

**An Analysis of the Forces influencing the  
implementation of Artificial Intelligence in the  
Intellectual Property Sector in UAE**

تحليل القوى المؤثرة على تطبيق الذكاء الاصطناعي في قطاع الملكية الفكرية  
في دولة الإمارات العربية المتحدة

by

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of the requirements for the degree of  
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## **Abstract**

The study at hand considers the way in which the potential for the integration of Artificial Intelligence (AI) is increasing in the current paradigm of social and economic change. This paper will consider the various dimensions of this proposed move of automating government services as witnessed through the signing of Memorandum with the South Korean government who will help to facilitate this move. Thus, the core aim is to uncover the various ways in which AI integration into the Intellectual Property mechanisms in UAE can cause massive shifts in terms of intellectual property management and innovation in general. The research objectives sought to identify the forces that will drive or restrain the implementation of Artificial Intelligence in the Intellectual Property Sector.

This research used the force field analysis method to identify the forces using a questionnaire specifically for the users of IP services and relied on personal interviews with selected employees within the IP department. From the findings of the study, it is apparent that the integration of AI into IP management has the potential to improve efficiency of dealing with applications and improving the overall rapidity with which applications are processed, it also revealed cultural and traditional methods of management are seen as the restraining forces whereas the driving forces were the continued support from the government to include AI into the workplaces and aim of having a technological skilled employee. Thus, this study has the potential of revealing important factors that needed to be addressed before the implementation of AI in an organization. Moreover, the study will also consider the intricate possibilities that are apparent in case of developing and furthering innovation potential in the country, specifically through the various ways in which AI can enable easier and more systematic application processing.

## الملخص

تتناول الدراسة الحالية الطريقة التي تتزايد بها إمكانيات تكامل الذكاء الاصطناعي (AI) في النموذج الحالي للتغيير الاجتماعي والاقتصادي. ستظهر هذه الورقة في الأبعاد المختلفة لهذه الخطوة المقترحة لأتمتة الخدمات الحكومية كما شهدنا من خلال توقيع مذكرة مع حكومة كوريا الجنوبية التي ستساعد في تسهيل هذه الخطوة. وبالتالي، فإن الهدف الأساسي هو الكشف عن الطرق المختلفة التي يمكن أن يؤدي بها دمج الذكاء الاصطناعي في آليات الملكية الفكرية في الإمارات العربية المتحدة إلى تحولات هائلة من حيث إدارة الملكية الفكرية والابتكار بشكل عام. سعت أهداف البحث إلى تحديد القوى التي ستدفع أو تقيد تطبيق الذكاء الاصطناعي في قطاع الملكية الفكرية. استخدم هذا البحث طريقة تحليل مجال القوة لتحديد القوى باستخدام استبيان خاص لمستخدمي خدمات الملكية الفكرية واعتمد على المقابلات الشخصية مع موظفين مختارين داخل قسم الملكية الفكرية. من نتائج الدراسة، من الواضح أن دمج الذكاء الاصطناعي في إدارة الملكية الفكرية لديه القدرة على تحسين كفاءة التعامل مع التطبيقات وتحسين السرعة الكلية لمعالجة الطلبات، كما كشف عن طرق ثقافية وتقليدية للإدارة. كقوى تقيد بينما كانت القوى الدافعة هي الدعم المستمر من الحكومة لإدراج الذكاء الاصطناعي في أماكن العمل والهدف من وجود موظف ماهر تقنياً. وبالتالي، فإن هذه الدراسة لديها القدرة على الكشف عن العوامل المهمة التي يجب معالجتها قبل تنفيذ الذكاء الاصطناعي في المنظمة. علاوة على ذلك، ستظهر الدراسة أيضاً في الإمكانيات المعقدة التي تظهر في حالة تطوير إمكانيات الابتكار وتعزيزها في الدولة، وتحديدًا من خلال الطرق المختلفة التي يمكن من خلالها للذكاء الاصطناعي تمكين معالجة التطبيقات بطريقة أسهل وأكثر منهجية.

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## **CHAPTER I.**

### **1.1. Introduction**

Artificial Intelligence (AI) is a technological phenomenon that has been on a steady rise to become an important part of the way organizations around the world provide services for their users. In the United Arab Emirates (UAE), AI has been used to benefit the systems of many governmental sectors and this has been supported by the government through the advanced technological schemes and initiatives. Artificial Intelligence has been described as a science of technology that is able to perform human like tendencies. The tools and systems of AI have made many companies use it to automate their services in order to increase overall efficiency (Canhoto and Clear, 2020). Of recent, it has been evident that the UAE is focused on increasing the demand and use of AI in government sectors, in particular there is immense support for Dubai's target of being a smart city. In addition, UAE has partnered with other governments around the world to help implement A.I into the public sectors. However, its full acceptance within most government departments has been limiting, and we see despite various advancements some sectors are lagging behind. Among the departments that the study will focus on will be Intellectual Property (IP) sector in the Ministry of Economy. This department has the potential to benefit from the adaptation of AI and through this study the various implications of AI's implementation will be discussed.

This research was done to explore the factors that have to be addressed before the implementations of AI in the IP sector. There are several organizational aspects that needed to be correctly aligned so as to properly ensure that when such technologies are installed in the business operation that they will function smoothly without any interruption. Thus, this dissertation will address these factors as well as providing an in-depth analysis of challenges

2that government sectors may face if they use AI to supplement their work, also the literature will discuss the benefits and the risks involved when business adopt to AI technologies.

## **1.2. Background of the Study**

Dubai's Intellectual Property regime is a true "rags to riches" story, especially owing to the way in which the region, having considerable low potential for inventions and innovation in general, was able to establish a fundamental framework for becoming a centre of creation. According to Khoury (2009), the country of UAE has successfully been able to piece two crucial aspects of the IP management puzzle together, namely the regulatory framework for governing IP rights and a core infrastructural network needed to take strategic action. As a result, by getting these fundamentals rights, the Emirates such as Dubai and Abu Dhabi, have also been able to attract creators from all over the world through initiatives such as Dubai Media City (DMC) which guarantees inventors the ability to express themselves without having to lose out on their rights to the creations. Initiatives such as this, coupled with film festivals and the bustling event scene in the UAE, especially in emirates such as Dubai, Abu Dhabi and Sharjah, have helped the country accumulate considerable intellectual property capital and "human wealth" over the years.

With a powerful foundation already set up, and a potent brand pertaining to places like Dubai, the country is now looking towards more intrinsic aspects that can enable better management of the intellectual property capital that it has and continues to accumulate. This is where Artificial Intelligence among many other technological interventions go into force. Recently, during the assembly meeting of the members of the WIPO (World Intellectual Property Organisation), an MoU (Memorandum of Understanding) was signed between the Ministry of Economy in UAE (represented in sign and presence by Mohammed Al Shehhi) and the Korean Intellectual Property Office (signed and represented by Park Wonjoo). This MoU had one major agenda within its scope, which was essentially to embrace the use of AI technologies for

the purpose of enhancing and upgrading the governance and management of intellectual property protection measures such as copyrights, industrial designs, trademarks and patents ((Emirates News Agency, 2019). As follows, the fundamental nature of this study looks to speculate, analyse as well as extract information through sharing of knowledge with regards to how the current position of the management process of IP stands and level of technological intervention is currently experienced for both users and the employees in the IP department. The study also will be shedding light on the limitations and issues that could arise from the use of the artificial intelligence and associated technological measures in the IP process.

As far as the intellectual property administration of UAE is concerned, some of the core progresses include the integration of the Emirate into the membership council of the WIPO (World Intellectual Property Organization) as well as the WTO (World Trade Organization). Moreover, Dubai is a follower of the principles pertaining to intellectual property rights management put into force by the convention in Paris for the Protection of Industrial Property and numerous other conventions such as the Protection of Performers, Broadcasting Organizations and Producers of Phonograms which was held in Rome, Italy. The legal framework guaranteeing the security of patents, copyrights and trademarks in the UAE are also well developed and established, specifically by enactments such as the Federal Law Number 19 of 2002 as well as the Law Number 17 of 2002 pertaining to Patent and Industrial Design, among several others (Intellectual Properties Sector, 2020). It has been agreed and witnessed that the legal infrastructure of the UAE has been expanded in order to accommodate the new forms of innovations and the subsequent IP management processes that have emerged, these include the Federal Law Number 2 of 2006 which is specifically associated with protection from cyber-crime, along with Federal Law Number 1 of 2006 which is concerned with protection of commercial electronic transactions (Saleh, 2021). Therefore, it is imperative that

departments that are processing these legal approvals should be updated digitally to increase the efficiency process.

The evolution of the well-established intellectual property management framework that is associated with the UAE today is divisible into three distinct phases. The first of these phases, which unfolded immediately after the Trucial States gained independence and crystallized over the years until the mid-1990s, which was characterized by the lack of special laws that uniquely corresponded with intellectual property rights protection. Instead of having their own independent existence, the laws of intellectual property rights management were filled into the general principal of the moral and social laws that were derived from The Holy Quran and the Hadith. The protection offered by these divine laws were established in a way so as to safeguard and ensure proper commercial activity, focusing on the rights of the consumers, trader, local merchant, foreign merchant and the agents associated with the merchants. Al-Sharieh (2021), published a study on the rise of Intellectual Property Rights in the UAE, discusses how the fundamental feature of the laws at these times was the immense levels of foreign influence that were instrumental in their implementation and establishment.

The second phase of the evolution of the UAE with regards to its ability to ensure proper management of intellectual property came with the emergence of the World Trade Organization and with it, the TRIPS agreement (Trade-Related Aspects of Intellectual Property Rights). As a part of being introduced into the league of member nations under the WTO, UAE had to enforce numerous specific laws that were designed to uphold the rights of inventors and their products/services. This move to develop new and dedicated laws within the purview of intellectual property was a world-wide effort that resonated through the member nations, forcing the UAE to develop real Intellectual Property Rights measures that were until then only implied by existing legal structures. However, one important aspect of this particular era or phase is that the global rush towards better legal frameworks for intellectual property rights

protection was mainly initiated due to the needs and demands of a select few industrialized nations, which were at that time some of the most developed countries on the global map. (Dowle and El Turk, 2016)

Currently, the UAE is still in the process of adjusting to the new legal framework that was set up as a part of the ripples that emanated from the TRIPS agreement. At the same time, in the midst of this adjustment arose the third phase in the evolution of IPR management infrastructure in the region. The latest force moving UAE towards the future of intellectual property protection and management was ushered in through the free trade agreements that were established between the nations and other major industrial powers of the world. The free trade agreements signed by the UAE include those with nations such as Singapore, Australia, New Zealand, European Union, Uruguay, Turkey, India and Japan amongst others (WTO | United Arab Emirates – Trade Agreement 2018). The cumulative end result of the integration of UAE into such free trade agreements was the proliferation of new and much more stringent intellectual property rights rules and regulations. As a heavily expat-influenced territory, the UAE has had to craft and modify its legal infrastructure in order to include the preservation of the interests of respective nations when it comes to intellectual property, an aspect that was especially heightened due to the free trade agreements.

The UAE's dedication towards the adopting of technologies in AI in government entities across the UAE has been steady growth over the past years. According to the National AI Strategy 2031, the UAE aims to attract the talented to experience new technological and experiment with the secure and sophisticated hubs to solving complex problems (World Leaders in AI by 2031 - UAE National Program for Artificial Intelligence, 2020). In this report, the country has laid out plans on how they plan to develop AI solutions, build right conditions to allow these novel technologies to prosper in workplaces as well as allow communities to access these

digital solutions for better management of work. And so, we are witnessing how the country is determined that AI become a part of conduction of business and documentation process.

One of the main reasons behind why the UAE has grown into a powerful name in the intellectual property framework of the world is due to Dubai and its multi-layered approach to improving innovation potential. The first layer of Dubai multi-faceted approach towards developing an economic environment that is more conducive to IPR management and innovation in general, was the enactment of the Law Number 1 for the year 2000. This specific law advocated and provided for the implementation mechanisms required to bring into function and force the Electronic Commerce, Media Free Zone, and Dubai Technology. Under the umbrella of this particular legal framework, a research centre as well as a university was set up to further knowledge generation and management for the purpose of improving innovation and experimentation potential in the Emirate. The second layer of Dubai's stratified IP management framework came through the form of the DIFC (Dubai International Financial Center), which exists to this day with the focus of developing and maintaining an economic environment that upholds progress and constant evolution for the UAE and surrounding allied regions. The DIFC, along with the DIFX (Dubai International Financial Exchange), played the fundamental role of financial bodies that drew international attention towards Dubai and thereby, increased the involvement of foreign companies in the intellectual property market of the country. Some of the financial benefits that were established for foreign companies and individuals in an attempt to improve their participation in the IP market of Dubai included zero tax rates on profits as well as a relaxation on all major foreign exchange restrictions.

As international business involvement grew in Dubai, the Emirate became the site for R&D centres and innovation labs, nurtured under the guidance and investment potential of major multinational companies such as Microsoft. The third crucial phase of IP market development in Dubai was the establishment of DIC or Dubai Internet City. Two of the fundamental

incentives offered to international companies under the insulating business environment of the DIC include complete ownership of subsidiaries located here as well as complete tax exemptions. These incentives, along with the promise of enabling a vast physical presence across the country via the branded identity of DIC and Dubai in general, enticed several large MNCs such as IBM and Cisco Systems to set up shop at this new business environment. Other than attracting foreign companies to Dubai, the DIC also served to develop much-needed physical infrastructure for research and innovation, thereby bringing the potential and capabilities housed within large MNCs closer to local entrepreneurs and inventors. Hence, it has been seen those initiatives like the DIC have further bolstered local innovation rates due to accessibility to both capital as well as opportunities for intellectual property development.

The fourth and one of the most important aspects of the infrastructural capabilities of Dubai which have raised the IP potential of the region to new heights, is the Dubai Biotechnology and Research Park, also known as DuBiotech. This particular infrastructural establishment is hailed as being the first free zone business environment that caters mainly to businesses involved in the life science industry. The ease with which companies can integrate themselves into this business environment along with the various financial incentives that are offered to foreign bodies have resulted in a large number of commercial entities housing their subsidiaries in this free zone over the years. From nanotechnology and agri-tech to pharmaceutical companies and environmental technology-based entrepreneurs, DuBiotech has successfully attracted entrepreneurial ventures as well as MNCs which contain considerable opportunities for IP development and innovation capabilities. Along with Dubai Silicon Oasis and other R&D based infrastructural ventures, DuBiotech has become a fundamental force in enabling better rates of innovation in Dubai and thereby, strengthening the IP management mechanisms in the Emirate and the UAE in general.

Additionally, there has more initiatives to combine the usage of Artificial Intelligence and it is gaining prominence throughout the GCC region, and more focus with operations inside the government of Dubai (How can Artificial intelligence transform the healthcare sector in UAE, 2018). However, the benefits and risks of incorporating AI in these sensitive agencies such as IP has yet to be discovered even though the government has already put in place various commodities to support AI in increasing efficiency of work. For that, the purpose of this study will be the exploration the forces that will enable the application of these digital advancements.

Other than commercial innovation and IP development, Dubai has also made massive strides in terms of attracting creators and artists with regards to developing and maintaining copyright-based intellectual property within the Emirate. The core infrastructural establishment that has enabled an increased in-flow of copyright-based creations into the Emirate is embodied under the DMC or Dubai Media City. The core incentives offered to creators under the insulating business environment of DMC is encapsulated under the umbrella phrase “freedom to create”. DMC offers creators the chance to take new leaps within the media industry without compromising on the freedom to express, including being exempt from interference due to local customs and perspectives. Dubai Studio City or DSC is yet another infrastructural attempt to improve local and foreign involvement in innovation within the entertainment and arts industrial sectors. DSC houses some of the latest technologies and capabilities with regards to production of movies, TV shows, music and other such forms of entertainment. Notwithstanding the ready-to-use stage sets and high production value equipment that is available for use at DSC, the infrastructural zone is also house to academies that are dedicated towards research within the industry. And so, it is seen that Dubai have established itself as being a contender of research and innovation and are seeking to produce new content and improve potential for new creations rather than merely being a facilitator.

