent innovation budget at

the division level enables, the organization always manage to fund all innovation ideas which leads to have an upper hand in the industry.

4- The implementation phase then involves bringing together the teams involved in creating the idea, the resources in a systematic project management process, with a value impact analysis at the end of the implementation. Conducting a value impact analysis seeks to establish internal and external transferability of the idea. The findings then help in the distribution of the given idea.

Another strategy used by DEWA to enable innovation is the Innovative Forces Project. Through this project, the company has created a series of short videos meant to identify and honor the creative minds in the organization. By recognizing the people who have impacted the organization with their innovative ideas, the innovative forces project encourages the employees and other stakeholders to submit their brilliant ideas as well. Innovative forces has simply encourage innovation within DEWA.



Figure 11: Innovative Forces (DEWA Innovates 2017)

The 10X Dubai Initiative is also another approach considered to DEWA strategy meant to boost innovation within the organization. This initiative, launched by HH Sheikh Mohamed Bin Rashid Al Maktoum, seeks to encourage all organizations in Dubai and the employees to think of futuristic disruptive innovation and find new, creative and truly disruptive approaches and technologies so as to make Dubai a world leader on innovation, in a span of ten years. 10X Dubai is about accelerating Dubai's rise to become the most innovative city in the world. The strategy simply seeks to ensure that the employees at DEWA are not restricted to incremental innovation when they have the capacity to completely change things for the better.



Figure 12: Dubai 10X
(Dubai Government 2017)

3.3. DEWA's Power Generation Division Innovation Processes

DEWA's Power Generation Division is an excellent part of the organization regarding its contribution to the overall innovation performance. This division has over the years established an integrated process management and development system based on the 10 Steps Continuous improvement model and through technical innovation and stakeholder engagement.

By the integrated process management and development system, the division can achieve the vision, mission, goals as well as objectives through a comprehensive model that involves

defining the KPIs, benchmarking, encouraging innovation where possible, focusing on process improvements and following the strategic directions provided by the organization.

The 10 Step Continuous Improvement Model is based on the cycle of planning, doing, checking, acting and sustaining, where the organization is always working towards their set goals and objectives. The integrated process management that drives the Power Generation Division is thus one of the principal that enable innovation since it provides room for evaluation and correction as well as sustaining change as part of the implementation plan.

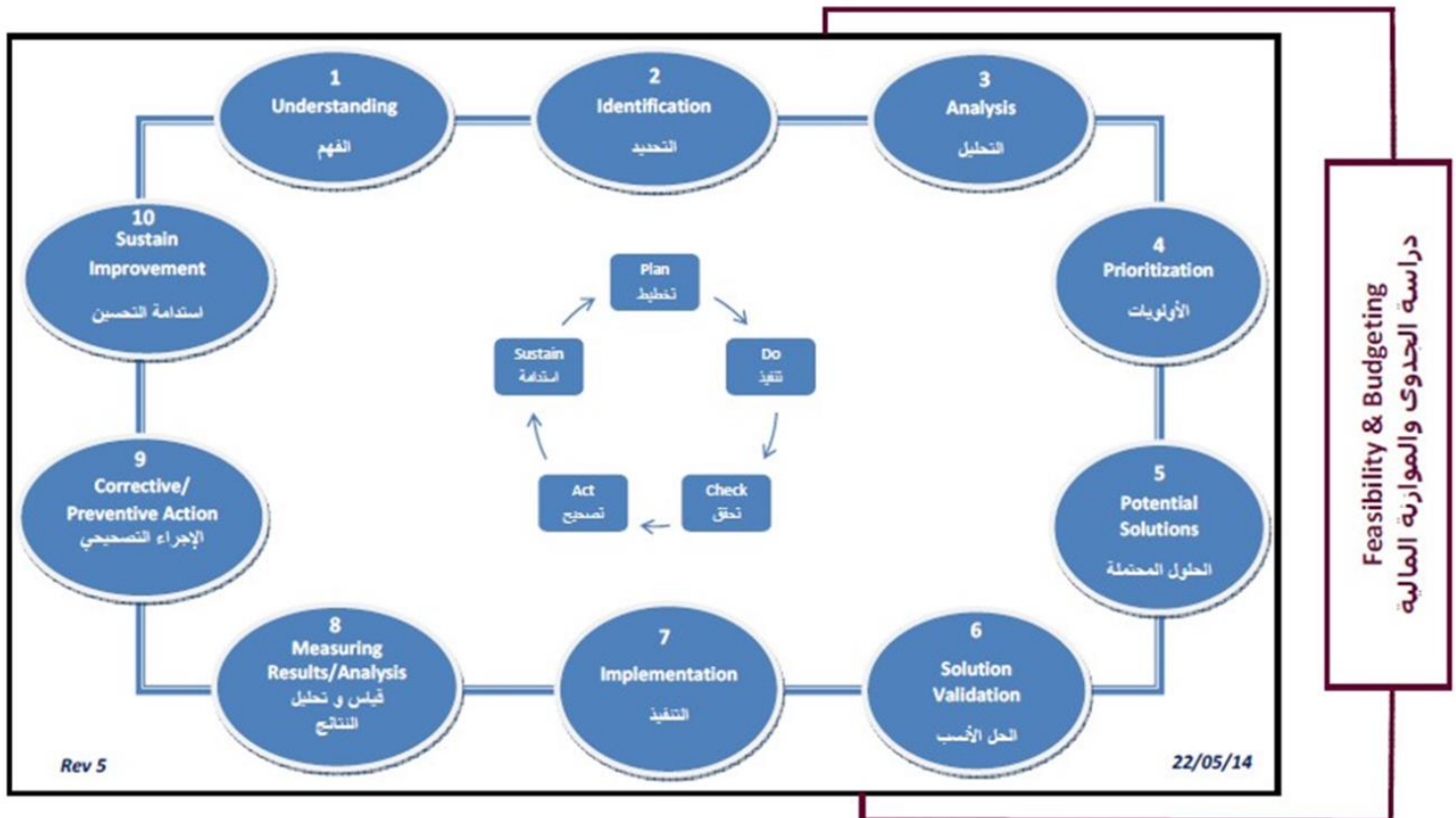
Four specific strategic objectives from DEWA affect the Power Generation Division. The first one is from the internal processes, and it is about ‘managing the organization's assets’ in such a way that they can deliver excellent standards when it comes to reliability, efficiency, and availability. The Generation Division is responsible for a large portion of DEWA's assets due to their responsibility over power/water generation processes.

Another strategic objective from the internal processes category is ‘innovative solutions and technologies’. A significant amount of the technology at DEWA is needed within this division as it contains the core business, which means that the Generation Division employees are better position to come up with impressive ideas regarding technology and other generation related solutions to improve DEWA’s performance significantly.

