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INTRODUCTION

From cloud platforms and Big Data to the Internet of things and Smart Government Apps, the language of governments everywhere reflects the new and improved services that now harness the internet and other recent advances in technology to deliver better services. Like never before, technology is being wedded to public sector operational and governance processes to create new and innovative product, process and policy innovations.

This report displays 12 recent cases of innovation in the UAE public sector that reflect the government’s continuous commitment to spreading the culture of innovation in the government work. These innovations were selected principally to capture the breadth of innovative activity that is underway in the public sector based on key evaluation criteria such as novelty, ability to replicate and impact.

The report highlights the novelty of the projects that were team oriented rather than individually driven. A noteworthy feature of several cases was that the insight that led to the innovation came from a staff member in various sectors and departments. They received support and guidance of their leaderships that facilitated resources to them to turn their ideas into innovative and feasible government projects that benefit the community and the stakeholders while saving resources. This finding speaks volumes about the calibre and maturity of the public service leadership that welcomed ideas from staff and were willing to invest in their development.

We hope that these innovations will inspire those who have a passion and honest desire to make their country a better place.
FROM TRASH TO TREASURE: INNOVATIVE WASTE WOOD RECYCLING
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Summary
In the summer of 2015, the Municipality of Ajman approved a project suggested by workers in their cleaning section to recycle waste wood into a range of trash bins and public benches with various innovative secondary functions. The project is significantly reducing the amount of waste wood sent to landfill in the municipality as well as generating sales revenues that will be reinvested to develop other recycling projects.

Problem Background
A major consequence of the world’s increasing population is the concomitant rise in the amount of waste that ends up in landfills. In 2010, the World Bank estimated that 1.3 billion tons of municipal solid waste (MSW) was generated around the world of which wealthier nations are responsible for a disproportionate share. Almost half being produced by OECD member countries. In the MENA region, an average of 1.1 kilograms of MSW is generated per person per day. The World Bank also notes that as urban areas grow they produce more waste than comparable rural locations.

Within the broader context of this pressing global issue, the leaders of UAE’s Municipality of Ajman were concerned about their community’s high amounts of MSW going into landfill. Facing projections for further urban expansion and population growth and approaching the limits of their available landfill space, it was clear that the Ajman community could not continue to dispose of ever increasing amounts of MSW as they had in the past. This is a dire problem in the Ajman since the whole Emirate spans approximately 168 KM2. A closer examination of the waste sent to landfill in 2012 revealed over 540 tons of waste wood, mostly from discarded furniture and tree debris. This form of waste is difficult to compact and tends to require a large amounts of landfill space.

Developing an Innovative Solution
The leaders of Ajman Municipality set a goal to substantially reduce the amount of waste wood being buried in local landfills. In January 2015, members of the Cleaning Section of the Municipality came up with an innovative solution to help address the immediate local problem and the larger global waste challenge. They proposed to tackle these through innovative recycling of the waste wood. The challenge facing them was to create recycled products with sufficiently high level of market demand to consume the amount of waste wood that needed to be diverted from landfills. After considering different possibilities the team decided to create wooden benches and waste bins from recycled material, as these items had an identifiable market. They then took this a step further by coming up with designs with an appealing concept and/or which provided a useful secondary function, in order to enhance their potential demand. The latter a key factor in the ongoing sustainability of any recycling project.

The idea from the Cleaning Section was welcomed by the municipality’s Department of Excellence Program. To demonstrate what kind of items could be produced and sold, prototypes were built and displayed for review by management.

The team next investigated the cost effectiveness of recycling waste wood into bins at the municipality versus outsourcing this work. It turned out that outsourcing would cost 3,500 AED per bin while doing this in-house would cost around 300 AED per bin. Likewise, outsourcing the task of recycling waste
wood into benches would cost between 1,500 and 7,000 AED per unit versus around 100 AED for doing this locally. Outsourcing was thus quickly rejected as an option. The reason for the discrepancy in costs was very simple. When purchasing a bin from a seller the price is set based upon labor, material, design, and profits. The municipality were able to facilitate all aspects without spending the extra money on each aspect of the product. All labor needed for the project are people working within the municipality. Following acceptance of the prototype designs and decision to do the work in-house, a budget of 350,000 AED was allocated to the project team by the municipality’s management.

In order to gather wood waste most efficiently around Ajman, the project team surveyed the emirate and identified that eight sectors generated most of this type of waste. The team installed in these places 100 specially marked bins for wood collection and setup a warehouse with 2,000 square meters for separation and recycling, development and production purposes.

Within this workspace and amidst a growing stock of recycled waste wood, the team began working on ideas for bins and benches. The team was determined that all the designs should have a secondary purpose in order to maximize their value to potential customers. For example the bench in figure 1 serves as a rest stop and a waste bin that helps maintain the cleanliness of its surrounding area. Figure 2 shows a chair with a dedicated reading rest for outdoor use. While figure 3 shows a colorful recycling bin designed to help people to conveniently separate their waste. This recycling bin features an information sheet that describes what should be disposed of in each of its sections.

The project team was continually trying to come up with new and more creative and interactive products. Given that one of their goals is to educate and enthuse the resident population and particularly children about the importance and benefits of recycling, the team developed an interactive solar powered recycling bin that greets users upon their arrival and which is built in part from old car parts (see figures 4, 5, 6).

Results

The project has proven successful in terms of its primary objectives which were to help protect the environment and to save money for the municipality by diverting waste wood from landfills. From 440 tons of waste wood deposited in landfill in 2013, this amount has been decreased to around 200 tons. The municipality aims to reduce this by a further 100 tons.

Together with the benefits for the environment, the initiative is forecast to generate around 5,000,000 AED over the next five years. Of this, 3,500,000 AED will come from the production of bins with the rest from the production of benches. The municipality’s effort has been acknowledged locally as well as internationally when it received the Ideas America Award in 2015 for its innovative ideas that support the environment.

In order to create awareness of the recycling effort for future generations of the emirate, the Cleaning Section
of the Municipality insures that recycling bins that they produce are placed in schools for student use. This is a form of an informative campaign for students growing up within the emirate as well as developing a culture of recycling by the local community.

**Replicable Success Factors**

Recycling municipal waste to divert from landfills is neither new or innovative per se. However this project was innovative in the way that it recycled waste wood. By producing wood products that have a secondary function and/or attractive feature, this significantly increased their value and sale ability. The latter a key ingredient in the sustainability success of any recycling initiative. There is an important lesson here for other communities or organisations involved in waste recycling.

This initiative also highlights the importance of nurturing creativity and innovation in organisations. What stands out about the leaders of the Municipality of Ajman is the way they welcomed the creative suggestion for this innovative recycling concept from workers in the municipality’s Cleaning Section. Management treated these workers and their ideas with respect and ultimately committed funds to support their initiative, despite the lack of any formal...
qualifications or expertise in design, carpentry or innovation among the workers involved. In turn, these workers felt motivated to live up to the faith that had been shown in them and to ensure that the project succeeded. They came up with novel and innovative prototypes and figured out ways of building them for a fraction of the costs proposed by external entities. The conduct of both the management and workers in the Municipality of Ajman is commendable. Other organisations could benefit likewise from emulating them in this important respect.