Some of the other entities in Dubai that have been established with the fundamental aim of improving the development and nurturing potential of intellectual property in the region include Dubai Knowledge Village and the Emirates Institute for Advanced Science and Technology. Both of these entities are specifically geared towards the development of human potential and improving local capabilities and functional abilities for creation, innovation and creative exploration of new commercial and artistic possibilities. The move to improve infrastructural facilities for human potential development and thereby, increase the number of creators and inventors in the region spreads beyond Dubai into other Emirates, especially the capital city of Abu Dhabi. In so doing, it becomes imperative that the process of attaining patents for ideas must be a smooth journey for innovators, thus as suggested by this study, with regards to UAE's vision of improving mechanisms inside government sectors through AI technology and the growing demand to patent ideas, it thus seems ideal to investigate the forces within the organization that would allow the incorporation of AI and in addition the benefits and risks that would be presented if departments were to transfer work to solely robots.

### **1.3. Significance of the Study**

This research will especially important as the UAE is encouraging its residents and foreigners to invest and get involved with innovations and already there has been many provisions created for organizations to implement their ideas both legal and in terms of infrastructures. As Khoury (2009) points out, Dubai and the UAE have successfully fulfilled the two core conditions that are required in order to transform and utilize intellectual property as a national asset. These two conditions include an effective regulatory system that allows for the holistic management of intellectual property rights and a vast infrastructural edifice that promotes innovation and creation within regional confines. Thus, it will be crucial for the UAE to focus then its efforts towards creating a well-organized path to support the creators' endeavors. Thus, the need for artificial intelligence in IP management signifies the next crucial step in the development of

the UAE as an intellectual property nurturing regime, especially within a global framework of IP laws that is constantly evolving and developing.

The need for such a study is extremely important owing to the fact that it is imminent that artificial intelligence will be introduced into IP management infrastructure; especially now that the Ministry of Economy has signed a Memorandum of Understanding with the South Korean IP management cells regarding the resolve to embrace AI as a part of IP governance. Moreover, as infrastructural capabilities improve and thereby, draw more inventions and companies towards the UAE in the search of developing and publishing their intellectual property, mechanisms such as AI seem especially prudent heading into the new information and knowledge age.

#### **1.4. Research Problem Statement**

There has been technological advancements in almost all sectors of the government and more business and government departments are using AI to increase efficiency . Furthermore, the UAE has put in place various legislatives and agreements to push the sector of innovations but a digital way of operating has not yet reached this sector. Currently, the Intellectual Property sector in Dubai, have not yet adapted to this digital way of processing applications and documentation for their users. This may decrease the protection measures for Intellectual Property, also hamper foreign business interest in the Emirates as well as lead to cumbersome efforts by employees during the processing of management of patent registration requests. The core problem statement that is addressed in this study is the possibility of what would happen if artificial intelligence is introduced into the realm of Intellectual Property management. Thus, this study will examine what forces that are present that are working towards the possible integration of AI and Machine Learning to the scope of work. Hence, the problem statement is used here will drive this research for the purpose of developing an understanding about what

is needed for the legislative and administrative environment to adapt to a merge of machine intelligence.

### **1.5. Research Aim and Objectives**

This research aims to investigate the management of the Intellectual Property process in the UAE, with a focus on how Artificial Intelligence can be integrated into the extensive application procedure and the various factors that will implicate this for both the applicants as well as employees processing the documents in the department of IP.

The fundamental objectives that will define the study at hand is as follows

1. Identify the forces that will drive the implementation of Artificial Intelligence to enhance the Intellectual Property process.
2. Identify the forces that may restrain the implementation of Artificial Intelligence during the Intellectual Property process.
3. To know how the employment of Artificial Intelligence will benefit in the process of Intellectual Property

### **1.6. Research Conceptual Framework**

The conceptual framework pertaining to research studies are defined by dependent and independent variables, the relationships between which form the “framework” upon which further conclusions and assumptions are built. In this case, the dependent variables would be the adaptation of artificial intelligence and all the other technological mediations to the process of management of Intellectual Property in the UAE. This dependent variables are those that will allow the researcher to measure and comprehend the inherent impacts of the independent variable, which essentially in this case are the forces that are present before can employ AI into the work scope.

Thus, for this study the independent variables that will be a part of the study are the elements that are will determine the efficiency of the management of the IP process. The activities that will be investigated pertaining to the tasks and job roles that IP management and governance including registration, licensing, patent request examination, approvals of patents in the department of IP in the Ministry of Economy.

## **CHAPTER II**

### **2.0. LITERATURE REVIEW**

The main aim of this research, is to examine the how artificial intelligence can be integrated in the Intellectual Property management process, and in addition to identifying the various factors and forces may affect its application. There are massive opportunities on how Artificial Intelligence has led to improvement of tasks of organizations globally. Artificial Intelligence is quickly growing to become an important trend for the business and sectors worldwide due to its ease and adaptability within any work organizations as well as its potential to evolve to suit the needs of its users (Russell et. al., 2016). The purpose of this research, is to discover what the current challenges and opportunities in the workplaces due to the adaptation of this automation in the UAE. For this, articles and scholarly papers will be analysed and reviewed critically in order to identify the main influences that will drive its adaptability in an organization. Through this study, the risks will also be discussed as well as other mediating factors such as support from the government of the UAE to push artificial intelligence usages across all sectors.

#### **2.1. Principles of Artificial Intelligence**

In order to understand the role of artificial intelligence in the IP management, one needs to first shed light upon the how artificial intelligence works and some its basic principles. Artificial Intelligence is the replication of processes interrelated with intelligence of humans and machine (Jarrahi, 2018). In addition, it can be defined as a technology and science that involves machine learning (Fetzer, 2012). Basically, AI are computers or machines that are stimulated to imitate intelligence of humans through reasoning, acting processes and process of distinguishing. The author Rouse (2019), discussed how robot usage can be designed to do a particular task without

the help of human intervention, she cited the Siri in Apple devices as a perfect example of how AI works in our modern present lives.

The history of AI, show us that it began with the questions on whether computers can think. Several experiments done in the 1950s, where the pioneer of AI, Alan Turing who wanted to discover if computers had intelligence and what could be implications of that. The results of these experiments showed that the computer indeed had some ability of intelligence (Guo, 2015). But the authors Luger & Chakrabarti (2017) agreed that, since the computer was able to distinguish some key responses and answer correctly to the questions posed at it, then surely it can possess some intelligence. Nonetheless, several decades later, there was a growing interest among engineers to build and code computers that are able to complete job assigned to them. However, there were challenges due to the nature of AI being that they are unable to conduct any extra tasks as their coding dictates their abilities (Ramalho, Souza and Freitas, 2020). This led to discussions on the need for computers to possess intrinsic coding for them to perform almost like humans but unfortunately their lack of emotional intelligence proves their inability to distinguish between fiction and facts (Gross, 2017)

Nevertheless, AI has grown and number of developments of the types of devices that are able to assist humans has grown exponentially. There have been different kinds of devices that have helped organizations in increasing its efficiency for their tasks. There have been remarkable ways in which through AI has been used to for extensive analysis according to the needs of the users. The term machine learning is used in conjunction with AI, and this has been what has opened the journey of AI in recent to become more developed. (Ghahramani, 2015). The growing demand of developing a more sustainable growth in industries, have led to multitude of research and investments towards technologies such as AI all over the world. In business organizations, there has been better understanding of what their customers' needs are as

companies have employed the use of AI to see trends of their behaviours and make analysis of their transactions.

## **2.2. Adoption of Artificial Intelligence in Business Sectors**

More recent attention has focused on how implementing AI in business may result in clearer organisation plan and development of strategic information that would influence decisions inside the company. Moreover, there has been an increase in companies that directs tasks such as speech recognition, visual acknowledgment, as well as touch identification to AI devices (Lichtenthaler, 2018). Thus, AI are used in industries to make tasks more automated and especially in repetitive and somewhat complex tasks. As a result, more companies are investing in modern technologies and structures to advance the workplaces in order to adapt AI. Therefore, business must assess their current status to ensure that this advanced technology can be effectively implemented so that they can boost their efficiency. Furthermore, to supplement the change in technology Bughin et al., (2017), reiterated the importance of employees to have certain skill set and engage in awareness of how AI builds efficiency inside the workplace. An efficient work structure thus must ensure all the elements are set in place so that process may run smoothly.

Regionally, we can discuss how UAE is already on its mission of growing their AI technologies and providing solutions in almost all sectors of the economy. Not only have they developed a strategy on AI, UAE is the pioneer country in the world to designate a government minister specifically for Artificial Intelligence, thus signifying its keenness of developing initiatives of AI into mainstream trade (O'Hagan, 2020). In most sectors of the government, they are continuing to advance their work by implementing the UAE AI Strategy especially in areas where the consumers are many and the task is complex. The strategic objectives include creating efficient solutions, create new marketplace that will boost the country's infrastructure

all leading to overall increase of performances for business in the UAE. (UAE Government Portal, 2017).

Currently, the UAE has embarked on several projects to prove that this type of technology is ready for its users one of which is the Dubai Metro. Authors Abbas, Zhang, & Khan (2014), reasoned the way Dubai is preparing to develop into a smart city is to start with having a complete overhaul of their government services, with the first target being the transportation industry through the inception of a train run by artificial intelligence. Another case, within the transportation sector where AI has started operation is on traffic systems, where AI technology is used for prediction of flow of traffic, drivers who have misbehaving on the road as well thus reducing the number of traffic accidents and misdemeanours (Tesorero, 2017).

The evidence seen here is that ambitious drive for the UAE to robotize services especially in the government sector, and likewise there is a strong support in concern of the development infrastructures and using AI to increase efficiency. Which brings us to our topic of discussions on what forces would be needed to be addressed before the Intellectual Property Sector in the Ministry of Economy are able to begin to adapt to AI in assisting in the patent, copyright and trademark procedures.

### **2.3. Perceptions of the use of AI in Intellectual Property Processes.**

On examining and summarising the vast reservoir of literature, represented by the numerous scholarly articles that have been written on intellectual property, the definition of this phrase is divisible into two core categories or concept. The first of these categories is to approach the definition of IP as a business asset, while the other essentially views IP as a legal one. The perspective is adopted by different people and levels of management within an organization as well as national frameworks of structure and function. Thus, when used as a business assets it

tends to be used to increase competitiveness and increase efficiency on the other hand when used legal terms, it is driven with the need to protect ideas from being imitated.

On further analysis, it can be decided that the essence of IP is intangible and is mainly composed of a set of rights rather than any tangible material substance. Owing to the nature of IP, this form of asset falls into the category of intellectual capital, which in recent years has become more important than ever within the corporate landscape. To understand the sheer significance of intellectual capital and intangible assets has for the future of organizations, a crucial study to consider is the one conducted by researchers of the Brookings Institution through the Compustat Database of firms (Blair & Wallman, 2001). In this study, several companies were analysed with respect to the ratio of intangible and tangible assets were analysis with a span of 30 years. It was revealed that at the beginning, 80% of their assets were tangible whilst intangible consisted of 20 %. After a period of 10 more years, during 1998, the same study found that the ratio and relative importance of different types of assets had become even more skewed. Surprisingly, modern firms were shown to attribute an overwhelming 70% of their intrinsic market value to intangible assets while only the mere remaining 30% was associated with tangible assets (Blair & Wallman, 2001). Thus, this tells us that more businesses have understood the value of intangible technology such as AI into their companies and that they are quickly moving toward technology to add value to their services. As a result, there is a necessary demand to have proper IP working structures to facilitate organizations and inventors in processing their ideas and with the aid of AI. Which brings to the light the objective of the study to investigate influences that will expediate AI application.

In 2020, researchers at The Dennemeyer Group performed a series of extensive surveys known as IP Trend Monitor. This IP Trend Monitor survey is an annual research done to investigate topics that are currently relevant within the IP management. This survey is done on 400 members from the panel of IP Trend Monitor who range from professionals working in the IP

sector such as consultants, lawyers to scientists and actual innovators, also included views from employees working in IP related offices. Below are some of the key responses in relation to what could be expected on the use of AI in the IP practice, and what the tools and automation can mean for the work and its users.

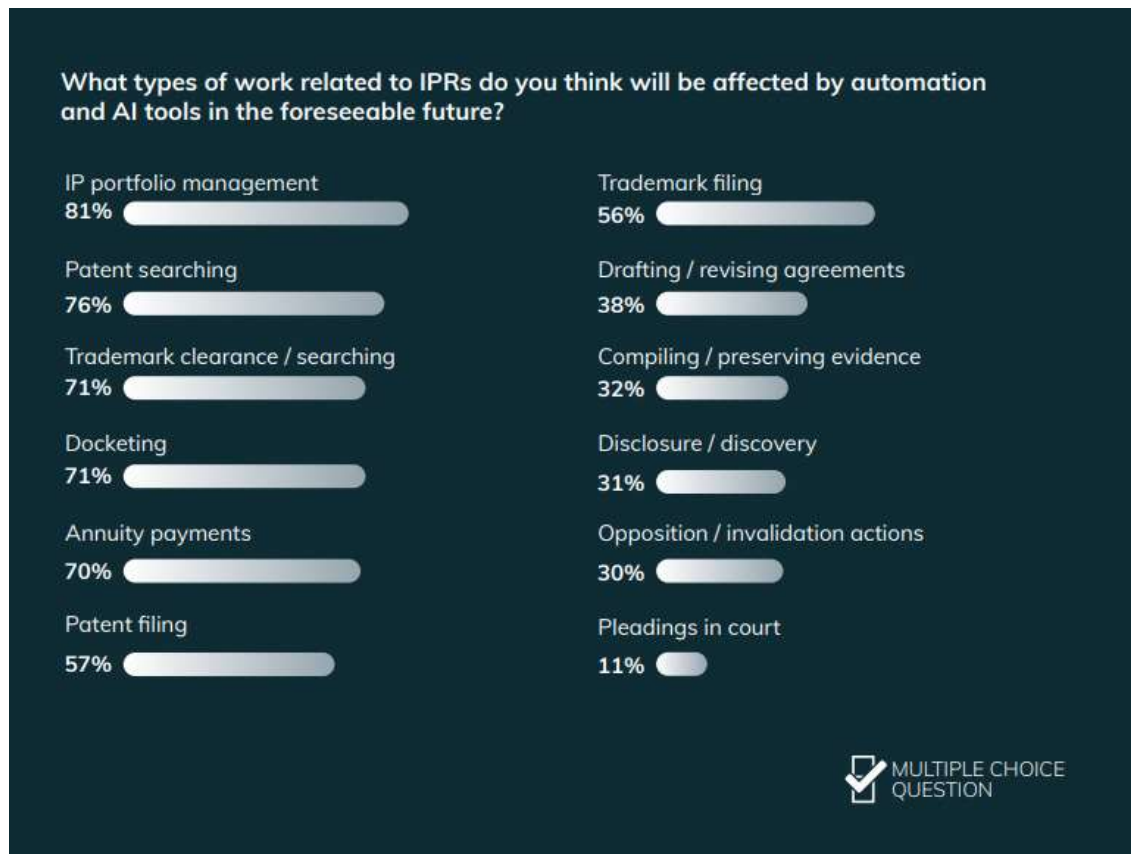


Figure 1: Survey Results The Trend Monitor 2020

(The Dennemeyer Group, 2021)

According the expert analysis at The Dennemeyer Group, this year's results as shown on The Figure 1 overall has suggested that AI tools and automation will soon play a bigger role for these kinds of work, or rather it is expected that this change is imminent and likely in the foreseeable future. When compared to the previous study done in 2019, the analyst concluded that there has been positive increase when the same question was posed last year. Another interesting observation that the analysts discovered from on the responses from the participants

from the management section versus the participants from the legal team informs us some significant differences, such that more of the IP legal practitioners believed IP process will affect their work due to automation (The Dennemeyer Group, 2021). With regards to IP works involving drafting, revising and patent search, most responders who ticked this as having high influence and effect were mostly from management level.