The other two strategic objectives are based on DEWA's triple bottom line. The first one is about ‘optimizing costs, revenues, as well as investments’, and the other one is about ‘reducing the organization's ecological footprint’. In order to optimize the costs, revenues, and investments, this division has to focus on promoting efficiency while improving productivity to increase the profit margins and make the stakeholders happy (Sartori and Scalco 2014). Moreover, as for the ecological footprint, it can be argued that the methods applied in the Power generation division

affect the value impact of DEWA as whole. Thus by focusing on this strategic objective, the division can pay attention to the effect of the processes that they involve in, about environmental sustainability.

One of the most notable innovations by the Power Generation Division is the one that leads to an improvement in the efficiency of the Gross Heat Rate. This primary innovation enabled the organization to attain a number of the strategic objectives. First, they reduced the level of emissions thus decreasing their ecological footprint. Secondly, the organization was able to reduce the direct operating cost by cutting down on the amount of fuel that was being used. As a result, efficiency was improved significantly. The third achievement was the improved gross profit margin based on low operating costs and high output efficiency. Such win-win innovation strategies are only enabled when there is a strong culture of creativity and innovation within the organization. DEWA's Power Generation Division, in this case, shows a high level synchronization between their written strategy and management model and their performance considering that they have successfully implemented innovative projects that currently contribute more to DEWA's reputation as a center of innovation. The innovative ideas are selected based on their compliance with DEWA strategy and their ability to give high returns for minimum effort and time.



Guidelines:

- Its recommended to use the 10 Steps model when carrying a holistic analysis to a process and where there is a need to initiate strategic initiatives due to an update on the Strategic plan or any substantial external variable (on yearly basis or whenever required).
- 10 Steps model is based on PDCAS model.

Figure 13: 10 Steps Continual Improvement Model
(DEWA Generation Sustainable Operational 2017)

B. Research Survey Design for the Case Study

The survey design for this case study was based on a literature review that was conducted to define the terms of organizational innovation in relation to employee experiences. The goal of the survey was to use the thoughts and feelings of DEWA's employees to determine how well the organization is really doing toward innovation as a corporate strategy.

The survey was divided into four sections. The first section was to collect information about the managerial category, nature of work and the division of operation. For an organization as large as DEWA, it is important to consider a possible view in innovative experiences since each managerial category has a different set of challenges, capacity and expectations related to innovation. Thus it was important for the survey to capture the specific managerial categories of the participants as a part of the data that would be important during analysis. For this study, the survey targeted participants working in the Generation Division, both under technical and administrative scopes of work.

The second section of the survey was based on the idea that management is responsible for not only creating but also maintaining a culture of innovation within the organization. To evaluate the support provided by the management at DEWA, the survey contained questions on financial resources, the impact of innovation on performance, innovation culture, how encouraged employees are when it comes to being innovative, family culture, success within the organization, tolerance to failure and giving more importance to results than processes. The participating employees simply had to state how they feel about DEWA's policies and practices on all these aspects in order to measure and determine if the management is doing the right thing

or not. Each one of the aspects highlighted above play a role in organizational behavior as related to innovation (Hewlett, Marshall and Sherbin 2013).

The third section was based on the significance of developing a culture of innovation into the organization as a full engagement. The questions were designed to test how much the participants know about innovation by stating innovation behaviors that are important to innovation such as accepting failure, staying up to date with developments in the field, as well as sharing knowledge and collaborating with others across divisions (Sartori and Scalco 2014). Other questions were meant to test how easy the participants thought innovation implementation would be. Empowering others to make decisions, taking ownership of innovation initiatives from design to execution, and allocating time to innovative activities are all important activities that the employees need to learn and practice if they are to be innovative.

The final section was designed to test the innovation system and processes at DEWA by asking specific questions related to the organization. For example, it was established that DEWA has a program known as Afkari program which is meant to motivate innovation. Thus, the participants were asked how they feel about the program's procedure, transparency and ease of communication, rewarding system, time used to evaluate the ideas, marketing initiatives and campaigns as well as evaluation feedback. In order for Afkari program to motivate innovation, it must be easy to access, fair in terms of how it evaluates the ideas, transparent and justifiable in their decisions, effective in creating awareness within the organization, as well as capable of improving the innovative ideas of the employees through clear evaluation feedback. This section of the survey also had items meant to establish how many of the participants had used the Afkari program and reasons of those who had not. Also, the survey was designed to test whether the participants were satisfied with DEWA's innovation department in terms of their facilitation,

support, activities, workshops and awareness. The innovation department is responsible for the innovative culture in the organization.

It must be noted that this survey was evaluated and further improved by an innovation specialist at DEWA Innovation Department who was very helpful and assist on refining a few survey questions to meet the DEWA aspects.

Chapter 4

Research Results and Discussion:

The survey contained 28 questions that were divided into three categories. The introductory of the survey presented information regarding the purpose of the survey, and the necessary information of the participants including their position, and the nature of their work. After the introduction, the survey had 18 questions on the aspects mentioned above and was followed by 8 questions on the Afkari program and 2 questions on the Innovation department. The survey was created via the Survey Monkey and copy is attached in Appendix A.

There were 89 participants in the survey. On the first question regarding their managerial category, 44 participants reported that they were in the Non-Supervisory category with their jobs ranging from grades 7 to 11. These were the majority in the survey. 29 participants were in the management category (grades from 11 to 16), 13 in the other group (grades 6 and below) and 3 in the Leadership category. Regarding the nature of their work, 71 of the participants reported that they are working in technical job while the remaining 18 participants stated that they are in administrative job. As for the divisions, all of the participants are working in the Power Generation Division.

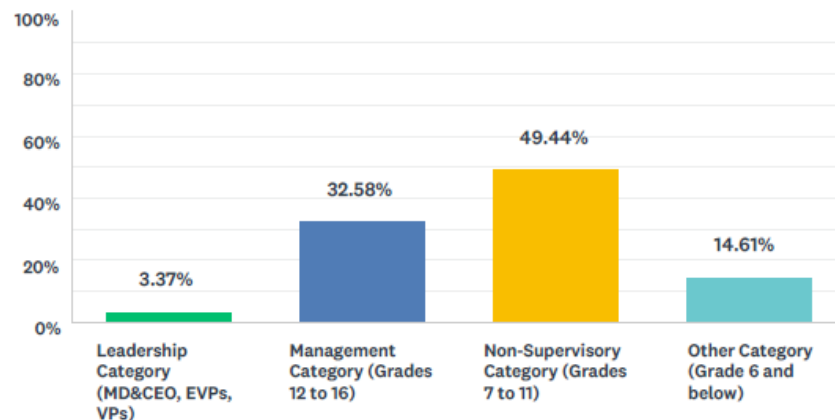


Figure 14: Managerial Category

1) Management Support for Innovation at DEWA

In question 4 with regards, 30 participants stated that they were totally satisfied and 43 were satisfied with the financial support for innovation. 13 participants then thought that the support was average, while 2 were dissatisfied and 1 was totally dissatisfied. The point to note in this question is that 16 participants are not happy with the financial resources that are provided to support innovation at DEWA in which it needs improvement.