The Municipality of Ajman intends to use the funds generated from this successful wood recycling venture to support the development of other categories of MSW for recycling. Their success has caught the attention of the other emirates interested in purchasing their innovative products as well as developing recycling programs of their own.
ENHANCING MOSQUES USING ARTIFICIAL INTELLIGENCE
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Summary
In 2014, The General Authority of Islamic Affairs & Endowments (also known as AWQAF) and Masdar Institute (MI) joined forces to develop the concept of a Smart Mosque System, which uses ‘smart’ technology to both maintain a healthy environment and reduce inefficient power consumption.

The results of a trial using three mosques in Abu Dhabi during the summer of 2016 resulted in an impressive 42% reduction in energy consumption. The estimated annual energy savings in these mosques is sufficient to power approximately 31 homes throughout the year. Given that there are over 5000 mosques in the UAE alone, the wider application of this technology is forecasted to yield enormous savings for the country.

Problem Background
Following the slide in oil revenues in 2006, UAE government subsidies needed to be revised in line with a reduced federal budget. Agencies such as the Crown Prince Court (CPC) expressed concern that more effort was required to use available funds more wisely and efficiently.

The higher price of fossil fuels had a doubly-severe impact on the cost of electricity in the UAE. Not only was fuel more expensive, but also the government had less available revenue to pay for its use in electricity generation. Finding opportunities to reduce energy consumption thus became an important priority for the nation.

In Abu Dhabi, approximately 70% of electricity costs are due to air conditioning, which suggested that air conditioning is a good place to seek efficiency gains. In this respect, there are over 5,000 mosques across the UAE that are significant users of energy for air conditioning as well as lighting, with each consuming an average of 100,000 AED in electricity annually. Given this high rate of consumption and the large number of sites, the CPC identified mosques as potentially opportune places to improve energy efficiency. At the CPC, His Highness Sheikh Mohammed bin Zayed, the Crowned Prince and Head of Armed Forces of the UAE, met with leaders from AWQAF who accepted this challenge in 2008.

Developing an Innovative Solution
At the time that the CPC and AWQAF were searching for a solution to high electricity consumption in mosques, a technology-driven shift was occurring in the way that electricity was being consumed in advanced economies around the world. The advent of more sophisticated monitoring tools, as well as ‘smart’ electricity meters, made it possible for users to reduce the costs of unnecessary lighting or air conditioning through systems that autonomously monitor and learn the users’ actual needs.

The abovementioned technology inspired the idea of a smart mosque system at AWQAF. Coincidently, in 2014, two faculty members at Masdar Institute started working on a system designed to reduce the energy consumption in mosques. The faculty members approached AWQAF to seek permission to deploy the system in a number of mosques in Abu Dhabi for testing purposes. AWQAF found in MI an ideal partner, because it is a local university and its focus is specifically on tackling issues of sustainability in the energy sector through innovation.

In particular, the MI team consisted of two faculty members, who supervised a number of research engineers as well as some MSc and PhD students.
They developed an ‘intelligent’ building-management device, connected to the air conditioners in mosques (the device can easily be modified to control the lights as well). This device adjusts the air-conditioner output according to the level of activity and the thermal needs at the mosque at any given point in time. The basic idea is that air-conditioning can be shut down when no one is present (the same applies to the lights, when the system is extended in the future), and the output of the air-conditioner can be reduced when there are fewer people present, or when the external temperature drops. With the data from the device being stored in a virtual ‘cloud’ database, maintenance and service needs can be scheduled automatically, and malfunctions can be detected instantaneously, in which case the system sends alerts (be it via SMS or email) to the maintenance team. This data can further be used to undertake reviews of the system itself to identify further opportunities for efficiency and savings.

The absence of such a ‘smart’ monitor on the market meant that the team from MI had to build their prototype from scratch. Sourcing the necessary components and the iterative trial and error process required to develop a version that met all of the required performance specifications exhausted the project budget, requiring several professors in the MI team to contribute their own funds to keep the project going until success was finally achieved in 2015. The final product is shown in figure 1.

The Smart Mosque Monitor surveys the inside of a mosque along various dimensions. It uses state-of-the-art algorithms to analyse the video footage in real time, and that is to count the number of people entering or leaving the mosque, and also count the rows that people create as they form group prayers, in addition to other behavioural patterns. The device uses a form of artificial intelligence programmed into its software to analyse the data (which is collected from different components of the system, such as the camera, the power-consumption meters, and the numerous temperature and humidity sensors). As the system observes the mosque over time, it literally “learns” what patterns of activity to expect at different times of the day, and different days of the year. Furthermore, the system learns over time the ‘thermal properties’ of the building, such as the rate at which the building leaks the cool air under different weather conditions. By learning these properties, the system is able to provide air-conditioning configurations that are tailored to that mosque’s needs. Figure 2 illustrates the different components of the system.
The prototype was trialled in three mosques in Abu Dhabi over the summer of 2016 (note that the system has been deployed in some of these mosques for over 18 months for testing purposes, but the full deployment of the completed system took place in the summer of 2016). The Smart Mosque Monitor now includes an alarm to indicate that a fault has been detected, in which case a fail-safe mode is automatically activated. This minimises disruption to the operations of a mosque because if the system is shut down due to a fault, it automatically alerts administrators and relinquishes control over the mosque’s air conditioning to manual operation by persons in the mosque.

In addition to reducing the energy consumption, MI and AWQAF saw opportunities to use the technology in the device to deliver additional services to the host mosque. For example, the upgraded device is able to count the number of people entering and exiting, as well as the number of rows formed during group prayers. With such information, a mobile App can be developed and released to the general public, which displays the live occupancy rates at each mosque. Such a mobile App enables members of the general public to make informed decisions about which mosque to visit, especially during Friday prayers (e.g., by selecting the mosques that are less crowded). The device is also able to perform automated live recording and archival of Friday sermons, which assists the Imam who currently has to personally record and upload each Friday sermon. The system can also be expanded to have security-related features, e.g., by scanning the mosque activity for abnormal patterns of behaviour (as illustrated in Figure 3). Lastly, the system can be expanded to provide the authorities with the ability to communicate information to the general public through the mosque speakers, which can be particularly critical in disaster-response scenarios.

In summary, transforming mosques using the Smart Mosque Monitor yields the following benefits:

1. Energy savings (through the intelligent control of air conditioning);
2. Instant fault detection (with manual over ride to minimize disruption);
3. Facilitate the Imam’s job (through the automated recording and archival of Friday sermons);
4. Enhanced security (through the detect of any abnormal occupancy patterns);
5. Improve the experience of visitors to a mosque (by enabling them to avoid overly-crowded mosques, and by adjusting the temperature according to scientific measures of comfort).
Results
The testing period has shown several very positive outcomes. Electricity consumption has been reduced by an impressive 42%. Extrapolating the savings observed at the three pilot sites to all 5000 mosques yields projected annual savings in the order of at least 150,000,000 AED.

As for the users of the mosques, the environment has been significantly enhanced by a system which consistently maintains comfortable and healthy temperatures. The additional functions of the device have also been well received: Imams are able to have their sermons and prayers recorded automatically without needing to go through the hassles of setting this up manually each time, as they did in the past.