The support for these findings were consistent when the Team asked the second question that pertained to AI and automation and its impact to business. The expert analysis also established that the overall response from all practitioners were in agreeableness that AI will impact their jobs. There were strong suggestions that most responders felt that automation will have an impact most significantly on their IP work. (The Dennemeyer Group, 2021). When asked if the implications of having IP process become automated would mean that lawyers will have to develop new skills, a majority agreed to that/. On the question if the automation will impact customers interactions, more than half respondent held this opinion. Then, almost half of the survey participants said that business will have to hire more automation and IT specialist to support AI systems in workplaces.

In another important study on AI and its role in the intellectual property field, was conducted by Nurton in 2019. Here, participants were also asked to consider how AI tools may improve efficiency, this led to the IP work and tasks being divided into three core areas within the field of intellectual property on the basis of how they were influenced by these technological innervations into the system of corporations (Nurton, 2019). This study asked participants to define areas of work that were highly unlikely to be affected by technological interventions, somewhat likely to be affected, and very likely in terms of vulnerability to change. Out of these, management of IP portfolio was considered to be a core area that was bound to become automated and eventually improved through AI and ML by a majority of the respondents, making up about 77% of the sample population. This result shows us that most people believe

in the future of AI and thus it is important for us to conduct a study on the forces and risks that can be existing before implementation of AI in the IPR process here in the UAE and what could the resulting benefits and risks associated due to these changes.

#### **2.4. Usage of AI in the IP management process.**

As recent significance literature shows, more companies around the world have started to see the importance of integrating AI in the workplaces. The advancements have changed the flow of organizational environment as well work tasks and as a result led to more production from workers. According to There are four major categories in which artificial intelligence has been utilized for the purpose of IPR management and intellectual property analytics in general. The four major avenues in this case are associated with the management of knowledge, the management of technology, the management/interpretation of value, and the extraction and management of information. All these categories are the same with the four core features of IPR management when it comes to official procedures within the workplace. Due to the inability to manipulate technology for suit the needs of users and organizational purposes, companies may face a definitive gap in competitive edge within the corporate world of today (Alavi & Leidner, 2001). Therefore, in order to solve and mitigate this issue, researchers and developers such as Trappey et al (2006) have developed AI-based systems that allow firms to manage and safeguard documents based on the degree of value that they hold when it comes to contribution to the efficiency of an organization. The authors suggested the development of a neural network-based system that allows organizations to take control of patent management in a seamless, automated and intelligent manner.

Another method that Trappy et. al. (2006) describes on how AI can be used to assess the quality of patents on the basis of the application documents, which are screened by neural networks for the purpose of outlining the degree of innovation within them. Another adaptation of AI in

the intellectual property process, will make use of algorithm also has the capability of finding or enabling organizations to discover trends as far as internal as well as external innovation in fields of choice or importance.

Another innovative method of adapting artificial intelligence in the IP management process was outlined by the work of Wu et al (2016). The core focus of their work was the development and implementation of an artificial intelligence model that would be used to classify patents automatically on the basis of the analysis of their quality. The model in this case was built using a combination of support vector machine model as well as other neural network learning models. Authors like Hido, et al. (2012) have also focused on combining artificial intelligence models with other techniques, such as text mining, in order to develop patentability scores that measures the chances of approval of a specific invention.

When it comes to selecting inventions relating to the degree of innovation potential present within them, for both in an organizational as well as regional perspective, the importance of taking into consideration current technological trends cannot be underestimated. The approval of patents has, in essence, a direct correlation with the overall level of contribution that it provides to the overall pace of technological growth and innovation within a country. Especially here in the UAE, where they are determined to transform their technological capabilities through various initiatives and strategies. The IP sector in the Ministry of Economy may be more likely to approve patents that provides a path-breaking and unique way of expanding existing technologies and solving the issues that older technological models currently in operation. This particular statement is based off of the work of authors such as Coccia (2019), who refer to the degree to which a patent-awaiting technology leeches off of and converts existing technological capabilities, thereby setting the pace of technological development in general amongst users of the latter, as technological parasitism.

Authors like Kayal (1999) further expand upon the relationship between intellectual property and technological evolution on a national level through the conceptual framework of “prior art”. According to the author, “prior art”, a term that was initially associated with the fundamental selection process of the US Patent and Trademark Office, is defined by the references and citations that are utilized within the patent document of a new invention. If the citations/references, which in most cases tend to be previous inventions and patents themselves, are considerably old, the pace of the technological evolution that is set by the current technological innovation is slow as compared to another patent that might be using fairly new and novel references/citations. The simple fundamental principle that is at work here is that the patent document that contains old references is building upon or shifting the paradigm that has been established by old technology. This change in turn is a slow one, owing to the fact that it parasitizes and feeds off of functional and structural perceptions and utilities which are defined by long term technological trends. On the other hand, a patent document that utilizes new and recent references or sources is one which is looking to instil change in a recently established technological trend, thereby setting a fast-paced rate of technological innovation.

In line with the “prior art” concept, several researchers and developers have worked on artificial intelligence models that allows for the placing of patent-awaiting concepts within the wider scope of technological development in a country or industry. One such example is that of the work of Kim & Lee (2017), in which a framework for the citation-analysis of patents was developed using neural networks. The artificial intelligence model proposed within the developmental framework put forth by these authors was able to work on the aspect of technological convergence, which enables patents to be analysed from the perspective of potential technological combinations. Another author, Jun (2016), combined patent citation analysis with support vector machine learning model for neural networks to find connections between patent documents and previous technologies, thereby outlining clusters within the

scope of technological development in an industry. Yet another prominent example of the use of artificial intelligence and patent-citation analysis is a study conducted by Kyebambe et al (2017), in which citation data of various patents was labelled in accordance to the purpose of forecasting emerging trends in technological innovation. Prior art and technological parasitize is not only restricted to patent citation analysis as is evident in the works of researchers like Choi et al (2015), where artificial intelligence models for patent analysis also include social network analysis as a fundamental means of outlining core trends in technological development. Jun & Park (2013) also utilized social network analysis as a crucial step in their artificial intelligence model associated with finding emerging technological clusters within the future growth scope of Apple. Hence, the above examples and uses reveals and proves to be a versatile solution, which understandably tells us why the UAE government services wants to incorporate automation in the near future.

Along with the ability to outline major technological trends and compare it to newly submitted patent documents, thereby aligning IPR management with overall technological development rates, artificial intelligence models also provide the powerful capability to forecast trends. Both the concept of technological parasitism as well as that of “prior art” are key to understanding the linkage between a specific patent document and the overarching technological trends defined by the nation’s economic progress (Fagerberg & Verspagen, 2002). Hence, considering the impact of a specific patent-awaiting technology on the overall technological innovation and progress levels as well as rate on both national and organizational platforms are extremely important when it comes to the approval process.

Patent retrieval is a fundamental part of the process of approval and IPR management in general, whereby individuals tasked with the responsibility have to recognize, interpret and take furtive decisions regarding the fate of each patent request on the basis of specific parameters. In order to allow for more efficiency and increased seamlessness with regards to

such a task within the IPR management process, Vrochidis et al (2012) developed an artificial intelligence mediated approach through which core concepts can be extracted from patent documents, specifically focused on elaborating upon the patent image content, so as to enable easier patent retrieval and classification.

A similar study was conducted by Riedl et al (2016), in which a combination of text and image analysis methods were used through neural network models for identification and extraction of graphic figures from patent documents. Another form of classification based on the information contained within patent documents was on the level of technological area of innovation, which was achieved using an artificial intelligence model that was developed by Venugopalan & Rai (2015), who utilized a support vector machine learning model to automate this form of classification. Similar to the visual output of map-like schematic summaries of technological trends achieved by certain authors mentioned in the previous section, Wu & Yao (2012) proposed an artificial intelligence framework that would provide a visual classification mechanism for patent documents. This framework, based on neural network learning frameworks, would classify patents on the basis of keywords used in the patent documents, the density or weight of keywords (also known as keyword frequency), and other such parameters. The classification would be represented in the form of a sophisticated visual network that would make it easy and simple for patent retrieval, patent clustering and also analysis/interpretation in general.

Researchers have also pushed the envelope with regards to the possibility that such a technological framework offers, by focusing on analysing disputed patents in order to find associations and patterns of connections with regards to litigations between such patents. The method utilized during this study was known as the modified formal concept analysis, utilized by Trappey & Trappey (2017) in order to analyse legal battles pertaining to patents within the 4G telecommunications industry. Companies and governments must be aware of growing

competition due to digitization and the quick changes of tools and technology of Artificial Intelligence and therefore must invest in their developments in order to reap its full benefits in organizations.

## **2.5. Advantages and benefits of Using AI in the IP process.**

A considerable amount of literature has been published on how implementing AI can lead to great developments within economy and government sectors. Authors Bharathy & McShane (2014), concluded in their study that a significant number of businesses profited and grew because of automating their services. These positive contributions are as a result of the nature of AI to allow tasks to be administered more smoothly, improve the networking and communication processes and thus increasing overall efficiency (Mok et al. (2014). The clear advancement of Artificial Intelligence in this scope for the improvement of processes and efficiency in almost all industries and the IP sector in the UAE is no exception. As was previously stated from the literature it is evident that they are on the road of structuring their organization in readiness for its implementation. Thus, the goal of this study is to examine the forces and the magnitude of benefits will also be addressed.

### **2.5.1. Reduce Error**

Previously, when the inception of AI was introduced to organizations, there was some initial errors received on the side of the AI machine. A study conducted on the number of times there were errors on the tasks done by newly automated agents, those that were in default though only contributed to 30% of the process and as the study maintained was due partly because it was a new innovation (Brynjolfsson et al. 2017). However, the error in results were significantly reduced in the same report, to 5% after the machine underwent more coding and improvement, to show that although the beginning stage of implementation was unstable, the AI machines went ahead to produce better results. Effectiveness in AI is mostly high when there is

automation of manually-intensive jobs that have been suffering extremely due to human errors. Thus, most complex tasks involving cognitive capacity, as well as searching and watching for results types of jobs will be easier to adapt to automation.

From the view of the process of intellectual property, tasks such as researching for trademarks can benefit greatly due to AI. As this is a type of work that receives the most errors. But as advised by Ronda Majure, a leading IP analyst, that AI itself is risky, but companies must make sure to supplement the automation with skilled workers who will work closely with the systems in case of errors. This, she added will not only produce error free task but will increase the knowledge of employees. And so, such contingencies such as human error within the organizations can be mitigated through AI implementation (Majure, 2017).

### **2.5.2. Work efficiency**

The integration of AI technology, in the form of artificial neural networks, machine learning, and deep learning techniques, has been successful to such an extent within the space of intellectual property management that there are new subjects emerging pertaining to the same. Authors like Brenner (2019) has explored the possibility of using artificial intelligence, specifically machine learning based aspects such as neural networks, to make fundamental decisions that have organization-wide implications, thereby cementing the possibility that such inventions could impact many judgment-based tasks that IP management is integrated with. Thus, this technology in neural networking has the ability to change the scope of trademark work, as it is designed to work in almost the same way brain of humans and through algorithms and coding it works to use huge amount of data to perform accurate tasks. Similarly, this type of technology is used to minimize risks involved with missing important factors pertaining to trademark brand names, slogans and logos. (Majure,2017).

One of the advantages highlighted by AI analyst is the strength of its ability to repeat findings based on matching inputs. This is due to the nature of AI in that strict coding must be followed in other words their algorithms dictate their performances and such human work variables such as physical exhaustion and inexperience will not hinder the Ai's performance. However, these benefits as explained by J. Carroll and Caixeiro, (2019), are only effective and successful as the basic data and algorithm that was designed and input in the foundation. Even now, AI systems from the modern era are having the ability to incorporate machine learning, which is an extension of AI, to improve tasks in the IP process. For instance, in the trademark process organization like WIPO and EU IPO have claimed to designed AI backed agents where they are searching for elements in documents will be more efficient using image search which is more sophisticated as this type of searching is seen as more useful. In addition, used in the registration and clearance process in IP has the ability to reduce costs and increase accuracy (Jennings, Neil and Patel, 2020)

### **2.5.3. Trademark Examination**

Another possible benefit of AI algorithm functions, examination in trade mark can be accelerate due to this automation process. Not only would it result in the reduction of time used, other significant positive features would be efficiency and decrease in costs, thus will produce a more consistence response to decisions. Especially, for a complex work process in the Intellectual Property filed, AI has been used to store and collect evidence for the utilization of trade marks in cases where the rights of the innovation need to be imposed and other legal course of action. The legal branch of IP would greatly benefit this as it would ease their work load and as well as examination of these trade mark would diminish its complexity.

#### **2.5.4. Patents Processing**

One of the key areas that the technology of AI has been used successful and efficiently is during searching for patents. For instance, patent searching is tedious job that requires thorough dedication to analyse the validity of the documents. Searching for similarities between newly filled patents and ones already in the database and in addition to identification of possible infringements on patents can all transform the IP process to a less intricate one. Fortunately, solutions using AI has allowed the easier perusal of extensive data to easily done in more rapidly and accurately. Other advanced solutions in some cases may use natural language search tools with which the AI is able to interpret the message and produce the commanded task. This model of AI agent was used in the US, and proved to be successful for both practitioners and owners. The natural language process automation was used a step further to transfer legal papers such as patent claims to patent application. This is a type of benefit that most IP department are looking to employ to allow the costs to decrease and increase competency.

#### **2.5.5. Smart Contracts**

The advent of AI has even further made the IP, with organizations revolutionizing how legal contracts can be do made. These contracts which are computer coded are known as smart contract use the blockchain technology which is a part of the AI system and used to transferring of IP assets. This has the great impact of contributing significancy to the productivity of IP management process. The basic function of this smart contract as described by Omohundro (2014) the contract terms would be coded, such that the legal transfer of the IP assets would only be change ownership if the specific criteria is matched. AI has the capacity to interact with this contract to for data analysis of the specific clauses in the IP contract, then using the blockchain technology due to its security elements due safely change ownerships of the

trademarks Omohundro (2014). This kind business execution and transfer has the consequence to reform legal aspects of IP and ultimately will benefit the IP practise.

In summary, through the discussion, it is evident that employment of AI and automation in the intellectual property process has the potential to benefit organizations by improving efficiency. As seen, levels of errors decreased significantly as well as work efficiency especially when dealing with searching and retrieval of data. With regards to trademark examinations, AI has been established as effective solution to increase its accuracy through easier documentation retrieval. The usage of natural language search tool for processing patents as well as creating smart contracts have the ability transform IP processes.

## **2.6. Challenges and Risks of Implementing AI in the IP Process.**

The focus of this study is to analyse the perceived factors in the Intellectual Property Sector in relation to possible integration of AI. Thus, it is critical that there should be light shed on the risks involved by having AI in organizations and so to better understand various parts that may be impacted due to the automation. It is important that organizations know how new technological implementations poses risks, and thus risk analysis must be measured. As the authors Wu et al. (2013) advised through their research on business and technology, that companies must have apt knowledge of the technological advancements that they would like to adapt to as these rapid changes can carry great risks on the process of organizations.

But then again, for business to retain their customers and increase efficiency they must be dedicated in modernizing and invest in growth in technology, which in this context it is AI. There have been studies published on how companies now are relating AI implementation into their risk management strategies. In his book titled, 'Project Management: A Systems Approach to Planning, Scheduling, and Controlling', the author Dr. Kerzner talked about the importance of understanding how incorporating technological advances such as AI can have

on an organization. In his book, he addresses key risks observed during such transformation, including, sudden change of technology, employees will lack the technological knowledge, risks in relation with security and privacy, risks with data management and maintaining. That's why, it is crucial that businesses must develop effective strategies to minimise and management the risk (Kerzner, 2001).