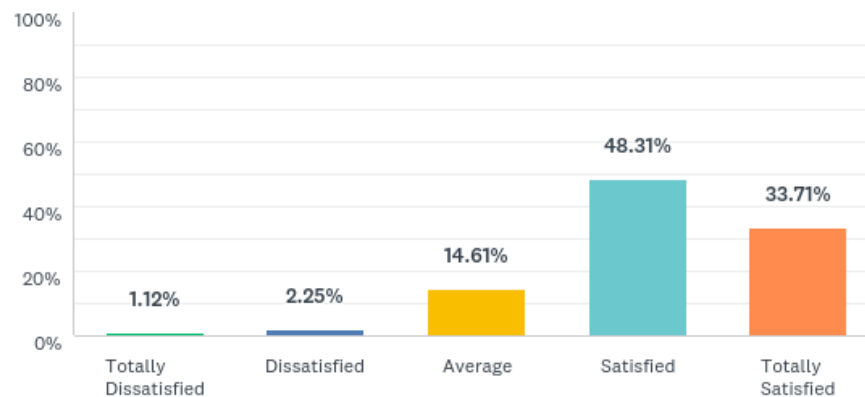


Figure 15: Financial Resources Needed to Support Innovation

In question 5, 37 and 37 participants stated that they were totally satisfied and satisfied respectively with the impact of innovation on improving the performance of the organization. These are the individuals that believed that the innovation was truly good for DEWA. For the remaining participants, 13 thought the impact was average and 2 were dissatisfied. This means that a total of 15 participants, representing 16.86% of the organization, believe that the management can do better.

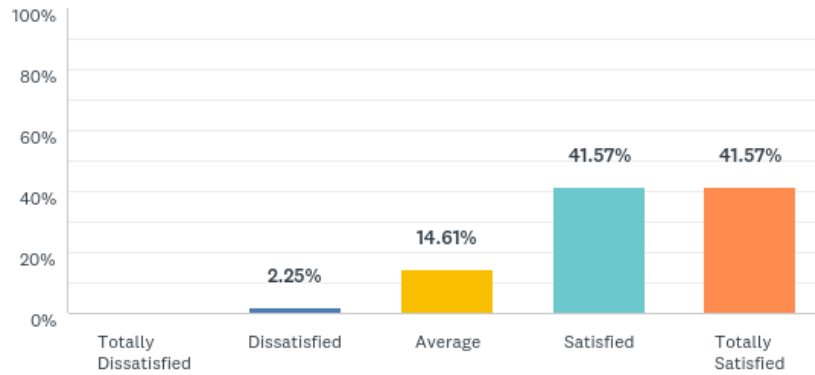


Figure 16: Impact of Innovation on Improving DEWA Performance

In question 6, 26 and 45 participants were totally satisfied and satisfied respectively with the innovative culture that was created to support innovation at DEWA. 16 participants thought it was average and 2 were dissatisfied. This represents at least 20% of the organization, implying that there is a lot to be done in relation to the innovative culture within DEWA’s Power Generation Division.

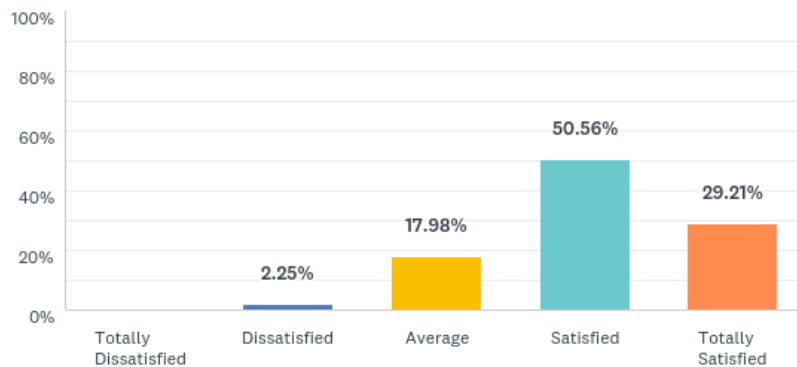


Figure 17: Innovative Culture for Support Innovation

In question 7, 24 and 47 participants were totally satisfied and satisfied, respectively, with how they were encouraged to come up with new innovative initiatives within their division. 13 participants thought that the encouragement was average and 2 were dissatisfied. These

participants represent more than 20% of the organization, requiring a lot of concern from the management. If 20% of the personnel are not encouraged to be innovative, something must be done to change that.

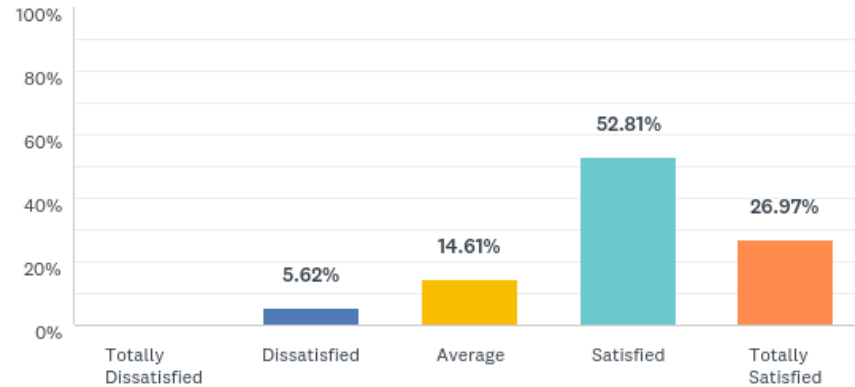


Figure 18: Division encouragement to come up with innovative initiatives

In question 8, 14 and 45 participants were totally satisfied and satisfied respectively, with the family culture at DEWA. 21 participants thought it was average, 8 were dissatisfied and 1 was totally dissatisfied. The negative responses sum up to 33%, indicating a serious problem in the organization with respect of providing a family culture. The family culture is meant to enable cohesion and encourage the personnel to support one another and always work together in a team spirit. It is a possibility that individual competitiveness always weaken the family culture within an organization. The management would in this case have to consider restructuring their strategy for competitiveness in order to provide collaborative link between employees.

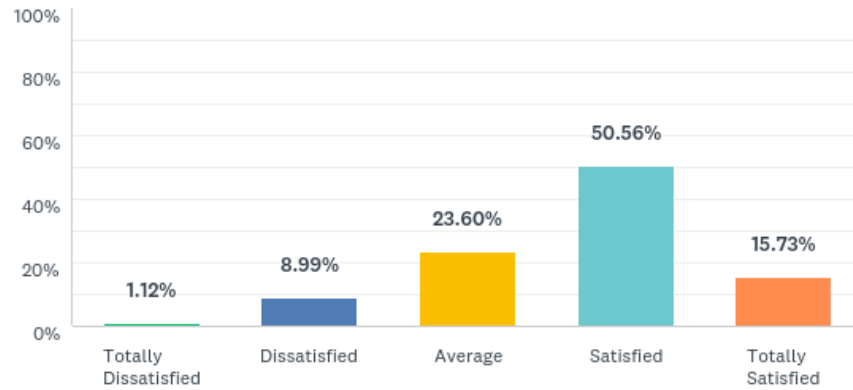


Figure 19: DEWA Providing Family Culture

In question 9, 30 participants were totally satisfied with DEWA as a success-driven organization, 49 participants were just satisfied, 9 thought the organization was average and 1 was dissatisfied. The negative responses amount is about 11% of the employees, which may be a good number but it still must be reduced significantly in order to get DEWA to the height that is desired by the top management.