Replicable Success Factors
In light of the impressive savings in electricity observed at each mosque during the testing phase, AWQAF was inspired to implement the technology in their Quran Memorization Centres to reduce electricity costs similarly. The teams at MI and AWQAF believe that this system can be implemented in other similar areas such as educational and sports facilities. Indeed the possibilities are significant for any organisation with large open plan areas, such as airports or large factories that also need to use energy for lighting and air-conditioning efficiently and who need to monitor behaviour patterns for security.

Having received enquiries to deploy the system in mosques as far away as the United States, and to help make the technology accessible more widely and commercially, MI has created Qudra Technology Limited, a spin-off company dedicated to market this system regionally and globally. Doing so will also generate revenues that help AWQAF to fund further experiments with technology related to Islamic affairs.
CUTTING EDGE INNOVATION IN POWER PLANT SYSTEMS: A LESSON IN WORKING SMARTER
CUTTING EDGE INNOVATION IN POWER PLANT SYSTEMS: A LESSON IN WORKING SMARTER

Summary
In their efforts to achieve His Highness’ Sheikh Mohammed bin Rashid Al Maktoum, UAE Vice President, Prime Minister and Ruler of Dubai, vision that innovation becomes a governmental habit, daily practice, a well-established organizational culture, and that the UAE Government be the most innovative government in the world. Also, as part of the vision of Dubai Electricity and Water Authority to become a sustainable innovative world-class utility, DEWA’s leadership always promotes and implements innovative initiatives to upgrade its data systems. Converting its eight autonomously functioning power stations into a network of smart power plants was one of those innovative initiatives. Information systems were upgraded in each plant to export real-time data in a common format and an innovative one-way data diode (ODD) was installed to secure each against the risk of cyber-attacks that may perpetrate through the network. The new Centralised Plant Information System (CPIS) was designed in 2014 to transform the data from the power plants into a range of reports that DEWA management could use to support decision making. These reports would then be translated into innovative graphical displays that provide all the stakeholders with a holistic and transparent view of the power plants’ condition in real-time to support quick and accurate decisions, especially during emergencies. The information display also assisted in managing faults and technical issues. This system, which has been recognised locally and internationally for its innovation, has been a major factor in the current world-leading standard of service that this organisation now delivers.

Problem Background
Finding efficiency gains has always been an objective for DEWA management. One of the challenges was due to that its eight power and desalination plants operated as standalone facilities, each independently operated from a separate control room by small teams of engineers and technicians trained to use the unique proprietary control systems. Considerable man-hours per day, roughly 22, per station were required to consolidate plant level data to produce the daily reports at Generation Division level. In short, DEWA’s management needed real-time data to get online calculations of efficiency and performance, let alone recognise and respond rapidly to a sudden loss of capacity or other technical problems.

The prospect of cyber-attacks on utility sector world-wide posed an altogether different problem for providers like DEWA. A pre-meditated attack on a city’s power supply to cut off its access to light, running water, refrigeration, medical care, etc. represents a far more menacing threat than an outage arising from a technical fault or accident. The growing sophistication and severity of documented cyber-attacks on power plants in Iran, South Korea and most recently in the Ukraine, has left utility providers everywhere scrambling to safeguard their systems.

Developing an Innovative Solution
Facing a forecast for growth in demand for power and having learned lessons from incidents in the past, DEWA’s leadership recognised that they needed to capture, analyse and respond to business critical performance data in real-time. They needed to respond
swiftly to demand fluctuations and to find ways of improving productivity and efficiency. Knowing both the strengths and weaknesses of the business intimately, a team from Generation Division with the required competencies was assigned to the task of leading this priority initiative for the organisation. The team members were equipped with the experience, technical background and skills, and a sufficient level of empowerment within the organisation to be effective organisational champions for the task that lay ahead.

Cognisant of the large number of challenges that had to be overcome, the project took a staged approach. This began with an upgrade of the standalone information systems in each of their independently functioning power stations so that they generated common data outputs that would allow DEWA to manage them as a related set of smart power stations.

The next step was to secure the network of smart power plants against cyber-attacks that might be perpetrated through the data network used to transmit their information to the Centralized Plant Information Systems (CPIS). The project team looked widely for solutions to this problem, participating in international conferences, meeting leading technology companies and organisations doing similar work, in order to determine what technical solutions were available that might meet their own. The DEWA team became drawn to the concept of a one way data diode (ODD) as a neat solution to the problem posed by cyber threats. The idea of which was to connect stations in a way that allows data only to exit with nothing received in return. This addressed the security issue because, irrespective of unforeseen penetration of DEWA’s systems, there was no possibility for external inputs into the control systems of any of its stations.

However, implementing the ODD solution was not straightforward. Because the technology underpinning devices that could be purchased was based on closely guarded proprietary systems, none could be fully tested against cyber threats. This risk, coupled with their high prices and the likely need for a contractually expensive long-term dependency on an external manufacturer, led to a decision to develop an in-house solution in 2013. The rationale being that it would be more cost-effective in the medium to long-term and most importantly, it would be more secure for DEWA to own the underlying intellectual property so that it could subject the ODD to the most stringent tests of robustness against cyber-attacks. The engineering and technical expertise at DEWA set about developing an in-house ODD with custom software to connect DEWA’s plants to its intranet and corporate accounts.

The ODD prototype developed within DEWA was tested by various cyber security experts who attempted to breach its security protocols. All of these experts failed to do so, suggesting the ODD was fit for purpose. Figure 1 below illustrates how the device was then implemented across DEWA to transfer plant data to its CPIS. Note the absence of bi-directional arrows at the ODD linking power stations to the CPIS server which indicates that information is transmitted only from and not received by the individual stations.
The final objective for the project team was to build a CPIS that could automate the execution of the complex thermodynamic calculations and other equations that had, in the past, been performed manually. The new CPIS was designed to facilitate online production and KPI monitoring, evaluation, reporting and instantaneous SMS or email notification of abnormal unit conditions. This integrated picture of system performance now allows DEWA’s personnel to access real-time plant data, dashboards and to generate executive reports on the move or through the corporate intranet from smart devices, PCs and laptops.

The system has acquired intelligence by capturing the gained expertise and implicit knowledge of DEWA experts and embedding them in the system. Also by programming in the logic processes typically used by plant system operators and engineers to diagnose and resolve faults, the system is further able to generate intelligent reports (performance analysis, life time monitoring, root cause Analysis, etc...) that give an
enhanced level of support to decision makers. Figures 2 and 3 show sample visuals of the sorts of informative data that is accessible live from any workstation connected to DEWAs network. The CPIS system can now monitor components within each power plant with such accuracy that many problems are now solved very rapidly. Generating complex reports is now as simple as a click of button and these can be sent automatically to relevant stakeholders according to daily, weekly, quarterly, or yearly schedules.

The enormous volume of system-wide business critical data captured by the CPIS was innovatively and summarily transformed by the project team into more accessible graphical displays that provide holistic and transparent view of the power plants’ condition in real-time. This is especially useful in emergencies and in fault and technical diagnostics since the system can carry out output adjustments or other corrections before a problem has an opportunity to escalate.

For example, the operating staff in one of DEWA stations are responsible for the daily coordination of water production to meet the consumption needs of the main drinking water reservoirs in the whole Dubai. Using live data screens provided by the CPIS System, they can easily coordinate by knowing the availability and readiness of all desalination plants and their production capacity.