There is a growing concern from employees all across the business sectors of the thought that computers and robots will soon take over humans in the workplace. There are questions on the future of work, and also the demand and supply of human labour and in addition to whether companies will build robots to do tasks that normally humans would do for a fee. Various studies done by Karoly and Panis, 2004; Autor et al., 2000; Acemoglu and Restrepo, 2017) all have been enquiring and questioning the future of work if automation and AI get immersed into the systems. Autor et al., (2000) reasoned that employees and organizations must be aware that the future of AI will not look like ATM machines rather systems will be built that will rely on previous data and are able to share tasks and will be more efficient than human input, bringing to the risk of dominance and preference in the future labour market.

With this in mind, one must look for risks involved if jobs becoming susceptible to automation. A study done by Frey and Osborne (2013), attempted to discover which types of jobs were at most risk of being redundant in today's age of technology. Detailed examination of susceptibility of jobs to AI by the authors showed that there are several job characteristics that would determine the high risk of it being replaced by robots. They concluded that social and creative intelligence, manipulation, and perception will determine if the job can be easily done by AI agents. The study revealed that 47% of jobs are in dire situation and highly likely to be deemed redundant. This figure shows us how a significantly high number of occupations will no longer exists in the near future. However, a report done by Arntz, Gregory, and Zierahn, in 2016 for the OECD (Organisation for Economic Co-operation and Development), challenged

the previous study conclusion. The authors reasoned that it is actually the tasks itself inside the job that will be subjected to expiration and rather not the jobs of people as they argued, the future of work will combine both human tasks as well as automation.

The discussion of risks also has brought to it the concept of security and privacy the realm of IP management. For companies that would further use Artificial Intelligence for security this could further the risks involved especially since IP is also forms a part of the legal component due to protection of ideas. (Osoba and Welser, 2017). Especially, in the such a critical department like Intellectual Property where national secrets and game changing ideas are scrambling to be locked and protected, there is a risk of data being maliciously stolen. In 2018, a study done by 26 researchers from different industries, produced an alarming report if the dangers and potential risks due to use of Artificial Intelligence of the privacy and security of the business. Some of the potential digital security that could be threatened was usage of face recognition technologies, surveillance and also manipulation of data to steal ideas and data. (Brundage et al., 2018)

Hence, it could be concluded that, there is needs to be calculated risks taken and through analysis as well as mitigation strategies done before organizations begin implementing AI. In addition, failure to manage the risks from the business stance will result in unsystematic organization procedures. Through the literature, the various risks involved can be mitigated with proper planning, training and adjustments of tasks and roles of the employees affected.

## **2.7. Summary**

The purpose of this study is to analyse potential opportunities and threats of implementing Artificial Intelligence in the workplaces of Intellectual Property. The literature review presented has revealed how this technology has grown exponentially in the past decade to become a more potentially acceptable form of services. It was evident that several key studies have shown how AI increased efficiency and now is soon becoming widespread in most business sectors including the UAE where there has been some trial of automation of services. However, even though there is also been growing evidence that the UAE especially how the city of Dubai has been preparing itself to incorporate AI in government services, there is still room for support of this advanced technology. The focus of this case study was with regards to intellectual property in UAE and its benefits of AI services and what risks could be involved if this sector decides to automate their services. On one hand, the key findings showed several ways that AI can be used to facilitate services of intellectual property, and how employees globally have positive belief of its contributions. However, as discussed demonstrated in the literature review there are still potential risks with involving AI such as loss of jobs and security reasons. The studies analysed portrayed that AI may be still perceived as a phenomenon as new and may not accept it. Therefore, this study aims to investigate the view here in the UAE in particular focus on the intellectual property department in the Ministry of Education and adaptation of AI in their business services.

## **CHAPTER III**

### **3.0. Methodology**

In any research, the methodology formulation is a central aspect of all scholarly papers, the methods that will be implemented during this process will be in alignment with the research objectives as well as be used to answer the research questions. In essence, Kothari (2004) acknowledged that this part of the research forms the framework through which data will be collected and subsequently analysed through which a suitable conclusion and possible answers will be derived. In accordance with this mode of research a Force Field Analysis will be systematically used to understand current distribution of forces in this research. This type of analysis will be administered as the driving methodology to recognize AI changes in an organization and influencing factors that enable the change. Driving forces has been described as those factors that push for change and they initiate the process of reform in an organization (Bozak, 2003). On the other hand, MacDuffie and DePoy (2004), defined restraining force those constraints inside an organization that influence behaviours. Therefore, both quantitative as well as qualitative methodologies will aide in the research, where a questionnaire can be used to rate the services received and understand the influential drivers of change and a follow-up interview question will be conducted to understand the factors that influence technology acceptance.

#### **3.1. Research Design – Force Field Analysis**

Bell, Bryman and Harley (2015), described research design or method as compromising of various related factors that build up to a layered structure that is used to efficiency in conduction of the study as well allowing more reliable results. This methodology model known as Force Field Analysis comes from author Kurt Lewin's observations about how commercial entities evolve and thrive in the ever-changing corporate landscape (Lewin, 1951). The tool of Force

Field Analysis, is simply a graph representation of the opposing and favoured forces that influence the development of an organizational goal (Hoffherr, Moran and Nadler, 1994). According to Lewis, the social systems in an organization exist due to the equilibrium that is held from the balance of the restraining and driving force, but these forces can then again be influenced and pushed towards a new equilibrium. (Lewin, 1951). For this study, the equilibrium would therefore be the current status of management and processes in the business organization. Thus, to lead to change, organizations must strengthen the driving forces or weaken the restraining forces which will eventually promote development and efficiency in a business.

The justification for using Force Field Analysis for this study will facilitate in identifying problems and strategy ideas for change. Also, the potential or its benefits can be assessed, in addition the factors that resisting change can be concluded through this analysis. More importantly, for this study which involves implementation of a new concept, it is a valuable approach in deciding strategic plans to promote innovation and creativity for efficiency. (Hoffherr & Moran, 1994). The key steps take for this research analysis would be through five steps, through this it enables the researcher to identify and describe forces that are influencing the current state of management process from the view of the users of their business services and from the perceptions of the employees.

### **3.1.1. Phase 1 – Identify the Core Change to be Initiated**

The initial step needed for a good force field analysis is the identification part, where all the relevant elements that form the research are selected. As the author Dubey (2017) states, for an effective force field analysis, there needs to be string comprehension of what is in the field, this phase of the process is critical as therefore there needs to be thorough analysis of relevant perceived elements in order to result in sufficient information for the formulation of the

research tools. Burnes and Cooke (2013), further advised that this planning stage needs refined and detailed enough but cautioned against simplifying it. This planning stage as theorized by Lewin's three stage process, supports the objective of the study and helps to understand of the scope of the study (Lewin, 1951). From the exploration of the literature review, perceived broad elements are derived from prior studies on the subject matter, this can then be used build upon the questions in the research tools that will be used to identify the specific various forces. After this step, the boundary conditions are mapped out and key perceived factors are categorized terms of relevancy to the research questions. For instance, organizational structure, human resources, technology or skills are some examples of key factors found in business.

### **3.1.2 Phase 2 – Identify Driving Forces for Change**

The suggestion for this Force Field Analysis is to employ a mixed method where for the qualitative design involves personal interview of key employees within the organization and a qualitative research involving a questionnaire. The approach for a Force Field Analysis identifies a blend of both qualitative and quantitative data is important for analysing data, Crotty (1998) further suggested using objective and subjective data from an individual's experience is key in meaning of participant's views.

Following, the mapping out of the various perceived elements of change using the evidence from the literature review, the next step would be to design a research tool that would be used on the sampled participants. After the understanding of the relations and interrelatedness of factors from the literature, the next step in any force field analysis will be the most commonly used practice of classification of forces into contrasting groups (Lewin, 1951).

However, a challenge is to be able to fully classify all the present forces in a field as clearly belonging to one of the two categories. There can be some forces in any conflict that are neither for change nor resisting it, but are in the force field and can influence the situation. When such

mapping of forces is completed, the change agents can better see the current distribution of forces in the current field and can plan the change better.

The essence of this study is to identify forces that will aid change in the organizations. One of the purpose of this study is to identify the driving forces for change, which will be identified via a questionnaire. Under Lewin's model, for any changes to happen, the forces driving the change must be more than the forces against change, if not then there is a risk of the potential harm from the change (Cronshaw & McCulloch, 2008).

In accordance to the framework for Force Field Analysis, a questionnaire is formulated and distributed to the chosen respondents after which information is combined and identification of data is carried out. This type of quantitative methods involves the collection of numerical data or quantifiable data that would then be put through statistical analysis to obtain meaning. Accordingly, this research is administered through the usage of surveys, or other numerical sources of data. Neuman (2013), confirmed that only values in numbers can be taken from this sort of study and used to support in answering the research questions. Based on the key factors captured from the literature review, the survey questions should be targeted to the users of the business services using a rating scheme. In doing so, the perceived forces of changes will emerge as the responders will be required to scale the influences of the implementation of change (Toves, Graf and Gould, 2016). According to the authors Toves Walden et al., questionnaires designed to reveal importance of various elements will aid in the clarification of issues that can be taken into consideration when developing business strategies.

Following this, the questionnaires were designed according to a differential scale technique using the Linkert Scale, the answers for the questions were rated from strongly agreed, agreed, neutral, disagree to strongly disagree. For other set of questions with regards to services offered ranged from very good, good, neutral to bad and then very bad. This 5-point scale is useful in

determining how many users rated the services in according to their experiences. Brannen (2017), stated the significance of the usage of survey type of research design, which was formulated to bring out the characteristics, attitudes, behaviours and opinions of the sampled population. The set of questions were formulated using the benefits discussed in the literature review.

This scaling technique for the questionnaire will be used to facilitate a systematic approach of understanding the main objectives of the study. Firstly, important factors will be presented as perceived by the external users. Secondly, the results will give an opportunity to validate the study further through the comparison of data from the literature as well as triangulating. Lastly, the author discussed how the results can lead to knowing which factors have higher potential of being implemented thus assist in improving strategic plans of a business (Toves, Graf and Gould, 2016). Most importantly though this is part of the framework of a Force Field Analysis that will facilitate the classification of the drivers for change and clearer understanding of their impact.

### **3.1.3. Phase 3- Identifying Restraining Forces for Change.**

The core aim in this case is to understand the speculations as well as the factual basis behind why the change seems to be a valid and necessary intervention in terms of shifting the way in which current management operates and what forces are supporting or opposing this shift. In a similar that was discussed above, the restraining forces for change coming from within the organization will be retrieved through personal interviews with participants. Although some researchers suggested using focus groups during Force Field Analysis to brainstorm forces in a term Brager and Holloway (1992), termed as group think. Here the authors showed how this analysis is an intensive process thus the recommended number of participants needed is between 15 to 20. However, when there is a wide array of views and opinions as in the case

of focus groups, the individual's feelings, beliefs and opinions are not elicited as clearly (Gibbs, 2007). In addition, for this study, personal interviews are easier to control than focus groups due to initiatives of participants.

As previously discussed, restraining forces as any factors that decreases or restrain the capability of achieving objectives for change (Fullan,1993). Thus, a qualitative interview questionnaire was specifically developed with a focus on understanding the ground reality behind the current situation of change needed in the organization. A series of interviews will be conducted to comprehend the inherent need for the particular need including the quality and objectives behind the tasks and activities involved, in addition to the reasoning behind why there is demand for the change intervention in the first place. The core fundamental aspect behind this particular series of interviews, all of which were directed towards employees of the organization, will be to understand the present scenario and the possible future circumstances that would arise through integration of the new system of work.

For the semi-structured questions, they were prepared based on the topic for the dissertation and aims of the study. The information gained from the interviews will enable this research to know about the current challenges and barriers that is facing the implementation of change within the organization. Using qualitative methods for research, as Creswell (2007) advocated for, allows the investigator to define and provide meaning an individual's experience by the analysis of interviews. For a Force-Field Analysis study, the problem of the research is suited for a qualitative design as the basis of the investigation explores the experiences of employees and higher management within the organization who determine the change's success and in addition supports Lewin's model of change management. Another particularly important reason for the adaptation of quantitative research design and methodology is that would help to quantifying the implementation of change in businesses. This research design would also

specifically observe the concerns and requirements needed to bring efficiency into the existing framework management.

Another justification of using this interview to get data allows this research to get more detailed clarity of the behaviours and thoughts of our research issue then afterward through an extensive and in-depth analysis a probable meaning can be presented. This type of research is suitable when the nature of the study is investigating the behavioural characteristics of the participants as well as trends. It can be noted that the information obtained here will not be able to get quantified nor any statistical tests can be implemented on them (Newman & Benz, 1998).

#### **3.1.4. Phase 4 – Data Collection and Sampling.**

Due to the nature of conducting a research in a pandemic and the several constraints that were apparent during this time it is therefore key for researchers to adopt to the situation. The suitable method here in alignment with the current context is the usage of email in which the questionnaire is attached. Subsequently, the questionnaires will be then distributed to the concerned participants, it will be expected that they will be filled and returned back to the researcher via email in adherence to ethical and privacy issues upheld to ensure anonymity of the responders.

The global environment is uncertain and thus the challenges of implementing effective research requires adaptability. With that respect, the interviews will be held via applicable web-cam applications as agreed with the participants at their preferred time. In a study done by Dodds and Hess (2020), to investigate the changes of research methodology in a time of crises revealed that most participants preferred this non-intrusive way of interviewing as it was safer and more convenient for them in addition to the easier set up at the comfort of their environment. Also, an interview schedule or guide will be employed by the research. As Creswell (2007) stated that this schedule of the semi-structure questions will ensure that the same kind of information

will be obtained from all the participants. Generally, it is important to set a time for the interview and to focus in the subject matter of the research.

Thereafter, the responses will be recorded using the method of transcribing, the utilization of this technique will enable the researcher to capture the main points and idea furthermore any questions or answers that need clarification will be clarified. The researcher should also ensure that the confidence of the respondents and their self-esteem, specifically during the personal interviews, was maintained by assuring them of their confidentiality as well as establishing a relationship of trust between the researcher and the respondent. Trust and confidence in the survey participants was also established via the use of signed written forms that encouraged their participation, clarified the intrinsic manner in which the information provided by them will be used, and also assured them of the confidentiality and privacy that will be maintained in their personal identities and opinions.

### **Sampling**

The target population or group of participants are the people who must have all of the elements essential for the research topic (Taherdoost, 2016). Furthermore, as described by Kothari (2004), the first and most important step involved in sampling is the definition of the universe within which the research inquiry is to be conducted. As Kothari (2004) defines it, a universe under sampling signifies the “set of objects” that are included as a part of the research inquiry. In other words, defining the universe of a study essentially indicates outlining the nature of the respondent population that is the focal point of the research objective. As shown in the beginning of the research methodology chapter, there is a definitive number of individual respondents that will be chosen for the study and hence, this constitutes a limited universe.

The principal approach used for the qualitative research will be purposeful sampling. This type of sampling according to Patton (1990), will allow in-depth study of cases with rich

information. Due to each person's experience vary thus, it is suggested to use samples that are small. (Patton, 1990). However, larger samples result in maximum variations which is mostly used for relating and gathering common outcomes from the respondents (Lincoln and Guba. 1985)

Conversely, simple random sampling was the preferred method used for the selection of users, according to Levy (2005), this gives an equal chance to all the respondents to take part in the study. The first item or respondent was selected at random from the database of applicants provided by organization after which every 7th entry was picked as per the technique's fundamental guidelines. Thereafter, questionnaires will be sent via email to the selected sample. Sekaran and Bougie (2013), proposed that minimum samples sizes must be 30 respondents and especially for a simple experimental research.

The interpretation of the data collected will the researcher to identify the forces present with the management that can either support or hinder implementation of change. For the surveys, a statistical analysis involved the use of frequency distribution tables and graphs to identify core patterns in the data obtained. The visualization of perception and perspective differences in the respondents using frequency distribution allowed for developing clarity in terms of how strong or weak a restraining or driving force was. At the same time, graphic visualization was utilized as a way of establishing the core distribution of perspectives about a specific question, thereby signifying the overarching perceptual framework surrounding the concerned question.