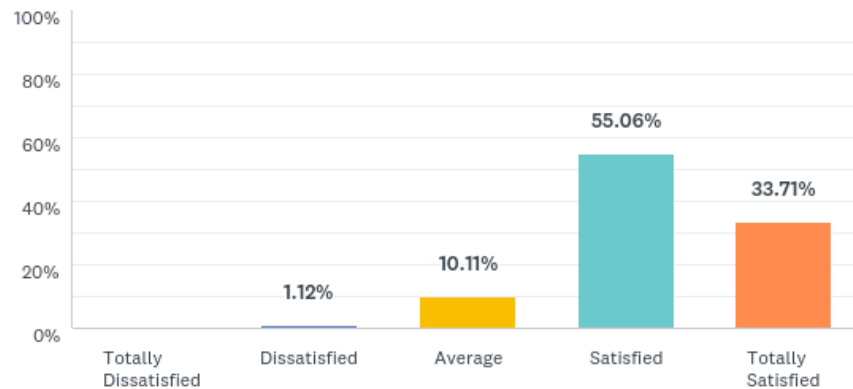


Figure 20: DEWA as a Success-Driven Organization

Question 10 was about the organization’s low tolerance to failure. In this question, the participants were asked to state whether they were okay with the organization’s obsession with perfection as seen in their low tolerance to failure. DEWA generally appreciates the winners, and it fails to recognize failures as starting points for future successes. Although the company may

not punish failures, they do not exactly invest in encouraging them to pursue their goals. 22 participants stated that they were totally satisfied with this policy, 47 were satisfied, 14 thought it was average, 5 were dissatisfied and 1 was totally dissatisfied. Thus 22% of the personnel were not entirely supportive of the low tolerance for failure. Generally, having a low tolerance to failure stifles innovation since in most cases the innovators have to fail a few times before they get it right.

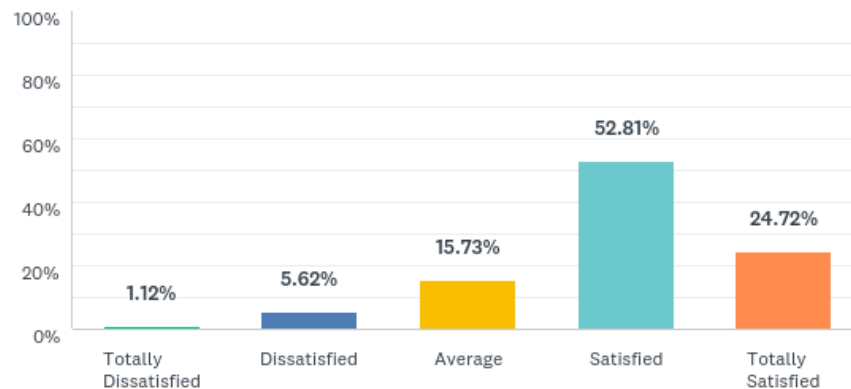


Figure 21: DEWA's Low Tolerance to Failure

Question 11 focused on the fact that DEWA gives more importance to results than to the processes used to get the results. Ideally, this is a negative aspect and DEWA's management should work to change it. The findings however indicated that 15 and 47 participants were totally satisfied and satisfied, respectively, 18 thought it was average and 9 were dissatisfied. This means that 30% of the personnel did not support the practice of valuing results more than processes. This is another thing that DEWA management could look into changing.

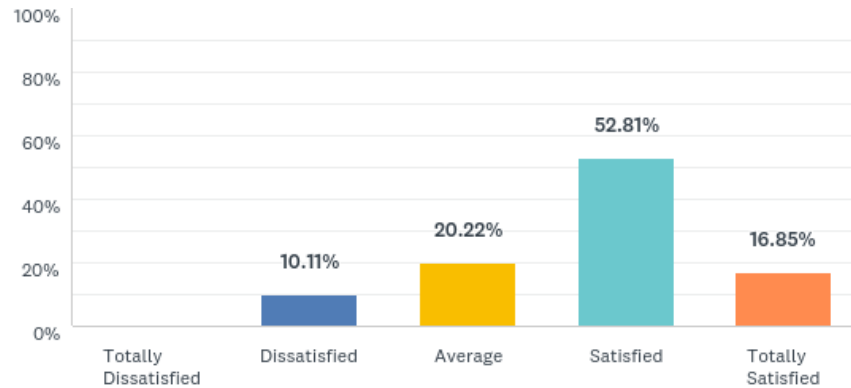


Figure 22: DEWA Giving More Importance to Results than Processes

The findings in this section bring out a number of issues as related to DEWA's management. The management is doing well based on the fact that at least 40% of the participants were constantly satisfied or very totally satisfied. Thus, the overall analysis is that when it comes to managing innovation, the leaders at DEWA are effective and competent with their policies and practices. However, the fact that there are always some participants (about 10% on average) stating dissatisfaction on almost every point cannot be ignored. Effective management of innovation is inclusive and the organization must be willing to find out why some of their employees are not happy with the management. At the moment, the management seems to be too happy with the portion of employees that are satisfied thus ignoring the dissatisfied. It may not be possible for an organization to record a satisfaction score of 100% but when it comes to innovation, the leaders in this organization should try.

2) Innovation Behaviors

In the next section, the participants were required to respond based on how important it is to believe the stated innovation behaviors are related to fostering a culture of innovation. The identified behaviors were accepting failure as an essential part of learning, empowering others to make decisions, staying up to date on the latest developments in the field of innovation. Other identified behaviors were taking ownership of innovation initiatives and being involved in their execution, allocating predefined time to innovation-related activities, sharing knowledge, and collaborating within teams and across divisions.

Cumulatively (questions 12 to 17), there were 226 'significant' responses, 255 'important' responses, 8 'average' responses, 5 'unimportant' responses and 1 'unimportant at all' response. All the means were above 4.00 thus indicating that a majority of the employees understand the concept of innovation although there still are some employees in the organization who do not fully appreciate the concept yet. For example, 89% of the employees stated that accepting failure as a part of learning is either important or very important. The remaining 11% either believed that this practice was average or unimportant. If the organization was fully committed into innovation, 100% of the participants would have agreed that accepting failure as a part of learning is very important in enabling innovation within an organization. The same applies in the questions that focused on empowering others to make decisions, staying up to date on the latest developments in the field of innovation, taking ownership of initiatives and being involved in their execution, allocating predefined time to innovation related activities, as well as sharing knowledge and collaborating within teams and across divisions. In each item, having participants stating that the practice was average or unimportant reflects the conflicting within the organization in relation to have innovation as a comprehensive practice. The management must

consider creating awareness and training for the leaders as well as the employees to get them to appreciate what innovation really involves.