The team is currently working on the fourth stage, also know as “Operational Excellence”, which is based on the
development of their system through methodologies revolving around the incremental innovation. The objective is to make the system autonomous to the extent where an artificial intelligence will monitor the plants and give signals to regulate them as needed during their operation.

Results

The upgrade which standardised the data exported by DEWA’s plants to an integrated CPIS and the use of ODD’s to secure each plant against cyber-attacks, effectively created the first set of smart power plants in the UAE. The installation of the CPIS to automate the calculations and transformations that were previously performed by teams of engineers, represents significant cost savings. The final price of 40,000 Dirhams for each unit compares very favourably to off the shelf products that cost between 300,000 to 500,000 Dirhams. Building the device in-house also developed the technical skills and confidence in DEWA engineers, positioning the organisation well to undertake future upgrades and resolve other technical challenges.

The CPIS System has enabled concerned DEWA staff to study, analyse, determine the root cause and then develop the solutions for the repetitive tube failures in M-Station boilers which had cost the authority significant losses due to the long outages. This was achieved by enabling the staff to utilize the system features by studying all the operational conditions and carry out online comparisons between the performance of those boilers and similar boilers in other stations.

The system also drew the attention of the concerned staff to the degradation of air compressors efficiency in some gas turbines. This allowed staff reactions to be swift in order to restore the efficiency to normal levels, in turn reducing operational costs.

An annual savings of 1,009,225 Dirhams is also achieved by automating the daily operation reports through the system.

The success of the ODD invention and the CPIS control system have been recognised both locally and internationally. In 2014, the ODD project won the UAE Idea award. In 2015, the ODD received the DEWA Innovative Idea Award. In 2016, the CPIS system received the Champion’s Category award from the International Telecommunication Union during the United Nations World Summit on the Information Society forum in Geneva. The CPIS system of smart power plants has also been nominated for the UK Ideas awards in late 2016.

Replicable Success Factors

The comparatively low cost per unit and successful implementation of the ODD device at DEWA suggests that it could be easily implemented by other private or public businesses who operate plants in a similar network configuration (such as oil and gas) and who face similar risks. The project team responsible for its creation and installation at DEWA are currently undertaking the processes to patent it as commercially viable invention.

The specific data transformations, reports and graphics created by the CPIS apply specifically to the DEWA sites and business and are not directly transferable to other organisations. However, the process and rationale for the data transformations, reports and innovative graphical displays and how they are used to cut costs and improve efficiency, performance and safety – demonstrates the advantages of a smart power plant system, which other similar businesses could and should seek to emulate.
CREATOPIA PLATFORM:
THE DIGITAL SPACE FOR
THE CREATIVE COMMUNITY
CREATOPIA PLATFORM:
The Digital Space for The Creative Community

Summary
Towards the end of 2015, Dubai Culture & Arts Authority (Dubai Culture) launched Creatopia – a Dubai government-empowered virtual community for creativity. The innovative online space allows artists to upload and share their art work, search for potential opportunities to showcase or sell to art lovers and creative entrepreneurs, or simply browse the wide portfolio of works on display.

Creatopia is the first government digital platform in the MENA region that is dedicated specifically to the creative arts and associated goods and services. The inspiration for its creation came from its patron, Her Highness Sheikha Latifa bint Mohammed bin Rashid Al Maktoum, Vice Chairman of Dubai Culture, who wanted to give the creative community a space to connect, share and grow on the local and the international levels irrespective of geographic distance.

Problem Background
The global market for creative goods and services was estimated at USD 2.25 billion in 2015. Despite this impressive figure, for many budding and even established artists and creative entrepreneurs, finding platforms to display, promote and sell work or creative skills poses a constant challenge. Barriers to market range from a lack of business training and acumen to set-up and marketing costs.

In many countries, emerging artists struggle on a daily basis to establish their creative enterprise and to find a fixed income while developing their talent. Artists in the Middle East also face cultural impediments, due to the perceptions associated with a long-term career in the arts. In general, emerging artists have lower career expectations than graduates who hold degrees in more lucrative or recognised areas such as law, engineering, and science.

Young artists need time and support to develop their skills, ability and reputation. This means that they are and should be in a constant search for opportunities. While the advent of digital platforms such as Behance, Instagram, and various other social media channels have allowed entrepreneurs in many sectors to grow their businesses, there hasn’t yet been a central platform that caters for the arts industry and creative talents in the UAE. Such platforms are critical to support and nurture artists and help them capitalise on the potential opportunities offered by the digital age, as well as to enable a constant exchange of knowledge and expertise in the creative community.

Developing an Innovative Solution
Dubai Culture is a relatively young entity. It was established in 2008 under the patronage of His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, and charged with the primary goal of supporting the development and growth of culture, arts and heritage in the Emirate of Dubai through its vision ‘To be a platform of diverse cultural exchange and innovation, regionally and globally.’

The idea was inspired by a quote from His Highness Sheikh Mohammed bin Rashid Al Maktoum, addressing young up-and-coming artists. “Dubai is your canvas” was the statement from His Highness, who emphasised that budding artists are essential to his vision for the future of the Emirate: “Dubai’s artists, innovators and creative talents are integral partners in its development and through their work they can capture its unique essence and voice.”
The Dubai Culture development team set about finding a solution that would make this vision a reality, stimulate growth, and help artists to find the right opportunities such as projects, job offers or a potential patron, mentor or art collector.

The team began by studying popular social media platforms including Behance, Instagram, LinkedIn and Facebook, to determine if these could be adapted to achieve their objectives.

Behance is a digital platform that is dedicated to connecting the arts industry with up-and-coming talents. Here, artists can promote their work and connect with others who may be interested in collaborative ventures. While Behance offers a number of useful features, it does not cater for all the needs and services that artists require to grow and find real opportunities to establish their careers.

Instagram is renowned for helping creative people such as artists, fashion designers, and other talents promote themselves and their products; however, it lacks a dedicated marketplace. Likewise, LinkedIn has proven very effective for helping people find jobs and connect with members of their industry, but it lacks the reach of Instagram as well as a dedicated marketplace.

Finally, the team looked at Facebook, which aims at connecting people and growing its capacity to promote products and services to a global audience. Despite its impressive global reach, the team found that Facebook is not equipped to facilitate the sorts of connections that an artist really needs to grow and develop. By way of example – two Dubai residents (Person A and Person B) may be connected on Facebook by a mutual friend. Person A is an artist living in an area and Person B is a well-connected arts industry professional residing in a different area. The problem the team identified with this scenario is that Facebook does not serve to introduce Person A and Person B, or to help them realise that they share a mutually common interest in art. The connection offered by Facebook does not generate value for either Person A or Person B in relation to their artistic careers.

Following its survey of social media platforms, the development team at Dubai Culture concluded that it needed to amalgamate key elements of these existing platforms, while also introducing additional features.

The team began by clarifying who their proposed platform would serve and how. They envisioned their end users as a ‘collection of creative, talented individuals, who are brought together by shared passions and ambitions’, and their objective as ‘structuring the community towards progress through opportunities.’

To build such a platform, the team was split in two to find solutions to the creative as well as technical challenges involved. This decision was based in part on the team member’s talents, but also on the need to find a solution in a timely fashion. While the creative part of the team was charged with creating a brand, logo and marketing plan, the technical side took on the task of building a digital space that would achieve the initiative’s objectives and be equipped to overcome any technical obstacles.