### **3.1.5. Phase 5 Assess the Scores**

Using the above techniques determines the identification of the restraining and driving forces, all which emerged from all of the research participants namely those who utilize the business services on one hand and those who were responsible for managing, approving and

implementing these changes. It is therefore, believed that the usage of Force Field Analysis will enable a deeper understanding of practicality of implementing change in an organization.

For this Force-Field Analysis, the raw data collected will be put into a more coherent structure. An inductive analysis of the data was used where significant themes emerged from the information (Patton, 1990). This challenging task of arranging raw data and classifying into meaningful segments. Open coding is a term used for the process of gathering the raw data and scrutinized in a holistic way in order to articulate the information (Strauss and Corbin, 2015). The authors explained that categories will be labelled and recognized into simple facts which then are classified together, with the aim of generating holistic and explanatory groups. This framework, is the initial plan for starting the analysis.

The technique known as thematic coding is a form of content analysis that allows a researcher to segment responses obtained through the interviews into codes, which are subsequently nurtured into themes. These codes function as categories within which the data is contained, each code acting as a representational node of the specific category that it belongs to. Duffee and Aikenhead (1992), proposed of the splitting of the content into more manageable parts, and a system of identification of these parts should be clearly done in accordance to research field. For instance, in a Force Field Analysis study done by Skepe in 2012, took the data collected on change management interventions in a bank sought to split the themes into portions such as workshop diversity and attitudes of personals.

After the segmentation of the data, any type of correlation between each segment should be identified and these links are then recorded. The same study done by Skepe (2012), identified a correlation between how commercial laws was significant in the change management thus categorized it as a driving force of the change in the bank. Eventually, the established forces are then pooled and matched to their respective categories to in a more coherent manner to

reveal the new perspective. Ritchie and Spencer (1994), highlighted this phase as being significant in retrieving new information of the change process and it creates a theoretical model for which the researcher can refer to in case more data is needed.

A similar approach will be implemented on the survey results. Firstly, a statistical analysis will be used, through which graphic representation of all the responses from the users will be presented. Secondly, each section of the questions will be analysed to identify the key forces of change. Using theme identification process described above, conclusions on the current situation of the organization will be examined, these key forces will then be tabulated in their respective categories.

For assessment of the scores, after the restraining and driving forces are organized according to their respective themes. A further analysis is then done where value will be added to the various forces according to their impact. In Force Field Analysis study, the weighing the forces is done by assessing the frequency of the issues as mentioned by the study participants (Nur et al., 2019). The quantification of the various identified forces is based according to its recurrence in the response from the research participants. The range of score for the restraining forces is from -5 to 0 where -5 is the highest strength. On the other side for the driving force the scores range from +5 to 0 where +5 represents the highest strength of the force.

Lastly, illustration of the overall forces will depict the results of the analysis in an easier manner. Using a Force Field Analysis computer software, overall results from the study will be clearly shown and agents of changes will be organized and quantified as previous sample shown in Figure 2. Even though the forces have been put on opposing ends, this does not imply or suggest that the forces are working in corresponding to each another. Rather, they all have an impact and are interrelated to affect the implementation of AI in intellectual property management process.

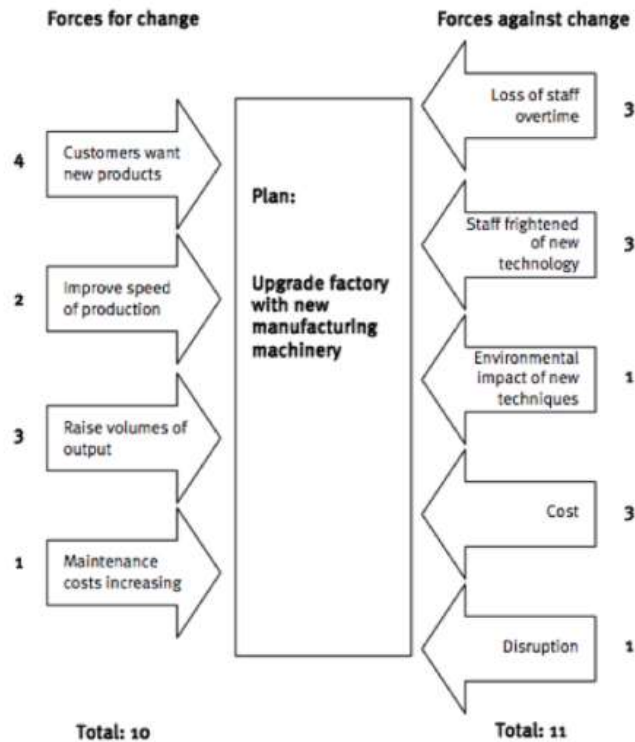


Figure 2: Example Force Field Analysis Illustration of forces present in a factory before the embarkment of the upgrading of machinery. (source: Wells, 2006)

### 3.2. Ethical Considerations

The ethical principles guiding this research includes maintaining and following rules and regulations of the respective organizations involved. Chen and Liu, (2015) affirms that for a research to operate in the most effective means the research must comply with the guidelines. For this study, all ethical principles were followed through including privacy of the respondents, names and personal identifications were are not revealed, the questions were all sent and approved to the respective sample population. The intentions of the study were clearly explained and the researcher also gave the participants choices on whether to contribute or withdraw from the study at any point without being held liable. Lastly, this research is only for academic purposes and follows strictly the laws of Data Protect Act 1998, where all

information provided will lead solely for research purposes and not be used against any participants.

### **3.3. Summary**

The research methodology outlined in 5 main phases that will be used to guide the investigation towards the achievement of the research goals. The usage of the Force Field Analysis is suitable for this research that involves change management. However, to gain a better understanding of the change elements, this type of analysis must be conducted within the organization as any research needs a comprehensive understanding of the situation through input of the experiences of the parties concerned. In a Force Field Analysis, the two main forces as discussed are driving force and restraining forces. With the former concerned with facilitating the change and the latter forces hinders change. Both qualitative and quantitative methods are the tools used for data collection. Thereafter, a combined analysis of descriptive statistics and interpretative qualitative analysis will be utilised to present the findings through which each forces identified and quantified. Finally, the forces will be drawn with reference to the Lewin's model.

## CHAPTER IV.

### 4.0. Data Analysis, Results and Discussions.

#### 4.1. Introduction

This fourth chapter will describe the application of the Force Field Analysis as outlined in the Methodology section. After the initial analysis of literature to reveal the possible categories of forces, next specific forces will be identified from the qualitative and quantitative studies. The responses from the participants will be interpreted and then graphically illustrated to enable the study to reveal the conclusions. The questions from the interviews will also analysed thoroughly and from which opinions on the implementation of AI in IP management and what forces currently exists within this framework. From there, each force that will either hinder or advance the implementation of AI will then be inputted in a Force Field Analysis illustration.

#### 4.2. Core Changes to be Initiated

This initial analysis is dervied fom the literature review which was developed from the research questions. Review of the beneifts and challenges of implementing Artifical Intellegence in the Intellectual Property Department will form the initial analysis from which the sources of forces of change will be identified. From here, broad possible categories were derived with repect to the literure review analysis as seen in Table 1.

**Table 1: Types of Forces to Consider**

Types of Forces to Consider		
Organizational Structure	Culture	Machine Value
Technology	Costs of Implementation	Security
Human Skills	Policies	Efficiency

(Source: identified from literature and research)

Thus, it was evident that there were strong forces present in the Intellectual Property services with regards to technological change. It showed that the forces were linked to organizational structure including management roles and policies. In addition, the human resources of an organizations as well as technological skills of the users determined the ease of acceptance of Artificial Intelligence. Another category recognized from the literature was the challenge of machine itself, where studies showed how individuals were ready to employ AI in the workplaces however there was a genuine concern of how it may take over jobs in addition to using it supplement their work. This analysis demonstrated the possible categories from where specific driving and restraining force will be classified.

#### **4.3. Questionnaire Structure for Identification for Driving Forces**

As mentioned in previous chapter, this research paper will rely on a questionnaire to retrieve data from the respondents. In general, the survey questions were formulated to capture all the various categorises identified in the first phase. This means that questions in the survey will provide precise information with regards to the various driving forces that are hindering the implementation of AI within the Intellectual Property sector. There were seven questions in total that were sufficiently created using the Linkert Scale to rate the experiences of Intellectual Property services in the Ministry of Economy. This systematic approach will be used to facilitate the Force Field Analysis and the identification of the driving forces. Below are the following questions used for this study:

1. *How would you describe your experience filing application for your IP?*

Very Good      Good      Neutral      Bad      Very Bad

2. *The process of IP application filing is an easy-to-complete process*

Strongly Agree   Agree   Neither agree nor disagree   Disagree   Strongly Disagree

3. *The rapidity of response associated with patent filing is high*

Strongly Agree   Agree   Neither Agree nor Disagree   Disagree   Strongly Disagree

4. *The cooperation and coordination of personnel and applicant is well managed during the process*

Strongly Agree   Agree   Neither Agree nor Disagree   Disagree   Strongly Disagree

5. *The overall process of IPR application is an efficient well-oiled mechanism*

Strongly Agree   Agree   Neither Agree nor Disagree   Disagree   Strongly Disagree

6. *The degree of technological development and integration in the process of IPR application filing is high*

Strongly Agree   Agree   Neither Agree nor Disagree   Disagree   Strongly Disagree

7. *The physical experiences pertaining to the IPR application process, such as meetings and face-to-face discussions with personnel were of significant help.*

Strongly Agree   Agree   Neither Agree nor Disagree   Disagree   Strongly Disagree

As discussed in the previous chapter, questionnaires will be administered to the users of the business services through which the driving forces of change will be identified. A questionnaire included benefits of implementation of AI in workplaces which were: increased efficiency of applications, technological advancement, reduce approval timings due to automation. Therefore, these statements above were designed to rate the integration of AI in IP management process for the targeted respondents including the innovators, creators and organizations who have used these services in the IP department. Later, these proposed questionnaires will be distributed after which results will be collected and complied.

#### **4.4. Interview Questions Structure for the Identification of the Restraining Forces**

For the quantitative study design, the questions were based on the objective of this study which was analysis of the restraining forces due to the implementation of Artificial Intelligence. This interview will give the researcher more information regarding the various

factors that hinder the integration of AI in the Intellectual Property sector. Thus, here this step of structuring the questions is crucial as it will be used to provide answers and meaning to our research objective. The following are the questions for the semi-structured interview research:

- 1. How has the UAE changed in incorporating technology such as A.I in the IPR application process?*
- 2. What is one thing that you think requires improvement in the current IPR application?*
- 3. What are some of the main obstacles that employees encounter in the current IPR application framework?*
- 4. How would you describe the working culture at the IPR department of the MoE?*
- 5. What is the level of daily interaction for you personally with digital/machine interfaces? Do you prefer the same over personal meetings/telephone conversations or vice versa?*
- 6. What are some of the ways, according to you, to increase speed and rapidity of IPR application processing functions?*
- 7. From the perspective of your own role/responsibility, how many tasks or processes can benefit from automation such as A.I?*
- 8. Which tasks, according to you, in the IPR application process contain the highest amount of human errors?*
- 9. What is the most time-consuming part of the IPR application approval process according to you? What do you think the reason behind this?*
- 10. What are some of the skills that IPR employees and executives, such as you, require to make good decisions regarding which innovations classify for protection under patents/trademarks/copyrights?*

The above personal interviews will be directed towards the employees of Ministry of Economy in particular the Intellectual Property department. Here, the ideal number of questions was ten, which was sufficient enough enable the researcher to obtain the appropriate information for the study.

#### **4.5 Data Collection and Sampling Method**

For the quantitative data (surveys) collection followed the method as described in the previous chapter. Due to the nature of the study and the chosen governmental organization, it was agreed that the HR personal will retrieve the participants from their databases, with the selection criteria being every 7<sup>th</sup> user from the list. From there, the research participants were provided with the questionnaire via email where they got to fill it and return the form. For the purpose of validity, 40 questionnaires were sent to assure the maintenance of the sample size. With regards to the target sample size, this research chose 30 participants which as previously discussed was the minimum number for an accurate study. All returned questionnaires were checked for quality in terms of all questions clearly marked, from tin total there were 30 forms officially selected for the research.

On the other hand, for the qualitative study which involved personal interviews, the sample population were ten employees from the Intellectual Property department in the Ministry of Economy in Dubai. The criteria of selection will be determined according to hierarchy, where officers and manager in direct involvement with the change process was contacted. This was a level of personal discretion evident in this process as the researcher picked individuals with a certain level of freedom in terms of choice, supported by the inputs offered by management.

## **4.6. Data Findings and Analysis**

### **4.6.1 Quantitative Research**

Following the collection of the 30 questionnaires from various innovators/ users of IP department's services, the researcher compiled the data into meaningful information. Here, a statistical analysis involving the use of frequency distribution tables and graphs were carried out to identify core patterns in the data obtained. The visualization of perception of the IP process from the respondents allowed for development of clarity in terms identification of possible driving forces. At the same time, graphic visualization was utilized as a way of establishing the core distribution of perspectives about a specific question, thereby signifying the overarching perceptual framework surrounding the concerned question.

#### **Descriptive Analysis of Questionnaire**

Below is the statistical analysis of the questionnaires, the main findings will be the driving forces of change as perceived from the user's standpoint. 30 innovators and creators from the Ministry of Economy's databases. Due to the current pandemic at the time of the study, emailing of the questionnaire was suitable method of distribution. The survey focused on the main research objectives, and it aimed to address the research questions and fill the gaps seen in the literature review and finally used as a guidance to the Force Field Analysis. These findings were collated and summarise the data using Excel computer program after which they were graphically presented using descriptive statistics. Thus, for clarity each question has been briefly described and discussed below.

#### **Question 1: How would you describe your experience filing application for your IP?**

Figure 1 shows us the various response of participants/organizations who have filed an IP protection application with IP department in the past, have been illustrated below their responses. In the case of the first question, it was apparent that most respondents had a balanced

opinion in terms of their overarching experience in filing an IP protection application with MoE. In relative terms, the number of individuals having a positive experience with regards to the digital format of application submission was higher than those who had a more negative opinion of the same. However, the largest majority of the sampled respondents opted for “neutral” as their answer to the question of the quality of experience. Over a third had a neutral experience, meaning that they can neither recommend it or oppose it. This means there is need for intervention to provide better note-worthy experience.