Questions 18 to 23 in the survey focused on determining the ease with which the participants would employ the previously listed innovation behaviors on a regular basis. In total, the results had 54 'very easy' responses, 90 'easy' responses, 107 'a bit easy' responses, 115 'a bit difficult' responses, 117 'difficult' responses and 51 'very difficult' responses. Between 6% and 11% of the employees reported that implementing a behavior that enable innovation was very difficult, however at least 60% of these participants were also reporting between category 1 "Very easy" and category 4 "a bit difficult".

Under question 24, the participants were requested to suggest other behaviors that they thought would be important in spreading the culture of innovation in DEWA. Some of the suggestions presented are as follows;

- The management should ensure that staff members believe that any proposed changes are meant to improve DEWA as an organization rather than just being another effort towards fulfilling the KPIs. Consequently, the employees would feel better about innovation if they were certain about its impact on the organization. KPIs are not motivational enough to drive commitment and support for innovation.
- The management has to show that they value the input of everyone in the organization. Besides, the management should involve all employees without discrimination or favoritism to individual or department. A collaborative working culture would also mean the elimination of all forms of discrimination whether based on religion, gender, nationality, or even social and economic background. In this case, the overall

environment will ensure that all staff are sufficiently cooperative to generate smooth support for innovation in all areas.

- The management should focus on ideas that are related to DEWA's core business rather than proposing ideas that are specifically meant to improve the proposer's department. Furthermore, the need for more definitive criteria for choosing the ideas that can be implemented. Employees are more likely to work for the sake of the entire organization than to improve the performance of one manager. Consequently, rather than having one proposer supporting the innovation, the management should be creating innovation teams in each department so that any proposed ideas are analyzed concerning their impact on the organization as a whole before being presented for implementation.
- The Management needs to start communicating and sharing the innovative ideas through some presentations that aim to make employees understand and appreciate the ideas that are supposed to be implemented. Communication will help in building the trust between all DEWA stakeholders thus acting as a foundation of success through which they can build a culture of innovation. It is important to note in this regard that it takes time and practice to build trust in the long term and the management will have to be patient. A multi-channel communication platform will be vital in improving communication with all the members of staff.
- The participants also stated that the managerial staff should be trained on leadership philosophies that promote innovation. Learning how to listen to the employees, in this case, could be the answer to ensuring that the employees felt valued enough to put in the extra effort required in innovation (Sartori and Scalco 2014). The leadership must also

engage in practices that foster and encourage innovation in teamwork rather than putting the pressure on individual employees or middle-level management.

- The participants also highlighted that the step of suggesting and approving an innovative idea for implementation is quite slow and that the relevant committees must consider making their decisions a bit faster. All the discussions make the employees lose hope when it comes to making proposals that could benefit them now, by the time the idea is approved for implementation, it may be too late.
- Benchmarking and change management were also mentioned by some of the participants as ideal practices related to innovation and that they should be included at DEWA. In fact, benchmarking is a part of the continuous improvement channels used by the Power Generation Division, with the organization using World Fleet as a standard/benchmark for innovation against which they measure their performance. However, it is possible that the technical staff may not be aware of the benchmarking practice since it is done at the administrative level during evaluation and monitoring of performance. In addition, DEWA must be able to create and stick to an effective change management strategy that focuses on the attitudes of the employees with regards to the proposed changes. This change management strategy should consider the need for creating more awareness about the need for developing a culture of innovation in DEWA.
- Brainstorming should become a main practice, and it should involve staff from all job grades within the organization. Currently, the higher level/grades personnel at DEWA are used to brainstorming and other aspects of an innovative culture, while their counterparts in the lower-level have no idea about such practices. This should change since all

employees having an interest in the organization's care and must thus be allowed to participate in decisions that are relevant to their work, regardless of their grades.

Besides, innovative behaviors are more like enablers when it comes to innovation. Accepting failure as an essential part of learning opens the individual up to take more risks in terms of coming up with ideas that have not been tested before. The fear of failure makes it impossible for an individual or an organization to innovate. Empowering others to make decisions then spreads the responsibility across the organization thus allowing each employee to innovate within their respective areas. When decision making is strictly centralized, the employees do not have any room to innovate, and thus they would never have to worry about failure. In organizations where decision making is centralized, any failures can be blamed on the management since they make all the choices. In such an organization, the employees cannot be motivated enough to stay up to date on the latest developments in the field of innovation seeing as their skills and abilities do not matter to the decision makers. When the employee has some room to make decisions however, they can learn as much as they need in order to improve their skill sets and make better decisions as related to their roles and responsibilities in the organization. Such an employee is more likely to take ownership of innovation initiatives and be involved in their execution, while also allocating predefined time to innovation related activities, sharing knowledge, and collaborating within teams and across divisions. The innovation behaviors generally shape the environment within which an employee can be innovative.

3) Afkari Program

Questions 25 to 30 covered the Afkari program, with the survey intending to evaluate how the participants feel about it. Out of the 89 participants, 45 stated that they were satisfied with the program and its procedure. 26 responded with 'average,' 14 were 'totally satisfied,' and 4 were dissatisfied. This mean 66% of the participants are satisfied with the current program but the remaining 33% are not. It is appropriate for the organization to note that, while meeting the expectations of two thirds of its staff may be a great achievement, the uninterested one third may significantly hinder the achievement of the set organizational goals and objectives.

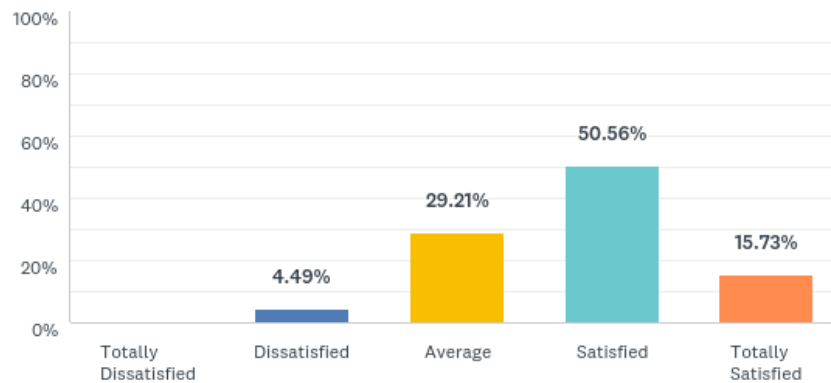


Figure 23: Satisfaction of Afkari Program and its Procedure

On transparency and ease of communication, 48 were satisfied, 23 thought it was 'average,' 12 were totally satisfied, and 5 were dissatisfied. This also indicates that more than 30% of the participants are not at all impressed by the transparency and ease of communication within Afkari. The management must thus be keen and able to look into how they communicate with the personnel.