The logo shown in figure 1 was inspired by the abovementioned description of the end users, as imagined by the team. Each dot symbolises a member of the community, while the symmetrical design represents a community that connects its members either directly or indirectly. Alongside the logo, the Creatopia name was devised to communicate a spirit of a ‘creative utopia’ – a space for creative talents.
With a logo and a brand name in place, the creative team went on to develop Creatopia as a platform that would be capable of supporting the ‘Creative Talent’ of artists and providing ‘Entity Benefits’ to businesses involved in the art industry. The vision for Creatopia was to help artists grow and become increasingly insightful and creative, while also learning how to market their work professionally. The team envisioned that members of the Creatopia community would learn and mature via feedback and reactions received from the online community. The team also believed that exposure to other artists would grow and deepen the community’s understanding of business and marketing within the art industry.

The Dubai Culture team saw Creatopia offering young artists recognition and opportunities in the art sector. By bringing their attention to training programmes and artistic events, connecting them with potential mentors and interested arts institutions, and even encouraging them to create their own opportunities via collaborative ventures, the site creates job opportunities and provides artists with promising leads.

With the concept taking shape, the technical team focused on building a portal to deliver everything that had been imagined. The team decided that Creatopia needed dedicated pages for ‘Events and News’, ‘Opportunities’ and ‘Legacy Accounts’, while also featuring a ‘Market Place’ that would be made available in phases. The ‘Events and News’ page provides easy access to ‘what’s on’ type information for artists, art-lovers and creative businesses across Dubai and the Middle East. ‘Opportunities’ is a page where members can promote openings and occasions in the art sector, without the hindrance of middle-men, while ‘Legacy accounts’ consists of pages that display artworks produced by iconic people who made history in the art industry. Finally, the ‘Market Place’ page permits direct interaction between sellers and buyers, eliminating intermediaries.

The technical team had to overcome a number of obstacles to deliver on Dubai Culture’s vision without compromising the creativity of the artists who use the site. The team had to devise servers capable of storing large amounts of data, and harness optimised software to ensure full uploading capabilities, whatever the file size or transmission rate. The team wanted a familiar, user-friendly portal design, so they settled on an arrangement and presentation that is consistent with that commonly found on social media websites.

The various sections and features of the portal are organised and designed to facilitate visitor access and artist visibility. Projects are directly displayed the moment a user enters the site (as seen in figure 2), and can be immediately viewed in more detail via a single click. The site also offers filters that visitors can use to search for specific categories of projects. To the left, a column highlights the work of popular artists, relevant events, and major community news.
Results

With the launch of Creatopia, Dubai Culture has created a strong platform that will inspire and motivate local and regional artists, creative workers and businesses through its dedicated marketplace and its creation of economies of scale for the region’s creative sector.

By the end of 2016, Creatopia had attracted over 1,800 registered users, with a near equivalent amount of live art projects and an average of 18,000 daily visitors. Dubai Culture sees the burgeoning Creatopia community envisioned by His Highness Sheikh Mohammed bin Rashid Al Maktoum as essential to the infrastructure needed for Expo 2020, as well as to helping realise the goals of the UAE’s Smart Government Vision 2021.

Creatopia is supporting the arts industry by crowdsourcing local artists and nurturing the Emirate’s home-grown talent. Its membership now spans a diverse array of talent, including artists, writers, poets, calligraphers, lyricists, musicians, singers and actors. Creatopia is also showing Dubai Culture which areas in the arts are thriving, and which still need more exposure.

Replicable Success Factors

In many ways, Creatopia represents an evolution of social media channels such as Instagram, LinkedIn and Behance, because it provides elements of these existing platforms but presents them in a completely new package that allows artists to grow, mature, and access digital and real markets in an unprecedented way. The innovative conceptual model that was developed by Dubai Culture for Creatopia has great potential to be adapted for use in other sectors, particularly those that are characterised by piecemeal production. This is certainly true of the fashion industry, for example, where ‘community pooling’ may yield benefits arising from economies of scale. Beyond this, the Creatopia model could also be replicated within government, where a similar digital platform may be valuable for sharing competencies across departments and reducing the need for sourcing similar competencies externally.
STANDING TALL FOR CITIZENS WITH A DISABILITY: THE SMART PARKING SPOT MONITOR
STANDING TALL FOR CITIZENS WITH A DISABILITY: THE SMART PARKING SPOT MONITOR

Summary
In 2014, the Dubai Police service invented an autonomous Smart Parking Spot Monitor that has reduced illegal parking in places reserved for persons with a disability as well as the need for an officer presence to deter and prosecute violations. This innovative device combines existing radar and cutting edge communications technologies. It warns potential offenders while gathering photo and video evidence to prosecute violations. Its very presence removes any possibility in the mind of a driver that they can escape sanction for parking illegally in these spaces. Indeed, the results of a real-world trial show that violations almost entirely cease wherever the monitors were installed. As well as developing an innovative solution at a very low cost, their effectiveness has allowed the Dubai Police service to reallocate its patrol officers to other policing matters.

Problem Background
The World Health Organization estimates that at least 1% of people in the world have a disability that affects their daily life. However, since societies have begun to acknowledge their disadvantage, laws and standards have been passed to help minimize or offset the impacts of having a disability. In 2006 His Highness Sheikh Khalifa, the President of the United Arab Emirates, the Emir of Abu Dhabi and the Supreme Commander of the Union Defence Force, enacted the Federal Law Number 29 which states “every person with disability shall have the right to an accessible environment and to have access to everything that others have access to”. To further equality for people with disabilities within the emirate of Dubai, His Highness Sheikh Mohammed bin Rashed, Vice-President and Prime Minister of the UAE and the Ruler of Dubai, enacted Law Number 2 in 2014. These laws have resulted in numerous actions by municipalities and organisations to facilitate access to persons with disabilities.

Around the world, there are drivers without disabilities who use these spaces illegally and to the detriment of disabled persons who really need them. In response, governments use local police and other inspectors to monitor these spaces and to issue fines for violations. This solution is however neither highly effective nor efficient. As well as consuming valuable police resources that could and should be better directed to more serious matters, the deterrent effect of fines is not sufficiently effective. This is because some offenders believe that they can occasionally risk violating the law without a police officer or parking inspector noticing their actions. Indeed, in 2014, the Dubai Police service issued 8,371 fines to drivers parking illegally in a disabled spot, which indicates it is not occurring infrequently. While the need to reduce illegal parking is pressing, the paradox for authorities is the cost barrier that limits the number of officers...
that can be assigned to monitoring duties versus other arguably more pressing matters. Particularly at a time when many communities want their police officers to be focusing on more serious crimes than parking violations.

Developing an Innovative Solution

While innovations that lead to performance improvements occur from time to time in most organisations, few endeavour to make this their modus operandi like the Dubai Police whose stated objectives are to: ‘maintain road rules and regulations’ and ‘consistently innovate internally’. It has been a regional leader in the use of DNA testing and electronic fingerprinting methods in criminal investigations, in electronic services, in establishing a human rights office and in using Global Positioning System technology to monitor its patrol cars.