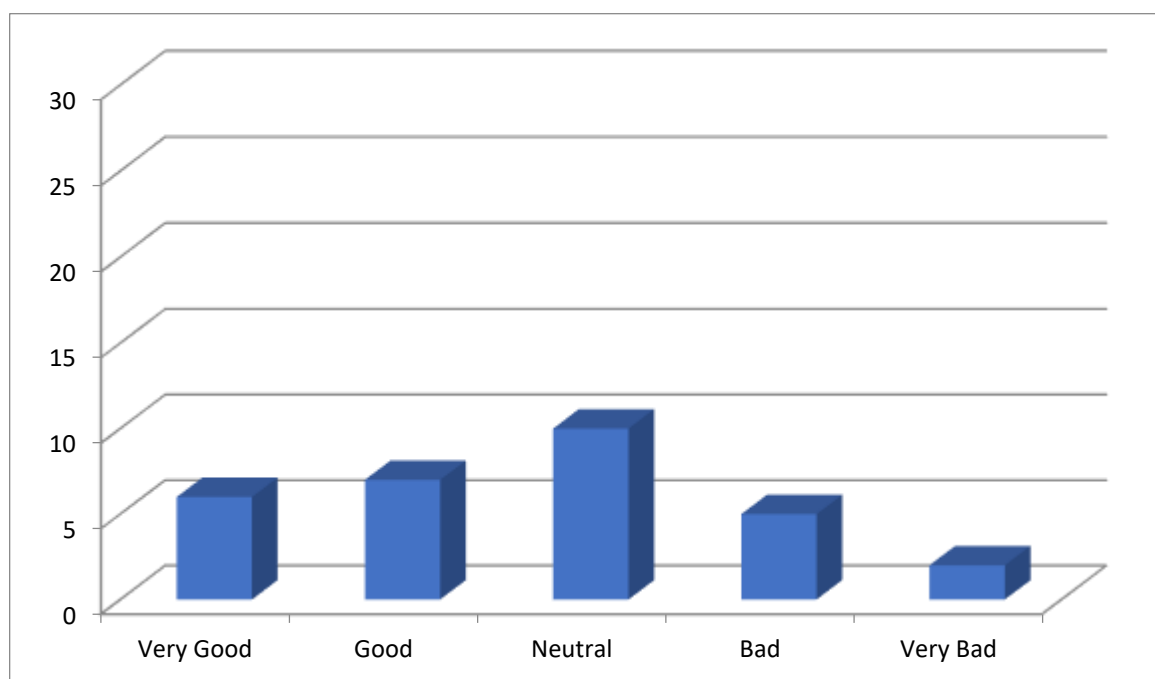


Figure 3. Results on the participants experience in filling IP application results

### **Question 2: Is the process of IP application filing is an easy-to-complete process?**

The responses to the second question offer a glimpse of the perspectives of the respondents on the relative ease and simplicity associated with the process of application filing. A majority of the respondents reacted negatively to the statement of ease and pointed to an increased level of

complexity in the process of filing with 12 out 30 respondents disagreeing with the statement. A validation for the above data can come from a deeper analysis of the actual steps and tasks involved in the process of application filing at MoE, which involves a number of intricate steps which include everything from using the website to submit documents, personal meetings, presenting the innovation in a specific format, and other such aspects. Thus, a restraining force here can be recognized here is the inefficiency of the services, difficulty and intrinsic nature of the filling process.

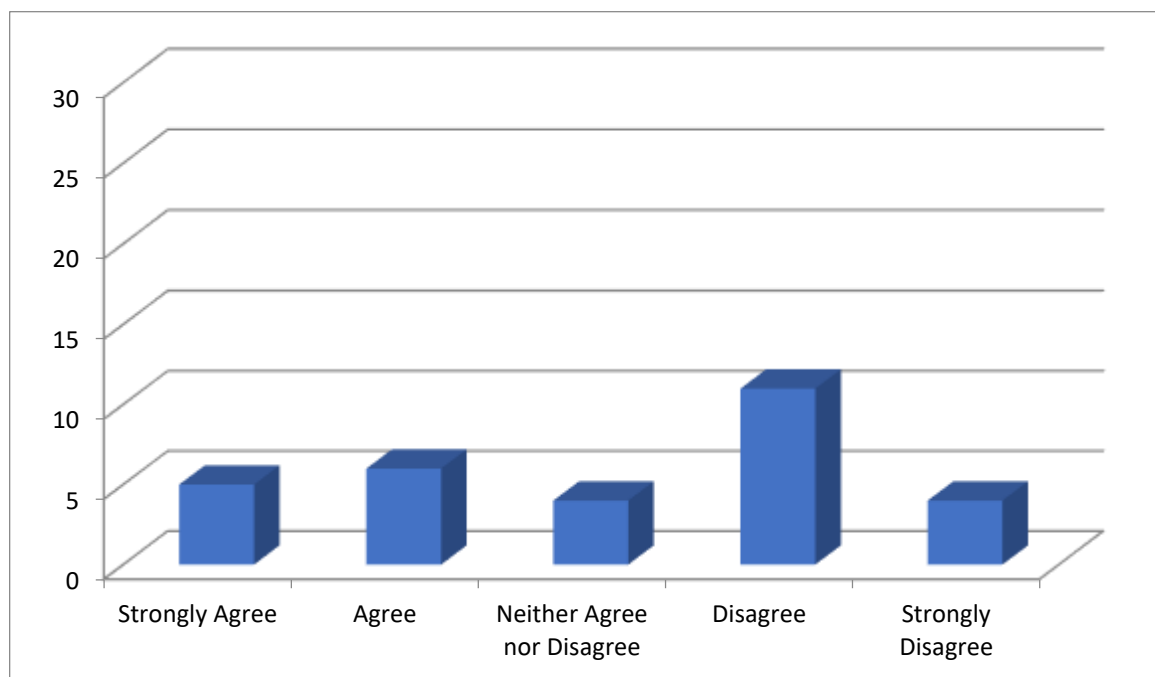


Figure 4. Results on the opinion for the statement ‘The process of IP application is an easy-to-complete process’

### Question 3: Is the rapidity of response associated with patent filing high?

In the case of the third question, a majority of the respondents answered “Disagree” to the scenario of application filing process which had a rapid response time associated with it. Even though an almost equal number of respondents answered “Agree” as did the number of those who answered “Disagree”, with the former having 9 out 30 while the latter had 10 respondents.

However, the frequency distribution shows that the collective opinion of the sample respondents is skewed towards the higher end of the Likert Scale. This means that more had an unfavourable answer to the question. This can be explained through the justification of the long approval processing time that IP department has established, and the complexity of IP process in general for which AI intervention thus aims to reduce and thereby increases rapidity of approval. Thus, forces that could be recognized here also associated with inefficient filing process, organizational structure also is inefficient as seen with slow rapidity.

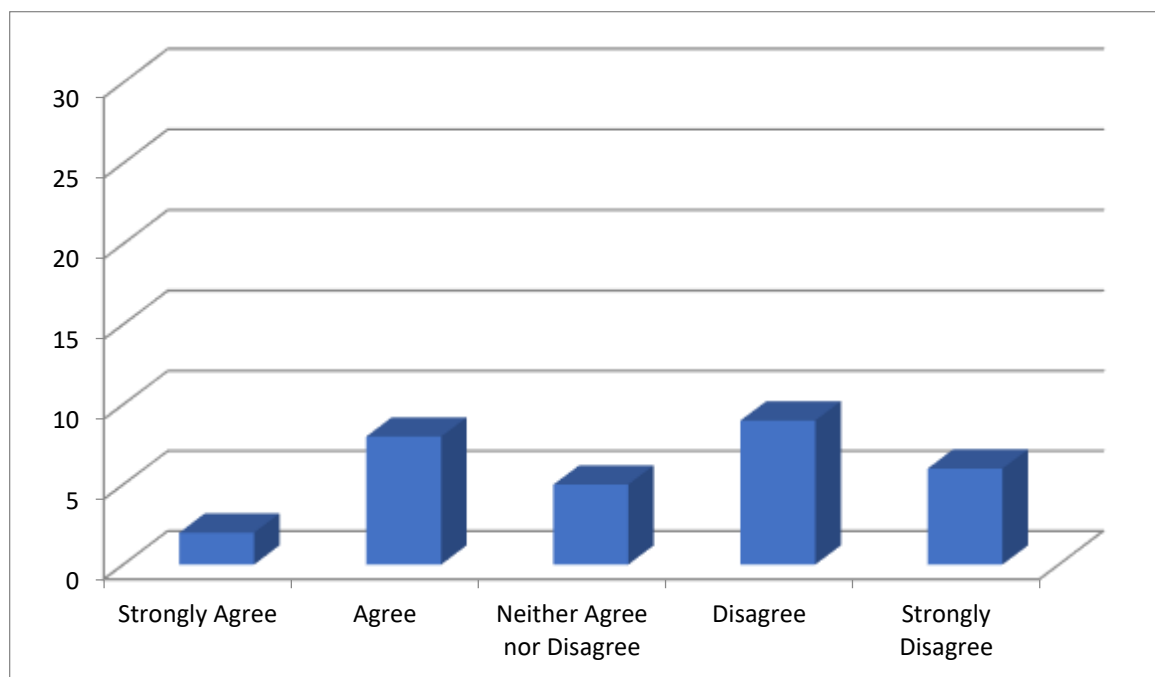


Figure 5: Results on the opinion of the high rapidness of patent filing process.

**Question 4: Is the cooperation and coordination of personnel and applicant is well managed during the process?**

With regards to the perspective of the respondents regarding the way in which the process was coordinated and the support that they received from personnel at MoE during the60 filing, the data was strongly skewed towards a more positive outlook. The driving forces here thus can be contributed to the highly experienced employees due to their well knowledge of the IP process,

thus this could accelerate the implementation of AI as staff are well competent to work hand in hand with automatons.

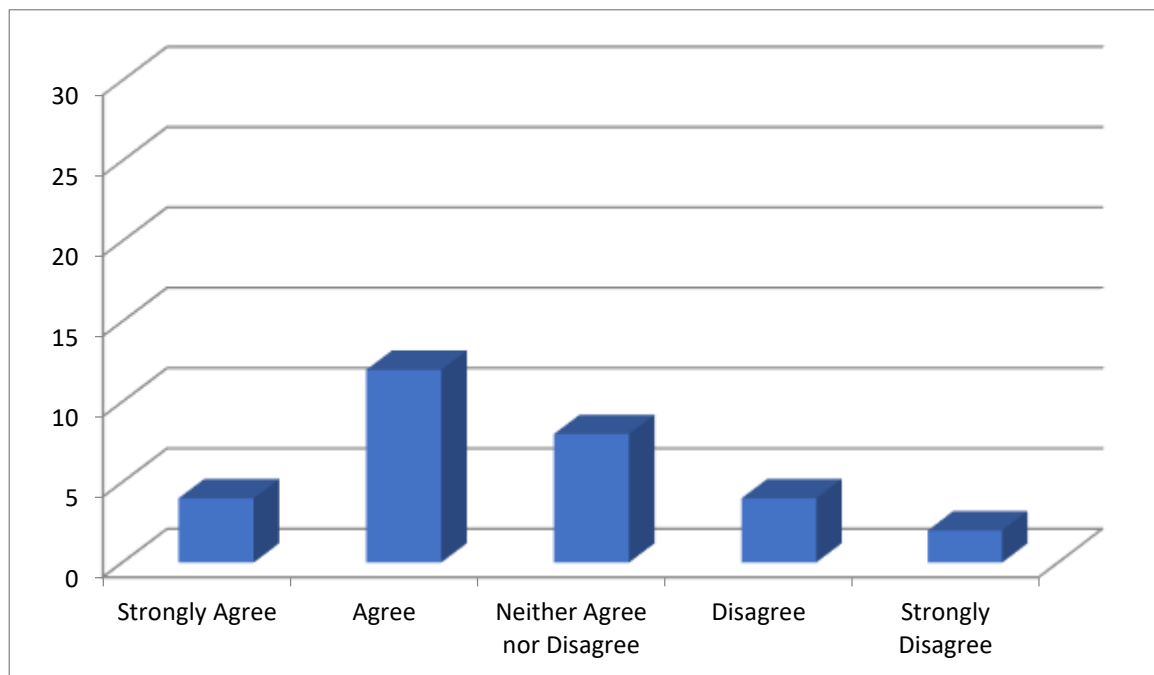


Figure 6: Opinion results of the statement ‘The cooperation and coordination of personnel and applicant is well managed during the process’ A

**Question 5: Was the overall process of IPR application is an efficient well-oiled mechanism?**

The responses of the sample population are more or less skewed towards a positive opinion on the overall efficiency of the application filing process. However, the most prominent response pertaining to this specific question was neutral, indicating that due to the deep involvement of human elements through the process, the experience is more or less subjective in nature meaning some respondents could have had a good experience because they filed a less complicated patent whereas others who filed more complex idea may have had some obstacles. Only 5 out of 30 participants did not think that IP management process had good flow of operations. Thus, this can contribute to a driving force of good organizational structure has

allowed the management of IP elements flow smoothly inside the organization but hinted at a chance for improvement as 14 out 30 were neutral.

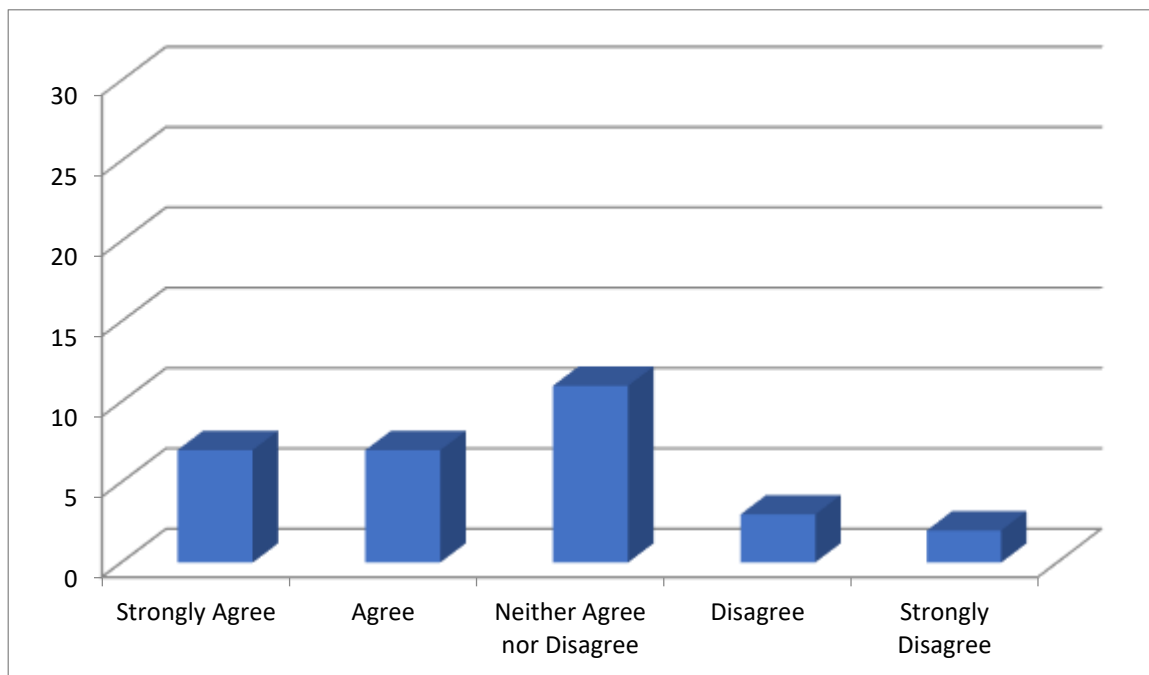


Figure 7: Opinion results of the statement ‘The overall process of IPR application is an efficient well-oiled mechanism’

**Question 6: Opinion of the statement ‘The degree of technological development and integration in the process of IPR application filing is high’**

The major response in the case of this particular question shows the way in which applicants view the degree of sophistication and technological improvement of the process of application filing. In this case, it is clear that most individual disagree to the idea of technological proficiency with regards to the process, with a total of 13 answering disagree and a further 5 strong disagreeing. On the hand only 7 respondent totals had a positive answer the above statement. This occurrence could have been expected due to the dependence on traditional technological mediums such as CDs during the process. Numerous parts of the process are inclined towards traditional methods of patent/trademark/copyright approval which are not as advanced as the mediums that modern technology can provide. A restraining force here can be

outdated methods of filling but on the other hand the respondents showed that they were not satisfied with technological progressions within the IP department meaning they would welcome technological interventions to enhance the filling procedure. Therefore, a driving force here is the readiness of technological intervention by the users.