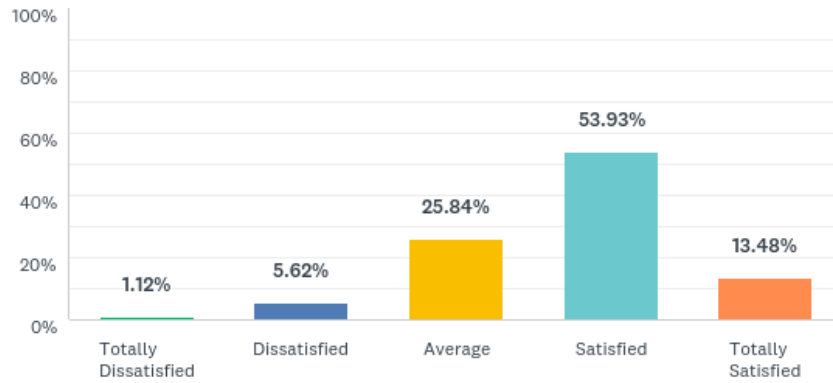


Figure 24: Afkari Transparency and Ease of Communication

On the rewarding system, 43 were satisfied, 26 thought it was average, 15 were totally satisfied, and 5 were dissatisfied. 35% were not impressed with how the organization rewards innovation, meaning that there is a need for better ideas on how to motivate innovation at DEWA. At the same time, up to one third of the organization’s brilliant minds will not be bothered to submit their ideas.

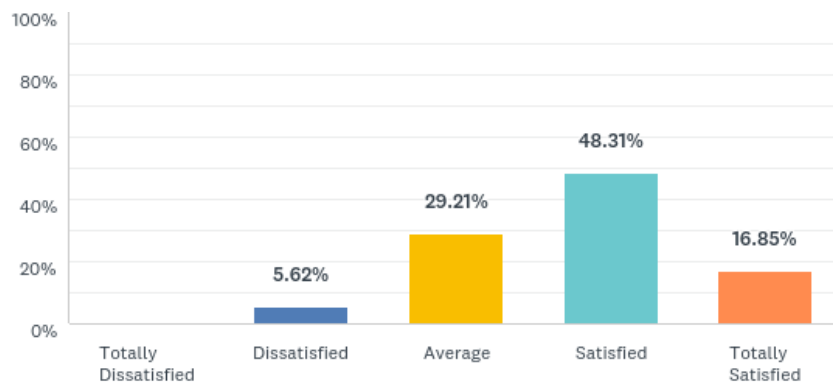


Figure 25: Afkari Rewarding System

The next question covered the time required to evaluate the employees' ideas. The mean response was a 3.54, which is close to ‘average’ but closer to ‘satisfied.’ However, at least 46% of the participants reported average, dissatisfied or totally dissatisfied, making it important for

DEWA’s management to look into shortening the time taken to evaluate the ideas submitted by employees under the Afkari program. It is possible that the waiting time makes ideas irrelevant especially if the ideas are aimed to solve a real time problems.

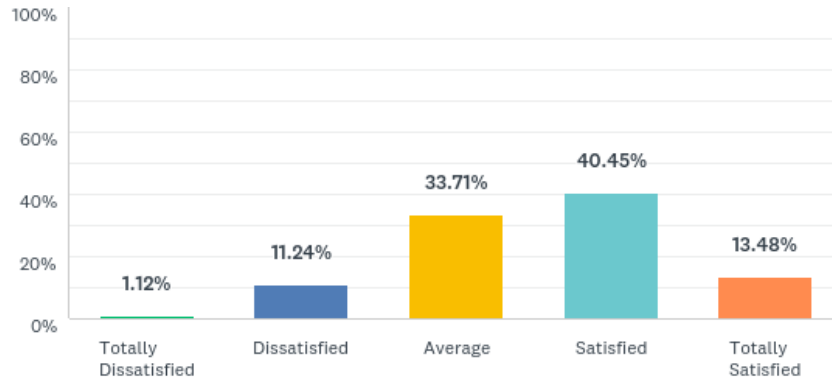


Figure 26: Time Required to Evaluate Employees' Idea

Question 29 then covered the motivational impact of Afkari campaigns and initiatives. The mean response was a 3.81, which is also closer to satisfaction but not quite there yet. 28% of the employees are not motivated by the campaigns and initiatives carried out under the Afkari program. This means that no matter how much money and effort has been put into the program, it is still not enough to get the entire workforce interested. There is a need to change tactics regarding campaigns and initiatives since 28% is more than a quarter of the company’s employees.

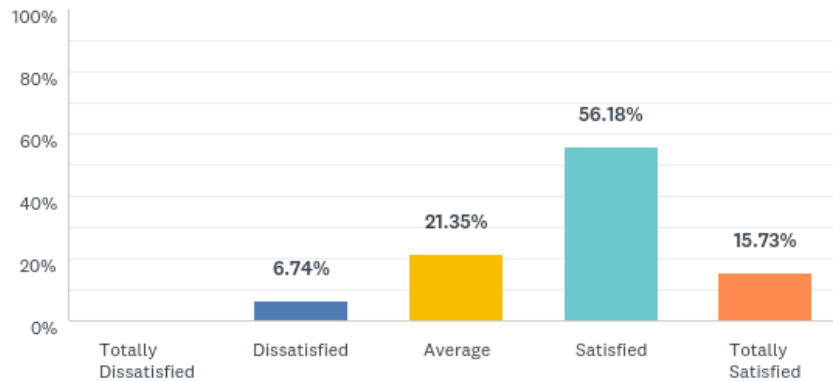


Figure 27: Motivational Impact of Afkari Campaigns and Initiatives

On the evaluation feedback given to employees on their ideas, a 3.62 mean was given, which indicates that the overall performance needs improvement. DEWA's management should consider putting more effort into giving feedback so that the employees can work on making better innovation suggestions in the future.