More recently, the Dubai Police provided officers in its patrol cars with a set of the Google Glass glasses developed by the technology giant Google. These high-tech glasses use 3G mobile networks to instantly notify police officers of a traffic violation committed by a driver of a vehicle that they scan with the device. The effectiveness of this innovative image scanning and communications technology inspired a group of officers within the Dubai Police service to adapt it to develop a solution to the problem of illegal parking in places allocated for disabled persons.

In August 2014, a suggestion submitted through the internal feedback system of the Dubai Police service described the creation of an autonomous device to replace the police officers used to monitor and prosecute parking violations in disabled spots. Together with the communications and scanning technology from the Google Glass apparatus, the suggestion proposed incorporating a radar sensor to monitor entry in a parking spot. While Doppler radar based equipment is used by police to monitor vehicle speed, many car makers are now using it in driver aids that help drivers to reverse and park their vehicles. Here a radar signal is used to recognise the arrival of an object within a set distance of a sensor. The overriding idea of the device was simple: to immediately warn potential offenders that they were illegally parking and to make it clear that there was no possibility for offenders to avoid sanction.

Recognising the potential merit of the idea, the Dubai Police service consulted with companies that provided them with speed monitoring radar equipment. Vendor proposals to build the monitor quoted prices between 270,000 and 370,000 AED per monitor. Given the apparent high cost of an outside solution, the management at Dubai Police decided instead to try to develop their own device. A team of eight members were assigned responsibility for building a prototype under the direction of a ranking Colonel.

By aligning the project to Dubai Police’s strategic plan, which had a focus on ensuring compliance with road rules and regulations, the team were able to access start-up funds to acquire hardware and components to build the prototype that is shown in figure 1.

Figure 1 First Prototype of Monitor
(Courtesy of Dubai Police)

The Abu Dhabi University was extremely impressed with Dubai Police’s progress with the radar, especially since it was an in house product. To understand how the team reached this stage of progress and design, they requested to review the unit and their project management report notes.
The appearance of the final operational prototype within just seven months was now more along the lines of the iconic Burj Khalifa that dominates the local skyline. The unit was redesigned to be more easily portable and mobile which means it can be moved after it has successfully reduced violations at a site or whenever its impact is required elsewhere. Sensors were recalibrated and placed more effectively to detect approaching vehicles, together with a host of other minor improvements.

The main components of the Smart Parking Spot Monitor are the sensors, mother board, memory storage unit, video recording camera, external speaker, visual alarm, power supply and a small cabinet for spare parts. The monitor has an external port for connecting a computer to make changes to its operating software. A maintenance truck has also been equipped with spare parts and tools to maintain or relocate the device when required.

The monitor’s systems are activated when its sensor detects movement in its immediate vicinity. The monitor provides a visual and audible alarm, advising drivers that they are attempting to park their cars at a spot designated for persons with a disability. Following this, the video camera records 20 seconds of footage to capture the vehicle license plate number as well as an offender as they exit their car. Simultaneously, the license plate sensor reads and sends the number to the registry of motor vehicles via the 3G mobile network. The registry’s computer system verifies whether or not the vehicle is authorized to use the parking spot. If the vehicle is not authorized, the camera stores the images of the license plate and video of the driver in its memory. This forms the evidence base in the event that an offender disputes an infringement notice. To conserve storage space, images and videos are stored only when a violation occurs.

The mobility of the monitor allows it to be targeted to known hot spots for offences or else it can be rotated across a facility with multiple parking places for disabled persons. Its high resolution cameras can also be programmed to monitor one or several parking spots that are within its proximity.

Results

To trial the Smart Parking Spot Monitor, the Dubai Police placed several units in the parking lot of the Dubai Mall which receives approximately 220,000 visitors each day. When the monitors were first placed, only a handful of fines were issued. Within weeks, however, there were no instances where disabled parking spots were illegally occupied. Moreover, during the three months of operation there were also zero unit failures and no technical problems reported. This suggests that the units are reliable and that maintenance costs will be low.

The cost of building the Smart Parking Spot Monitor was 15,000 AED. This represents an enormous saving over the 370,000 AED quoted by outside vendors. A secondary and even larger financial and community benefit arising from the effectiveness of the new parking space monitors is that they are allowing Dubai Police to reallocate patrol units to more pressing matters than parking duty.

Building a parking monitor that frees up officer resources so quickly and at such a low cost is a very significant achievement. In this regard, the Dubai Police has been recognized for this innovative monitor and have been asked to display it in three different exhibits.
in 2014: Gitex, Gulf Traffic, and The Government Achievement Summit. In 2015, the Dubai Police was invited to attend the 10th Best Police Invention Summit to display and present their monitor.

**Replicable Success Factors**

Given its success and interest expressed from police elsewhere, the Dubai Police is now looking at options for licensing its technology or creating a company that sells the product globally. The successful use of radar and communications technology to replace the physical presence of police officers suggests we may see variants appear in other policing contexts in the future.

Notwithstanding the merits of the Smart Parking Spot Monitor which has been recognised internationally for its innovation, the process that led to its creation includes a number of other important lessons. Firstly, the action of the Dubai Police service in making innovation a formal business objective was an important step in empowering the creative talent within its workforce to seek better and more efficient ways of doing business. Its willingness to equip its officers with Google Glass technology sent a very direct message that the organisation was serious in its determination to be an innovative agency. The implementation of The Dubai Police internal feedback system deserves special mention because this innovation was the mechanism by which an officer on the ground, who was well informed about the parameters of the problem and who saw a novel solution, was able to share their idea with senior management. The willingness of the latter to pursue it and to allocate personnel to form a project team, once again shows the importance of management being committed to innovation. The final product which while highly innovative, doesn’t seem so surprising when viewed within the supportive environment for innovation created by Dubai Police. An organisational commitment to pursuing innovation is clearly something that other agencies could adopt to their equally considerable benefit.
SMART SYSTEM FOR
STUDENT’S SAFETY INSIDE
SCHOOL BUSES
SMART SYSTEM FOR STUDENT’S SAFETY INSIDE SCHOOL BUSES

Summary

The vast majority of school busses around the world rely on a driver to monitor the safety of travelling children. However, with large numbers of children to monitor while negotiating a route and the need for urgency in delivering them to school on schedule, the risk of human error remains even if monitoring protocols exist. Following a tragic accident in late 2014 that resulted in the loss of child’s life, the Ministry of Transport undertook to substantially upgrade the safety systems on busses in time for the following school year.

Each of the 1,300 busses operated by Emirate Transport was fitted with an innovative safety system that provides multiple means of checking that no child remains on board at the end of a route. Connected by mobile 3G technology to a control centre, the compliance of drivers with safety protocols is automatically checked and alarms issued if an alert occurs or if sensors detect movement on a supposedly empty bus.

Problem Background

On October 7, 2014, a four-year-old Abu Dhabi kindergartner named Naziha Al Ahmed died from heat exposure after being accidentally left locked in a school bus. She had boarded the bus at 6.30am and fallen asleep en route to school. She was inadvertently left inside after the other students disembarked and the bus was parked and locked. When the bus was reopened at mid-day to take students home Naziha was found deceased.