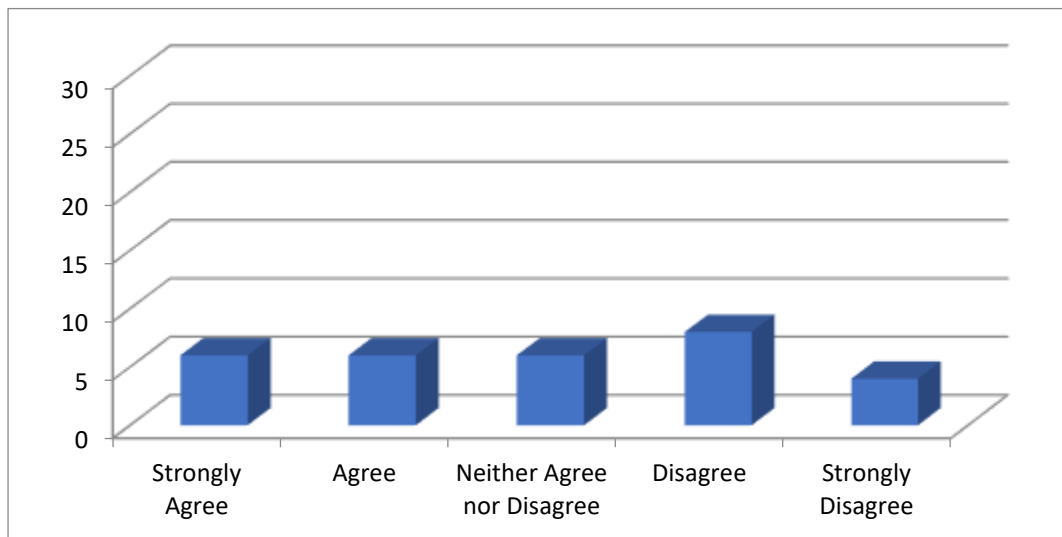


Figure 8: Opinion results ‘The degree of technological development and integration in the process of IPR application filing is high’

**Question 7: Opinion results on the statement ‘The physical experiences pertaining to the IPR application process, such as meetings and face-to-face discussions with personnel were of significant help’**

The answers, as illustrated below, are skewed towards a positive perspective towards physical interactions that are a part of the application process. This is indicative of the collective tendency amongst UAE locals to value face-to-face personal interactions more than digital medium. It is clear from this perspective that inventors and organizations filing for IP protection still value their ability to meet the individual dealing with their application on a personal level during the process. Thus, this can be identified as a restraining force for there is a traditional process of working, so this makes it a challenge to switch to a more automated way of doing things.

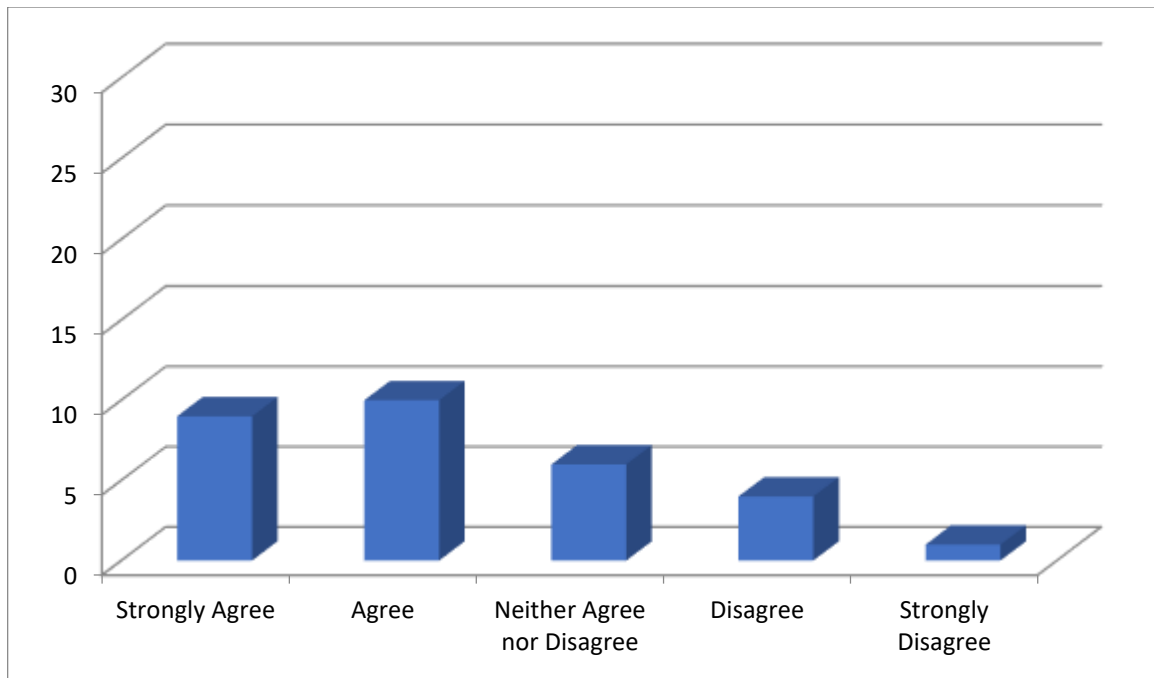


Figure 9: Opinion results on the statement ‘The physical experiences pertaining to the IP application process, such as meetings and face-to-face discussions with personnel were of significant help’

Following this, the researcher then identified within the results of the questionnaire with regards to respondents showed some recurring categories present in the IP department according to the users. Within these categories, the driving forces were extracted and used to analyse the qualitative study. The categories that were found were organizational factors, cultural factors, machine related forces, skill-oriented factors, and lastly human forces.

#### 4.6.2. Qualitative Research

This section presents the results from the semi structured interviews with employees from different departments with the Intellectual Property Department in the Ministry of Economy. The experience and perceptions of the employees with regards to IP management will be discussed.

As mentioned in the methodology section above, an interpretative qualitative analysis was carried out. The fundamental process of the analysis of data from the personal interviews involved coding the responses to the specific categories and thereafter organizing each factor

to their respective forces. The interview responses, most of which were via webcam meetings, were first transcribed into textual format. After this, specific codes were developed through intricate examination of the transcribed texts, specifically by focusing in the core phrases, sentences and word formations that were of interest. The selection of these codes was done based on the main objective of identifying the restraining forces for the adoption of artificial intelligence in IPR management. The codes, once identified and highlighted from the transcripts, were segregated into specific categories that were recognized earlier in the analysis which were organizational, human-level, machine-level, cultural and skill-based umbrellas of process-individual interaction and perspective.

In the table below, the categories and their main themes are tabulated with the help of a specific few sample code summaries that were gleaned from the transcribed texts. Also included, specific examples of quotes derived from the interviews. In this case, it is essential to note that this table acts as a representation of a much larger process which involved collating and categorizing various codes based on their intrinsic alignment towards a specific theme.

**Table 2: Qualitative Results Framework revealing Organizational Structures Forces**

Category	Thematic Codes	Quotations
<b>Organizational Structure</b>	<ul style="list-style-type: none"> <li>• Managerial Efficiency</li> <li>• Slow approvals</li> <li>• Hierarchy decision-making.</li> <li>• Paperwork</li> <li>• AI in govt workplaces</li> <li>• Teamwork</li> <li>• Communication</li> </ul>	<p>‘All applicants we receive have already gone through other colleagues, so we always double check details’</p> <p>‘There is large background research and paperwork involved in IP process’</p> <p>‘A lot of details, a lot of time taken to approve the ideas’</p> <p>‘As a manager, there is an inability reach more approvals because at our level we need more tangible records and dealings with innovators’</p> <p>‘More pressure from government areas to improve these approvals and ideas so to support the efficiency, thus demand for this be a quicker approval’</p>

**Table 3: Qualitative Results Framework revealing Human Capital forces**

Category	Thematic Codes	Quotations
<b>Human Capital</b>	<ul style="list-style-type: none"> <li>• Manual Approval Ideas.</li> <li>• Users' preferences</li> <li>• Mistrust of technology</li> <li>• Acceptance of technology</li> <li>• Elimination of Human Subjectivity</li> <li>• Less acceptance of Digital documents.</li> <li>• Elimination of Human subjectivity</li> <li>• AI in Universities</li> </ul>	<p>'We see for most new employees takes longer in application of patent process, also more errors'</p> <p>'Maybe, we need 5 years more to accept technology to help us'</p> <p>'Because patent approval is now human-based work, factors like experiences, errors, expertise make hard for new employees to become experts'</p> <p>'Because some ideas like in entertainment become difficult, it needs human level views, maybe sensitive'</p> <p>'AI, I think will help to eliminate confusion like image recognition, copyright registration'</p>

**Table 4: Qualitative Results Framework revealing Skills Ability**

Category	Thematic Codes	Quotations
<b>Skill- Ability</b>	<ul style="list-style-type: none"> <li>• High Technology skills</li> <li>• Experience in IP process</li> <li>• Low skills of new employees</li> <li>• Imbalance of employee skills</li> <li>• UAE Vision of skilled workers</li> <li>• AI in UAE University Programs</li> </ul>	<p>‘It is a dynamic workplace to grow, employees from different background, combined new experiences and growth to the org’</p> <p>‘Challenges due to employees with different skills set’</p> <p>‘More training provided to support AI example judicial processes’</p>

**Table 5: Qualitative Results Framework Revealing Culture Forces**

Category	Thematic Codes	Quotations
<b>Culture</b>	<ul style="list-style-type: none"> <li>• Traditional way of working.</li> <li>• Innovator's work culture</li> <li>• Face to face meetings</li> <li>• Prefer physical interactions</li> <li>• Less Acceptance of Digital documents</li> </ul>	<p>'I prefer face to face, because of their long-term applicability till date'</p> <p>'The org culture is slow to advance'</p> <p>'As an expat I am used to paperless, but here there is some applicants who prefer papers'</p> <p>'Due to org mindset, they rely still personal meeting with regards to approvals'</p> <p>'Some foreign innovators come to apply, maybe they used to different way of processes ideas especially entertainment/art areas, but maybe AI can help to see trends of ideas and through demand we can make more definite criteria for selecting an idea'</p> <p>'More youth are driven to use AI'</p>

**Table 6: Qualitative Results Framework Revealing Machine Forces**

Category	Thematic Codes	Quotations
<b>Machine</b>	<ul style="list-style-type: none"> <li>• Easier to navigate</li> <li>• Lack of Manual assistance</li> <li>• Multitask</li> <li>• High Investments</li> <li>• Security</li> </ul>	<p>‘All the time, I can manage many activities and multi-task because of digital and technology’</p> <p>‘All dept now use digital ways of working, AI is there in legal procedures’</p> <p>‘Increased assurance of security’</p> <p>‘More reliable and secure use of technology’</p> <p>‘There is high costs and risks in technology’</p> <p>‘The Assembly in Dubai Knowledge already is a big hub for innovators, it has all latest technology and machines’</p> <p>‘Some customers find it hard to apply online, esp. local creators want to come to Happiness Centre and bring all their documents’</p>

#### **4.6.3. Assessment of the Forces**

As discussed in the previous chapters, after the usage of Force Field Analysis will enable the study to draw conclusions and reveal what can be expected for the stakeholders in the IP department in the Ministry of Economy during a possible AI intervention for their services. Thus, a completed graphical presentation of forces was drawn using SmartDraw Software to describe the overall results from the study, this figure is the Force Field Analysis as adapted from the illustrations by Lewin (1951). As seen in the below illustration, even though the forces have been put on opposing ends, this does not imply or suggest that the forces are working in corresponding to each another. Rather, they all have an impact and are interrelated to affect the implementation of AI in intellectual property management process.

The diagram below, thus, has quantified the various identified forces according to its recurrence in the quantitative interview. The range of score for the restraining forces is from -5 to 0 where -5 is the highest strength. On the other side for the driving force the scores range from +5 to 0 where +5 represents the highest strength of the force. For example, hierarchy decision making force was a concern for nearly all participants where they felt that decision concerning IP processes had to pass through the long chain of command thus perhaps giving it a maximum score of 5 (negative). And so, this is an aspect that needs reforms as it may diminish the proper use of AI implementation whose job is to decrease the approval process of intellectual property. Another example within the organizational structure was teamwork, this theme was given a score of 2 (positive) as it was discussed a few times but it may not have as much of a relative strength to determine a quick AI implementation. On the other side though, imbalance of employee skills was scored at +5 as it was a major topic of discussions with almost all the participants. Its strength can show us that this imbalance of expertise can be used as a driving reason to adapt to AI to thus standardize the services. As seen through the analysis, most innovators had mixed views with concern with rapidity of IP process leading to the

identification of this force. The various forces will be further discussed with evidence from the quantitative interviews will be analysed further in the next pages.,

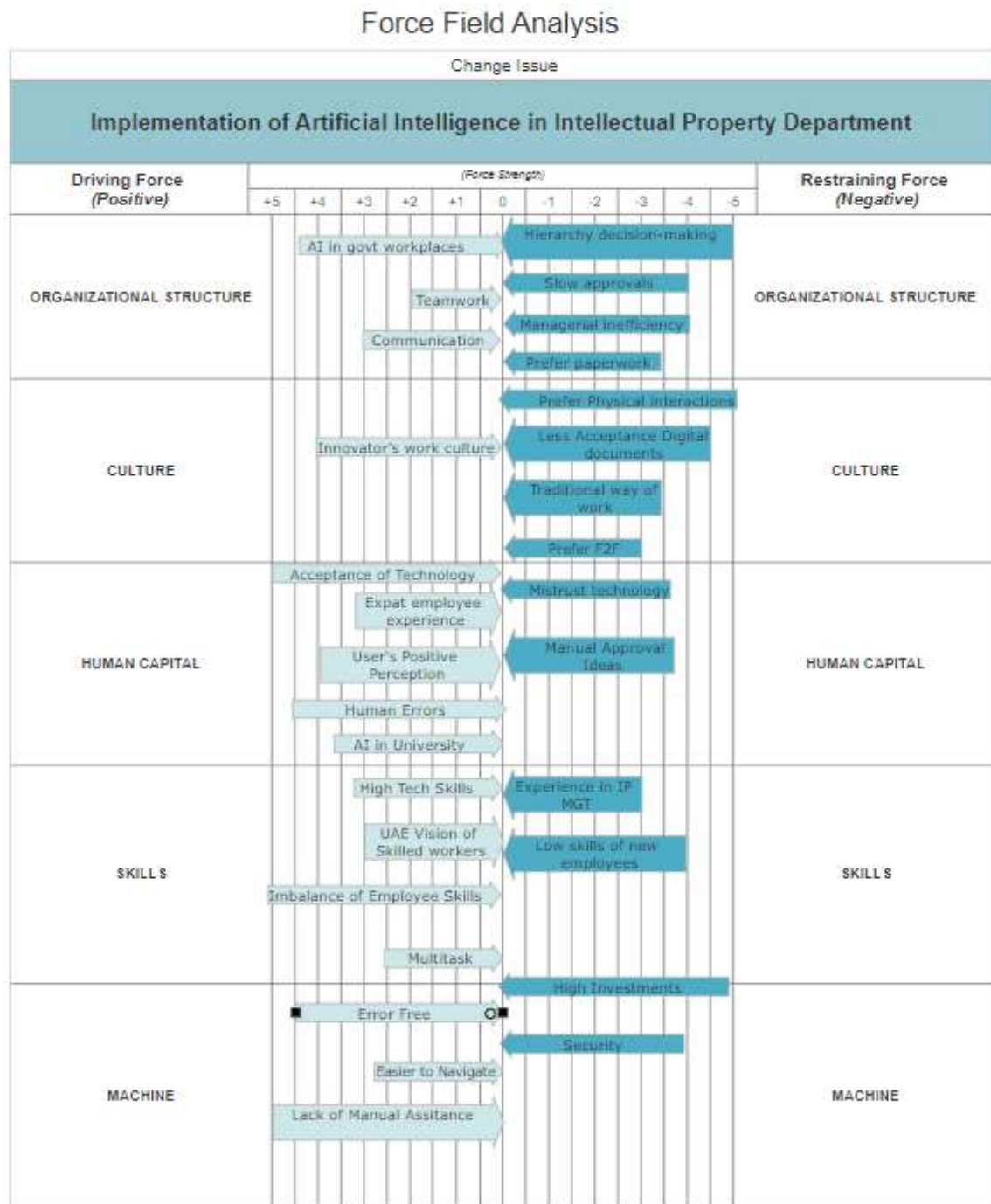


Figure 10: Force Field Analysis Illustration

## **4.7. Discussions**

### **4.7.1. Driving Forces**

Most of the respondents interviewed during the course of the qualitative dynamics of the study were inclined to shed light on the various ways in which the UAE government has been encouraging the adoption of AI in different sectors over the past few years. One of the respondents, an executive manager of operations at the IPR department of Ministry of Economy, mentioned that Emirates like Abu Dhabi are now integrating artificial intelligence capabilities in legal procedures and are also providing elaborate support and training systems for lawyers in order to encourage smoother and more seamless transition to this “new age” of judicial processes.