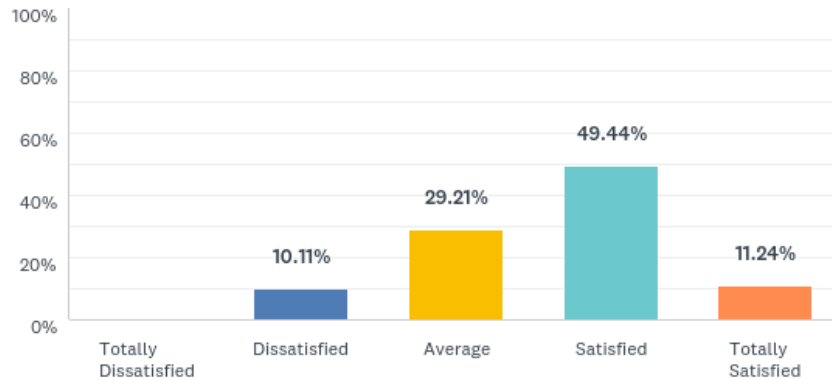
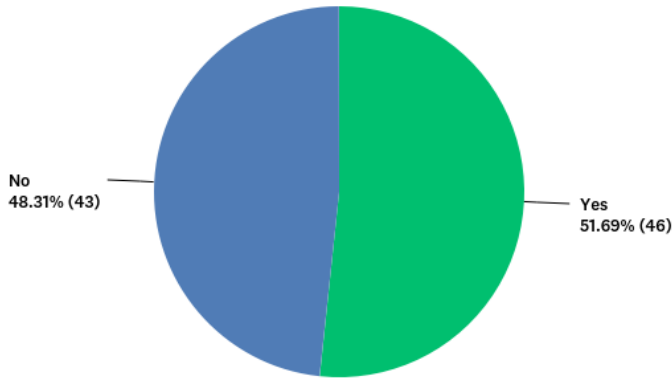


Figure 28: Evaluation Feedback for Ideas

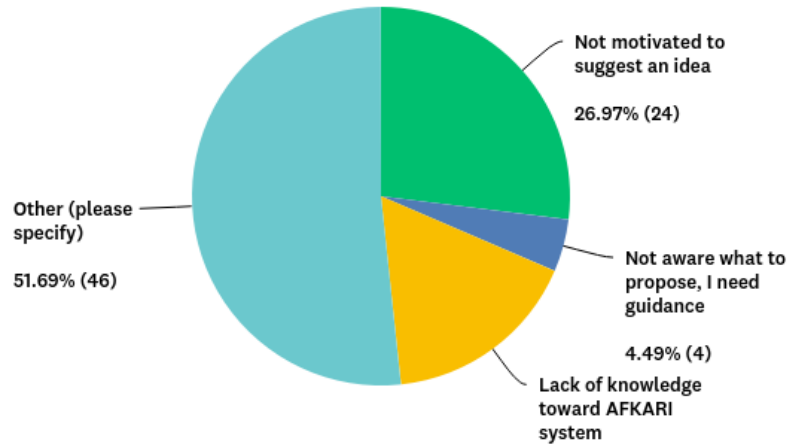
Under question 31, it was noted that 46 out of the 89 participants had submitted an innovative idea for consideration. This is an excellent turnout for the organization, but it is still not enough since almost the same ratio of employees have never submitted a design. Out of the 43 participants that had never submitted an idea, 24 were not motivated, 4 needed guidance, and 15 their knowledge about Afkari system were limited. The explanation here is that the management needs to make more effort to motivate and encourage the employees to submit their ideas. This may include creating more awareness for Afkari and even offering guidance to those who may need it.

BUID



A. Idea Submitting

MSc in Engineering Management



B. Reason of Not

Figure 29

The Afkari program and the findings in this section indicate that a lot more can be done to improve how the employees feel about the program and thus how much they are encouraged to participate in it. The idea of the program was to get the employees as well as the public to participate in innovation within the organization but if the program is not effectively publicized within the organization then it becomes irrelevant to its own objectives. It is important for the innovation department at DEWA to look into using Afkari to completely motivate innovation as 48% of the employees uninspired.

4) Innovation Department

45 out of the 89 participants reported that they were satisfied with the innovation department facilitation and support. Furthermore, 25 participants thought it was average and 12 were totally satisfied. 6 were dissatisfied, and 1 person was totally dissatisfied. The mean response showed that the employees at DEWA are mostly satisfied, but the management needs to

make more effort in this regard as 36% of the personnel are not happy and something must be done to change that.

When the participants were asked about the innovation department’s activities, workshops and awareness, 45 participants stated that they were satisfied, 26 thought it was average, 11 were entirely satisfied, 6 were dissatisfied and 1 was entirely dissatisfied. This means that the management was trying but still not hard enough. 37% of the workforce remains unconvinced by these efforts, requiring more effort from the management as well.

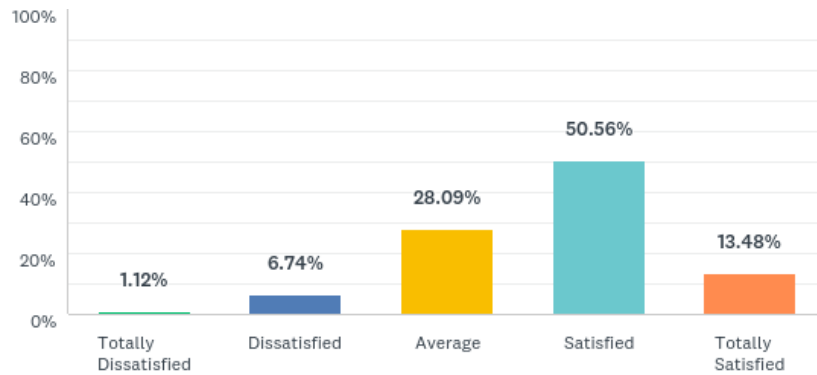


Figure 30: Innovation Department Facilitation, Support, and Activities Awareness

Chapter 5

Conclusion and Recommendations

5.1. Conclusion

This study was based on two main objectives. The first one was to evaluate the benefits and validation of incorporating innovation into organizational strategy, and how can it be aligned and adapted. To meet this objective, the study focused on innovation at DEWA and how it has been aligned and adapted. DEWA remains one of the most distinguished organizations in the world when it comes to innovation due to the organization's noticeable efforts to make innovation a part of its strategic objectives. At DEWA, innovation is not just a secondary or a random occurrence that the management can tolerate with. Rather, the organization is guided by global, national, city and organizational goals and objectives that are part of the operational policy.

The global innovation index requires a set of considerations to be met before they can recognize an organization as innovative. The UAE also has its guiding policies that are meant to define the level of innovation that organizations must practice to meet the set national standards that will help in defining the country as a leading nation in global innovation. Dubai has also policies, goals, and objectives that require organizations to adapt, support and sustain innovation as part of their corporate culture with the ultimate goal of making Dubai better in the short and long terms. DEWA's status as an excellent organization when it comes to the implementation of innovation is not totally perfect and need improvements. A further analysis of the Electrical Power Generation Division at DEWA showed that the management should work on many aspects if the organization needs to be innovative in a more comprehensive way. Many of the low level employees have been locked out of the innovation process through discriminatory

operational policies that have only opened up innovation to specific technical and administrative positions at high level. This one of limited approaches that reduce the numbers of new ideas which an organization can gain. In addition, the management seems to be guaranteed with all the current efforts towards creating awareness of the Afkari program, and yet nearly 30% of the employees are not acknowledged and satisfied with the amount of information that they have.