At the time of this tragic event, monitoring and accounting for students on school busses in the Emirate relied solely on a visual inspection process conducted by the driver and a monitor appointed by the school to accompany the students. At the start of a route, the driver was required to flip a two-sided signboard which says “bus is empty” to show instead “occupied with students”. As each student enters, the monitor notes their presence on a checklist. When all children are on board, the monitor does a head count to confirm the tally shown on their checklist. Upon the bus’ arrival at school, the monitor is meant to count students as they disembark and then finally, to walk through the bus to check if anyone is still on board. The driver then repeats the inspection and changes the sign from ‘occupied’ to ‘empty’. If the monitor observes that fewer students exited the bus than indicated on the checklist, they must immediately report this to the school’s administrators.

The subsequent investigation of the tragedy concluded that human error and a failure to comply with safety protocols caused the loss of Nahiza’s life. The accident occurred because the driver and monitor did not correctly follow the protocol described above. Investigators concluded that even with two adults to check that all of the children had disembarked, the existing protocol could not be relied upon.

Developing an Innovative Solution

Following the tragic loss of Naziha’s life in October 2014, Emirates Transport immediately announced that it would upgrade its monitoring systems by the start of the following school year. In November 2014, a team was assembled at Emirates Transport to look at how the existing protocols could be improved and to investigate other more reliable methods of ensuring child security on busses. The team had the following four objectives:

1. Increase the safety of students on school busses
2. Ensure all systems and processes proposed are correctly implemented
3. Decrease response time to any incidents involving school buses
4. Eliminate the problem of a child being left aboard a school bus

Following an examination of systems used around the world for monitoring child safety in transit, a decision was made to build upon an existing development concept at Emirates Transport for a ‘smart’ bus. Akin to the concept of a ‘smart’ phone, the proposed approach was to equip busses with enhanced functions and sensory capabilities to detect and monitor children as well as driver compliance with safety protocols, and to generate alerts if something appears amiss. A key objective of this upgrade was to include multiple back-up systems so that a problem will be detected even if a component in the monitoring system fails.

The proposed upgrade included innovative hardware that is not typically seen on school busses. An intelligent camera and closed circuit television (CCTV) system would be installed at the entrance of the bus to count students getting on or off and to monitor the behaviour of students and the driver. A mandatory reporting mechanism dubbed the “checkmate” system would be installed to confirm that the driver had checked the bus at the end of a route according to protocol. Motion detectors that activate an alarm signal if something moves when the bus is supposed to be empty were installed (figure 2). A panic button for the driver was included to facilitate calls for emergency assistance. Finally, the various sensors would be connected to a ‘data box’ that relays their information via the 3G mobile network to a control centre that is continually monitored.

The “checkmate” system was devised as a ‘back-up’ to help ensure that the driver remembered to check that the bus really is empty before he locks it up at the end of a route. Under the new system, the driver must now press a button indicating that a visual inspection has been conducted. Failure to comply triggers an alert at the remote control centre, which prompts a controller to contact the driver.

As a further backup to the driver and the checkmate system, the motion detection system installed on busses checks for movement within a bus when it is supposed to be empty. This is expressly designed to detect the movement of a child like Naziha who finds themselves locked in a bus and unable to attract attention.

Figure 1 Camera-Counter (Courtesy of Emirates Transport)
As a final backup to the abovementioned systems, the data from the sensors on the bus is relayed to a control centre that is continually monitored. Operators at the control receive incoming data from busses on a dashboard display as shown in figures 3 and 4. The system provides immediate notification of incidents and constantly shows the locations of busses in real time.

If the driver fails to indicate that he has checked the bus at the end of a route, a control centre operator makes contact to remedy the error. If the motion detectors on a supposedly empty bus detect movement on board, the control centre receives an alert. The controller can then use the CCTV to view the source of the movement and summon help if necessary. Finally, in the event of an emergency, the driver can request assistance from the control centre using a ‘panic button’. Likewise, the bus’ horn which is connected to the data box can be remotely activated by the control centre to alert passers by.
Results

Upgrading the entire fleet of 1,300 Emirates Transport busses presented a major logistical challenge. Beginning with sourcing large numbers of components and scheduling maintenance without disrupting services to the 65,000 students who rely on the service. Some 115 technicians worked long shifts to install and test a total of 5,200 components by August 31 in readiness to transport students in the forthcoming school year. To date there have been no failures by the new system.

Replicable Success Factors

The smart bus concept developed by Emirate Transport has performed without fault to date. It offers a level of safety that is unmatched anywhere in the world. As such, its combination of hardware and protocols ought to be replicated in schools more widely in order to reduce the likelihood of accidents elsewhere. The over-riding principle of building in multiple backup systems as a way of ensuring safety, deserves mention because it is an approach that could be replicated in any field of safety where the stakes are high.
UAE NATIONAL PROGRAM TO MONITOR TIRE PRODUCTS USING RFID TECHNOLOGY
UAE NATIONAL PROGRAM TO MONITOR TIRE PRODUCTS USING RFID TECHNOLOGY

Summary

In the summer of 2015, the Emirates Standardization and Meteorology Authority (ESMA) launched a new system for monitoring tire compliance to standards in the UAE. ESMA has mandated the placement of tags with radio-frequency identification (RFID) capabilities on all new tires that are sold and fitted in the country. As well as ensuring that the tires sold in the UAE comply with local and regional standards, the new system has benefited new tire manufacturers and vendors alongside the consumers and society in general. The tags allow them to monitor inventory levels much more efficiently and cheaply and the system has removed the competition for their products from non-complying and obsolete tires.

Problem Background

One of the largest product recalls in automobile history took place in the United States on 9 August 2000 when Bridgestone-Firestone Inc. was forced to recall roughly 6.5 million tires due to a product defect that had caused tread separation at highways speeds, resulting in multiple vehicle accidents with over 700 injuries and 175 deaths. While reports of tire failures were received from some of this company’s export markets in the Middle East and South America, the recall primarily remedied vehicles in the USA. Moreover, while over 90,000 tires were ultimately replaced, examples of the affected batch of tires were still being found up for sale in 2013, suggesting that the recall was not entirely successful in protecting the public.

When manufacturers send tires to specific regions, they must comply with local and regional standards. In the UAE, standards for tires are concerned with their safety performance under consistently hot conditions as the UAE is considered among the high ambient temperature countries (HAT). The harsh local environment reduces the durability of tires, especially if they are not properly maintained.

Most manufacturers also recommend changing tires between every six to 10 years from the production date, regardless of their remaining tread depth because the rubber in them dries out and loses grip and they are increasingly prone to disintegration. In the UAE, when re-registering a car, the condition of its tires is assessed. Tire life is permitted to be a maximum of five years from their date of production. Tire mileage is monitored and an inspector can fail a tire if it has exceeded its maximum recommended annual mileage.

The high standards and level of enforcement in the UAE is undertaken for safety reasons. ESMA reports that prior to 2014, 60% of annual tire sales in the country did not comply with UAE standards. In 2014, 30 motor vehicle accidents resulting in death occurred that were attributed to a tire fault.

The challenges for the ESMA in enforcing compliance under this regime were the cost of inspectors and inspection stations and the inconvenience caused to vehicle owners who had to take their cars to an inspection station. ESMA needed to find a more efficient solution to monitoring the origin and age of tires sold in the UAE.