Another respondent, a patent examination expert from Ministry of Economy, pointed to the emergence of youth-driven and heavily funded organizations that were dedicated to pursuing innovation in advanced technology using mediums such as artificial intelligence, naming “The Assembly” situated at Dubai Knowledge Village as a powerful innovation incubator and workshop that has allowed numerous inventors and local creators to learn and apply fundamental concepts of AI and ML. This discussion has thus led to forces in the human category such as acceptance of technology scoring +5 as it was widely agreed that more people are now used to technology. Furthermore, the human resource manager at Ministry of Economy associated with the IPR department elaborated upon the point that artificial intelligence is becoming a definitive aspect of university curriculums across the UAE, an aspect that has enabled a large amount of skilled labour to be generated for the advanced operations that AI integration into IPR might require in the future. The brings about the strength of the forces in the skills categories, where + 3 was average score of its impact to change. Together with the fundamental aspect of governmental and national systems aiding the skill development process for artificial intelligence in the UAE was a point that seemed to be serving as one of the main

driving forces for the adoption of this technology into the IPR department of MoE. The forces identified was increased AI in workplaces (+4) and a score of +3 given to skills of overall workforce as seen when participants were asked to assess their daily technological interactions.

The trademark and copyright experts who were interviewed during the course of qualitative analysis offered a glimpse of an important dilemma that has been there acting as the driving force for the adoption of AI in everyday processes of the national IPR department. These experts offered a perspective which was seen by the ambiguity and uncertainty associated with invention applications in creative and entertainment-based fields, especially owing to the fact that there is a considerable amount of subjectivity involved. The decision-making process behind selecting innovations to approve when it comes to entertainment and creative fields like art and film tends to derive heavily from human-level perspectives on the creation in concern. They pointed out to scenarios where specific symbols and inclusions of particular aesthetic aspects, such as shapes and culturally-sensitive patterns, are sometimes not applicable to be reserved as copyrights under individual creators owing to their widespread socio-cultural presence and application. The recognition and classification of such artistic features have not yet been carried out thoroughly on a human level and hence, tends to be subjective to a large extent. This force was recognized as a driving force in that there is a consensus in the interviews by the participants that the removal of human subjectivity for idea approvals can be replaced and improved by AI thus +4 score was appropriate.

This leads to the argument, that with the inclusion of artificial intelligence into the domain of image recognition to aid copyright registration processes may just bring in even more ambiguity and uncertainty in terms of application and protecting art ideas. The thought of an automated robot to decide if your idea is patent worthy may lead to other inconveniences. But, on the other hand, if this aspect was implemented, this would allow for in-depth analysis

of main trends in terms of entertainment, art and creative intellectual property being created within the UAE, it would also allow the IP department to create a defined set of rules in terms of creative copyrights which until now has been more or less subjective when it comes to selection procedures. The forces identified through these discussions were in the machine category, where lack of manual assistance (+5) drives the implementation and need for AI systems, most participants agreeing on the benefit of AI to IP process.

#### **4.7.2. Restraining Forces.**

On an organizational level, employees mentioned that there was a high degree of disinterest in AI intervention, specifically due to major cultural aspects, which resulted in a lack of separation from techniques and processes of IP registration that were established in the before. In this case, several respondents brought up the point of how face-to-face meetings were still preferred over purely digital methods, especially owing to the fact that on a cultural level, Emiratis tend to value and trust personal meetings more than machine-mediated modes of communication, especially in case of personal issues associated with copyrights, trademarks, patents, and other forms of IP protection. In other words, the respondents were pointing to the fact that the adoption of the AI and the changes that will be ushered in through the same will eventually lead to a movement against the existing cultural paradigm of interaction, communication, relationship-building and concern-handling processes/tasks. In terms of the basic theme of restraining forces, the cultural unwillingness to accept services from robots due to traditional inclination towards specific forms of communication and interaction can have a major impact on the overall development of an AI-mediated mode of intellectual property rights management. Hence, most forces identified here within the culture category were given strengths of -5 to -3, including preferring physical interaction and prefer face-to-face.

Another point of observation that was brought up by some of the respondents was the difficulty that many applicants faced as far as filing an application through the digital medium was concerned. Even though there are resources and step-by-step guides associated with filing a patent/copyright/trademark through the website or Ministry of Economy app, there have been several cases of individuals, especially local creators and innovation pursuers, who were confused and required direct experience. This mistrust of technology forces was discussed often by the employees of MoE, thus -3 strength was fitting. Additionally, the respondents mention that the number of individuals preferring face-to-face contact through Happiness Centres for filing their IP protection applications also remain high due to a certain level of mistrust in digital mechanisms as well as the inertial inclination towards physical interactions. This, in turn, can lead to some complications when an advanced system of artificial intelligence is integrated into the process of IPR management, especially owing to the fact that it can reduce or limit the degree as well as the avenues in which AI-mediated automation can be implemented.

On the other hand, the fundamental area of dilemma brought up by executive managers and resource managers associated with the IPR department of Ministry of Economy was the physical interactions and traditional means of dealing with individuals and organizations, which were stipulated as being core reasons for both the need as well as the current inability to achieve a higher rate of application perusal and intellectual property development on a national level. This hierarchy of decision making had a strength of -5 due to the high influence it has to change. But, Increased government-mediated pressure on improving innovation potential and on ushering in new innovations from foreign organizations and creators has also been a fundamental driving force when it comes to organizational processes, tasks and responsibilities, all of which demand change in order to meet the efficiency needed for national-level evolution of innovation potential. The questionnaire responses of the survey conducted amongst

innovators and creators who have experienced the process of IP protection filing with Ministry of Economy also pointed to the fact that there is a general opinion among the masses that the process is a time consuming one. This leads to a force such as slow approvals are a major one at -4, which in essence may be a complicated one to tackle.

With regards to obstacles and time-consuming aspects of the current IPR process, the respondents pointed to different sources of dilemma within the mechanisms of this national system of intellectual property protection. On one hand, patent and trademark experts were quick to point out that the sheer number of applications being filed along with the large amount of background research into specificity, innovation potential, and overall need for a new proposed innovation that makes it viable to become protected intellectual property, are all prone to be intricate, complex and time-consuming tasks on a human level. These therefore, were then identified as potential restraining forces and were given each +4 score as it was evident that a major obstacle. The experts also mentioned that due to the current human-based system of patent approval, experience levels and on-ground expertise is a defining factor, which makes it difficult for new and young individuals to master their responsibilities in the time required for them to do so. Which then lead to the forces within the human capital category such as manual approval of ideas a strength of (-4) as it forms a significant influence to change.

#### **4.8. Summary**

Thus, in summary, this chapter has explored the findings from the qualitative and quantitative researches and furthermore, conducted a Force Field Analysis to determine the various forces present. The quantitative research enabled the research to derive the key categories that was surrounding the IP process with respect to a possible AI implementation. The main core categories were shown to organizational structure, Human capital, skills abilities, machine and lastly culture. From here, various forces identified through the analysis of the qualitative

research. Thereafter, the research organized the forces in accordance to with it being an obstacle to change (restraining force) or accelerates the change (driving force). The strengths of the forces were determined through the frequency and importance as seen through the transcribed interviews. Lastly, it can be determined that culture and organizational structure may need a push and more awareness regarding the benefits of AI to business and especially ones dealing with intrinsic tasks, on the other hand, the IP department as seen through these discussions has major potential to grow and get accepted and the UAE has already taken great strides into building the technology and skills of the employees.

## **CHAPTER V**

### **5.0. Conclusions and Recommendations**

#### **5.1 Conclusions**

It is clear from the findings that there are definitive overlapping data trends and patterns which emerge from a comparison of the responses obtained from the employees of the Ministry of Economy on one hand and the survey respondents (innovators, creators, and IP nurturing organizations) on the other hand. The collective perception tends to be impacted by everything from cultural factors to actual technical aspects of the procedure involved. One of the core driving forces identified includes an increasing acceptance of AI under the national industrial complex of infrastructure and service development, which is thereby furthering and enabling the proliferation of training centres and other forms of support systems for skill development in this field. Other driving force patterns observed from the data include an increasing awareness amongst both applicants as well as employees at Ministry of Economy regarding the redundancies in the overall process of IP management. This includes factors such as reliance on traditional data sharing mechanisms, increased convolutions of procedural aspects due to human intervention, as well as a cultural inertia with regards to an increased trust in face-to-face personal interactions. At the same time, the restraining forces emerge from the dynamic associations that driving forces have established with the overarching socio-cultural framework of the nation. In this case, cultural factors such as preference for face-to-face personal meetings as well as established technical aspects of procedure such as increasing uncertainty in personal experiences due to automation and increase of technological intervention tend to play a negative role.

The central conclusion that can be collected from this particular research is that there is a definitive relationship between both driving as well as restraining forces, both of which are

intertwined through organizational, cultural, social, and personal-level experiences. The foundation of the task involving an increasing of the momentum towards AI-based IPR management involves establishment of the core characteristic of the IPR application filing process. This core characteristic that is being referred to is that the intrinsic nature of the IPR filing process is that it is a highly dynamic, flexible and personal experience that differs on the basis of each innovation. In such cases, the direct large-scale implementation of artificial intelligence or machine learning-based frameworks of function can result in a steep learning curve owing to the fact that the inherent uncertainty and the possibilities contained within the experience are too vast to be automated easily. At the same time, increasing human intervention and dependence on traditional/physical means only can result in an inability to harness the optimal level of innovation potential on a national scale. Hence, the best way to integrate AI into the IP management process would be to utilize it in order to remove fundamentally redundant parts of the process while still retaining some of the human-level subjective spheres of exchange and communication so as to keep the shock of transition to a minimum. In this case, utilizing AI as an additional tool or instrument to improve efficiency, rapidity, accuracy and seamlessness of research when it comes to approving a patent/trademark/copyright while still maintaining face-to-face interactions with applicants can help in improving the turn-around time for patents. By integrating smart image search and aesthetic evaluation mechanisms using AI and large reservoirs of data, specific procedural aspects can be enhanced considerably while at the same time, maintaining the personalized and subjective nature of experience that is IP management.

## **5.2. Recommendations**

This research provided a firm groundwork for understanding the implications of integrating Artificial Intelligence to improve the service experience in the Intellectual Property Sector in the Ministry of Economy. A framework of Force Field Analysis was used as a part of an

investigating case study, where various factors were identified from the view of the users of the services along with the employees. Thus, the findings of this research offered a glimpse of a single service sector within the government organization in particular in the city of Dubai. Therefore, future studies can be recommended on this same technique but using a larger scale and also include more sections especially in the government sector where they have aims to automate their services. This current study will contribute to the viability of similar future study where it could provide the identified forces as a foundation for developing change management strategies. In addition, this study could be used to provide the best performances needed for variables needed for technological changes. Moreover, this research done can be utilized as a guideline to further identify, reduce and identify elements that affect an individual and change. Especially, with regards to technological change and managing of the changes in an organization, this study will show how it is essential that there are concurrent preparations for efficient transformations.

### **5.3. Limitations of the Study**

This research took place in the midst of a pandemic, thus with that there were various accommodations that had to take place for instances interviews were held virtually and due to technological issues and network made it challenging to capture clearly the views. In addition, sample size for the employees was another limitation. This was due to decreased access to the employee due to the Covid-19 restrictions and the research was unable to convince more employees to take part in the research thus relying on the ones who personally volunteered. Lastly, the study took part in city of Dubai where there is growing acceptance for Artificial Intelligence with hubs and creation of smart mini-cities to support this integration thus then limits and creates a bias to the one city in the UAE.

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## Appendix A

### Consent Form for an Involvement in Study

#### **The Use of Artificial Intelligence and machine learning for Intellectual Property Rights management in UAE**

##### *Informed Consent*

**You are invited to participate in a research study** about the need and demands for Artificial Technology (AI) and Machine Learning (ML) for the Intellectual Property Rights (IPR) management process in the UAE.

The goal of this research study is to identify both the positive as well as negative factors associated with the inclusion of AI and ML in the IPR management process.

This study is being conducted by the student Abdulla Al Yazeedi from The British University in Dubai.

**Participation in this study is voluntary.** If you agree to participate in this study, you would be asked to fill in the below short survey about your experience with regards to the IPR management process, including your opinions about its efficiency, avenues of conflict/issues, and possible areas of improvement.

**Participating in this study may not benefit you directly,** but it will help us learn about how the impending decision of integrating Artificial Intelligence in Intellectual Property Management will change the way innovation is orchestrated in the region.

You may find answering some of the questions upsetting, but we expect that this would not be different from the kinds of things you discuss with family or friends. You may skip any questions you don't want to answer and you may end the survey at any time.

**The information you will share with us if you participate in this study will be kept completely confidential to the full extent of the law.**

The list connecting your name to this number will be kept in a locked file on the researcher's computer. No one at The British University in Dubai will be able to see your survey or even know whether you participated in this study. When the study is completed and the data have been analyzed, the list linking participant's names to the study responses will be destroyed. Study findings will be presented only in summary form and your name would not be used in any report. While the researcher(s) will keep your information confidential, there are some risks of data breaches when sending information over the internet that are beyond the control of the researcher(s).

**By completing this survey, you are consenting to participate in this study.**

*\*Please print or save a copy of this form for your records. \**

### Survey Questionnaire:

**Due to the current pandemic and the inaccessibility, it has brought down to both the researcher and participants, it has been suggested that participants can kindly use the highlight option (any colour) and/or Underline option to select your relevant opinion. After the completion of the survey, please email the questionnaire to respective email Thank you.**

1. How would you describe your experience filing application for your IP?
  - a. Very good
  - b. Good
  - c. Neutral
  - d. Bad
  - e. Very Bad
2. The process of IP application filing is an easy-to-complete process
  - a. Strongly Agree
  - b. Agree
  - c. Neither agree nor disagree
  - d. Disagree
  - e. Strongly Disagree
3. The rapidity of response associated with patent filing is high
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree
4. The cooperation and coordination of personnel and applicant is well managed during the process
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree

5. The overall process of IPR application is an efficient well-oiled mechanism
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree
6. The degree of technological development and integration in the process of IPR application filing is high
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree
7. The physical experiences pertaining to the IPR application process, such as meetings and face-to-face discussions with personnel were of significant help
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree

## **Appendix B**

### **Personal Interview Questionnaire**

**Due to the current pandemic and the inaccessibility for us to conduct a face-to-face interview, it has been suggested that participants will kindly either**

- a) Arrange for a Zoom meeting**
- b) Telephone Interview questions.**
- c) Type out the responses after which email the saved responses to the researcher**

**Please note that the survey will not take more than 20 minutes to answer.**

**Thank you.**

1. How has the UAE changed in incorporating technology such as A.I in the IP application process?

2. What is one thing that you think requires improvement in the current IP application?

3. What are some of the main obstacles that employees encounter in the current IP application framework?

4. How would you describe the working culture at the IP department of the MoE?

5. What is the level of daily interaction for you personally with digital/machine interfaces? Do you prefer the same over personal meetings/telephone conversations or vice versa?

6. What are some of the ways, according to you, to increase speed and rapidity of IP application processing functions?

7. From the perspective of your own role/responsibility, how many tasks or processes can benefit from automation such as A.I?

8. Which tasks, according to you, in the IP application process contain the highest amount of human errors?

9. What is the most time-consuming part of the IP application approval process according to you? What do you think the reason behind this?

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10. What are some of the skills that IP employees and executives, such as you, require to make good decisions regarding which innovations classify for protection under patents/trademarks/copyrights?

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