The second objective of the study was to investigate how well DEWA has managed to adapt and incorporate innovation to establish an understanding and come up with recommendations that might be considered by other companies. This was accomplished by evaluating the thoughts and feelings of the employees at DEWA in relation to how the management handles innovation. During the investigation it was established that innovation within an organization includes an endless cycle of continuous evaluations followed by necessary improvements, especially within a business industry. To make the most out of innovation, DEWA has had to invest a lot in its employees, and it should invest even more not only for the sake of employee motivation but also improve on organizational learning and raise innovation performance to the desired international standards. Therefore, when it comes to innovation, the learning process never stops. Moreover, if an organization, such as DEWA, still has work to do, smaller organizations with less innovation achievements would have to make even more efforts to be recognized as innovative establishments. Earlier in the paper, it was established that up to 10% of the employees were often dissatisfied with the company's management practices that are meant to support innovation thus requiring improvements and adjustments. Every organization has its own set of challenges such that no matter how well they are performing they can always do better. DEWA is no exception in this regard, as some of the potential changes that the management must consider will be discussed under recommendations.

5.2. Recommendations

Incorporating innovation into organizational practice and policy this means always considering the particular innovations as a fundamental pillar in organizational operations and consequently putting the organization in a favorable position with respect to how they apply innovation. The benefits of innovation become obvious when a certain organization starts perform better than its counterparts not just within the region but also all over the world.

DEWA's success in this case can be directly attributed to their abilities to link its strategic objectives to the divisional KPIs thus being able to translate its innovation's aspirations onto the BSC not only at the corporate level but also at the divisional level. Innovation management in this case is considered a pillar on which any business can grow well if its management towards innovation is carried out effectively, and here are some recommendations that concluded from the literature review and after investigating more with the conducted survey:

- For a company to be effective on implementation innovation management systems it's suggested to incorporate innovation into the KPIs. It should be guided by strategy through its mission and vision. This strategy is then translated into a set of strategic objectives that determine the direction taken by each operational division. These strategic objectives are used to define its KPIs and thus align the organization in the right direction in relation to its Balanced Scorecards on both divisional level and organizational level. Thus, the company will be able to succeed because it does not identify innovation as an accessory but instead a part of a culture that will lead them to their desired targets.

- DEWA and other companies need to focus and be attention to fostering innovation culture through acknowledging and encouraging the employees about this concept. It has been noticed from the survey results that some employees do not appreciate this concept yet and see it unimportant. This is reflecting conflict within the organization that has innovation as a corporate practice.
- Also having a complete program like Afkari uses as tool for implementation of the innovative ideas is really helpful as it shows in the result that two thirds of the participants are satisfied. However, communication, and shortening the time taken to evaluate the ideas bedside creating more awareness and guidance for the program or procedures adapted are all need to considered and kept in mind.
- There are many types of innovation and factors that impact significantly the innovative opportunities, besides the challenges that discussed in the literature review. By considering all these aspects and adapt one of the suitable processes such as Funnel Framework, the organization will be on the right path to be successful in the implantation and thus benefits their businesses.
- It is important for an organization to align their innovation strategy with guidelines and objectives of global innovation index, national, and city in order to ensure continuously moving in the right direction to compete with the rest of the world and thus leads the economy and finding more investment opportunities.
- Suggested behaviors from the survey participants are great inputs that are important and might be considered to spread the culture of innovation in the organization besides other behaviors which have been measured and discussed in the survey results.

Future research should focus on how to ensure that the management within a given organization is capable of creating and maintaining the innovative corporate culture. This study did not dwell on the management practices at DEWA for long enough to explain the role of the management in the triumphs and shortcomings of the organization as related to innovation. It will be good to have studies that directly investigate managers and team leaders within innovative organizations so as to provide empirical evidence on the association between good management or leadership and the successful implementation of innovation as a culture in the organization.

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Appendix

APPENDIX A – INNOVATION SURVEY

Innovation Survey:

This survey is designed to apply best practices in innovation and to measure your awareness of innovation within DEWA. Please take a few minutes to complete this survey.

Job details

1. Managerial Category
 - Leadership Category (MD&CEO, EVPs, VPs)
 - Management Category (Grades 12 to 16)
 - Non-Supervisory Category (Grades 7 to 11)
 - Other Category (Grade 6 and below)

2. Nature of your work?
 - Administrative
 - Technical

3. Division:
 - General Management
 - Generation
 - Transmission
 - Distribution
 - Customer Services
 - Water & Civil
 - Business Support & Human Resources
 - Information Technology

Management support for innovation culture in DEWA

4. How satisfied are you with DEWA providing the financial resources needed to support the innovation environment?
 - Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied

5. How satisfied are you with the impact of innovation on improving DEWA performance?
 - Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied

6. How satisfied are you with providing innovation culture supportive of innovation within DEWA?
 - Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied

7. How satisfied are you with your Division encourages you to come up with new innovative initiatives?
 - Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied

8. How satisfied are you with DEWA in term of providing family culture?
 - Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied

9. How satisfied are you with DEWA as a success-driven organization?
 - Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied

10. How satisfied are you with DEWA generally as a low tolerance to failure organization?
 - Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied

- 11. How satisfied are you with DEWA giving more importance to results than processes?
 - Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied

Spreading a culture of innovation:

In your opinion, how important are the below innovation behaviors to foster a culture of innovation?

- 12. Accept failure as an essential aspect of learning
 - Unimportant at all - Unimportant - Average - Important - Very Important
- 13. Stay up to date on the latest developments in the field of innovation
 - Unimportant at all - Unimportant - Average - Important - Very Important
- 14. Share knowledge and collaborate within teams and across divisions
 - Unimportant at all - Unimportant - Average - Important - Very Important

In your opinion, how easy would it be for you to apply the following innovation behaviors on a regular basis?

- 15. Empower others to make decisions
 - Unimportant at all - Unimportant - Average - Important - Very Important
- 16. Take ownership of initiatives and be involved in their execution
 - Unimportant at all - Unimportant - Average - Important - Very Important
- 17. Allocate predefined time to innovation related activities
 - Unimportant at all - Unimportant - Average - Important - Very Important
- 18. Are there other behaviors that you believe important to spread a culture of innovation in DEWA?
(Please suggest)
.....
.....

DEWA Innovation Systems & Processes

Afkari Program

- 19. How satisfied are you with Afkari Program and its procedure?
 - Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied
- 20. How satisfied are you with Afkari transparency and ease of communication with other peers?
 - Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied
- 21. How satisfied are you with the Afkari rewarding system?
 - Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied

22. How satisfied are you with the time required to evaluate your idea?
- Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied
23. How satisfied are you with Afkari initiatives and campaigns to motivate you to come up with new ideas?
- Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied
24. How satisfied are you with the evaluation feedback you receive about your ideas in terms of comprehensiveness and clearness?
- Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied
25. Have you submitted an idea?
- Yes
- No
26. Please specify the reason of not submitting ideas:
- Not motivated to suggest an idea
- Not aware what to propose, I need guidance
- Lack of knowledge toward AFKARI system
- Other (please specify)

Innovation Department

27. How satisfied are you with the Innovation department facilitation and support?
- Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied
28. How satisfied are you with the Innovation department's activities workshops & awareness?
- Totally Dissatisfied - Dissatisfied - Average - Satisfied - Totally Satisfied