On a strategic level, safety of traffic users is one of the critical aspects of UAE’s national agenda. This concern has risen from the high fatality rates. When reviewing the components of vehicles accidents many components were assessed and it was noticed that tires are a major contributor to accidents.
Developing an Innovative Solution

In 2013, a three member team at ESMA set about tackling the challenge of monitoring the safety of local tires in a more efficient and cost effective way. They turned to RFID technology, which permits automatic identification of tagged objects that pass within range of a sensor. This smart technology uses electromagnetic fields to identify a tag that contains electronically stored information. It can operate passively, by capturing the energy from the interrogating radio waves of a proximal RFID reader and using this to transmit its own signal back to the reader. Unlike a barcode, the tag does not need to be within the line of sight of the reader. It will work even if embedded within the tracked object.

When first introduced in 2008, RFID technology was used to improve the tracking of stock as it was moved through large warehouse systems. RFID tags are now used in many other industries, for example, to track the progress of an item along an assembly line or as part of freight management logistics; and implanted RFID microchips are also used to positively identify livestock or pets as an anti-theft measure.

With the support of the UAE’s leadership a regulation to enforce the use of RFID was established with the decision of the Cabinet. The team at ESMA began by collaborating with an RFID developer to develop a prototype. They then moved to involve tire manufacturers for their feedback and to obtain their agreement to attach the tags to new tires. To the ESMA team’s surprise, manufacturers responded positively to incorporating this technology into their products, as it would wipe out the large non-complying and obsolete tires from the market that was affecting their competitiveness to sell high quality, standard compliance, resilient and effective products that will enhance the safety of consumers. The manufacturers also recognised that the RFID tags would help them to monitor their inventories more efficiently, cutting their operating costs.

The ESMA team and the RFID developer decided not to embed an RFID chip directly into a tire as this would add significant cost and because harsh local weather conditions would quickly destroy it in any case. In addition, this complies with international norms of products that will assure harmonizing products for the UAE’s and regional market such as Gulf Cooperation Council countries. Permanently fixing an RFID chip was also ruled out because of privacy concerns given that vehicle owners (as the registered owner of the tagged tires) might be personally identifiable to anyone with an RFID chip reader. Instead, the system was designed with the chip inserted into the tag. When purchased or fitted to a new car, the removal of the tag from the tire destroys the RFID chip. The ESMA team and the RFID developer agreed on a final concept for a tag (as shown in figure 1) that would be placed on each tire sold in the UAE that contains a generic description of the tire including its production origins.

The ESMA team were also concerned about counterfeiting or illegal manipulation of the RFID tags. Duplication was prevented by using read-only RFID chips which do not permit their signal to be modified and which are unique to each tire. At the point of sale and fitment to a car, the tag is designed to be removed from the tire and attached to the customer’s receipt. This also gives the customer an assurance that the tire they have purchased is a legitimate approved product and not a counterfeit item.

![Figure 1 ESMA RFID Tire Tag (Courtesy of ESMA)](image)
The use of RFID tags allows the entire logistical supply chain of tires to be monitored. When manufacturers produce a tire for the UAE, they place a unique RFID tag on it. Upon arrival at a customs facility, an officer can quickly scan all of the tires inside a shipping container. Wholesalers and sellers can monitor their stocks easily and cheaply without having to physically count each tire in their storeroom. When sold to a customer, a tire appears as follows:

This process also allowed easier, more effective monitoring and surveillance acts when inspecting larger warehouses and wholesale shops. The inspector can check all items in store with one click of button that will generate a report on stock availability and their details. This information can easily be checked with stock/inventory data of the shop, allowing for smarter inspection rather than random inspection.

Many stakeholders benefited from this act including local inspection authorities as it will reduce time and need for excessive human resource for inspection.

ESMA and the manufacturers have yet to announce the use of the smart tags to avoid raising concerns among consumers about the tires currently fitted to their cars or their inability to fit cheaper used tires. By the end of the 2016, manufacturers and ESMA will begin an awareness campaign for customers. ESMA has also created two applications using the RFID tags. One application is for reporting sellers that do not comply with UAE standards while the other allows any user to scan the RFID tag on their tire and access the information about its production origins and compliance with UAE standards.
Results

The innovative RFID solution has allowed ESMA to improve the quality of tires sold in the UAE. They were successful in obtaining the cooperation of manufacturers to introduce a new system because they showed that the new system would remove their competition from cheaper used tires.

It was announced by officials that the number of non-compliant tires sold in the UAE has dropped from 60% to just 15% and that the new system has reduced the number of car accidents resulting from faulty tires by 5% in 2015 as reported by the Ministry of Interior. This act also resulted in dramatic reduction of fatalities in car accidents due to tire faults by 54% as reported by the Ministry of Interior. This translates to an estimated saving of 727,600 dirhams per year.

ESMA is the first public sector agency in the world to use RFID to achieve multiple outcomes such as ensuring the compliance of new tires with UAE standards, removing cheaper non-complying and obsolete tires from the marketplace, reducing the costs incurred by vendors in monitoring their stock, as well as providing consumers with detailed information about tires that they purchase.

Replicable Success Factors

The success of the RFID tags in the tire industry has inspired ESMA to deploy the technology to control standards on other products such as electronics and automobiles using this technology in the same way. ESMA’s success has encouraged other regional peer organizations to adopt such action when monitoring tires product, as The Gulf Standardization Committee is studying the implementation of this project in all of the GCC such as Yemen.
NATIONAL KITCHEN: ENTREPRENEURIAL HUB FOR INNOVATIVE PROJECTS
NATIONAL KITCHEN: ENTREPRENEURIAL HUB FOR INNOVATIVE PROJECTS

Summary
In 2012, the Khalifa Fund and United Arab Emirates University (UAEU) joined forces to create a novel venture known as the Kitchen Incubator. As the name implies, it combines an industrial kitchen with guidance from experts in the food and beverage sector to create an environment that help persons with innovative ideas in this area to develop and commercialize them. This is achieved by chaining resources in ways that overcomes the barriers typically faced by new start-ups in the sector, facilitating a transformation from concept to product, all while interacting with potential clients for the venture. This Kitchen Incubator is a first of its kind in the MENA region and one of few Kitchen Incubators to be integrated within a university anywhere in the world.

Problem Background
To protect public health and safety in the UAE, high standards for food safety and hygiene have been set by authorities in each of its emirates. Satisfying these regulations however poses a major cost barrier to anyone entering the sector as this usually necessitates specific fit-out requirements, the purchase of expensive equipment, and high running costs. Start-up ventures in this sector thus require considerably greater planning, financing and strategic partners to have any chance of success. The capital requirements alone for launching a food and beverage related venture are estimated to be in the order of AED 1.5 million. Given the cost, red tape and other barriers, it is not surprising that no more than 5% of all start-ups in the UAE come from this sector.

Research shows that many innovative start-up ventures in the MENA region are hampered not only by the above-mentioned barriers, but that they are also stifled by prevailing community perceptions that failure will result in humiliation and loss of face, that discourages many from trying. Given that small to medium sized enterprises which diversify local economies play a major role in driving growth and creating local employment, investment in interventions that help start-ups to overcome such are needed to strengthen communities and the broader economy.

Developing an Innovative Solution
A team at the Khalifa Fund were inspired to address the barriers in the food and beverage sector after observing the success of the International Business Innovation Association (InBIA) in setting up ‘incubators’ around the United States. As its name suggests, an incubator is the name given to the infrastructure that takes a good idea at a vulnerable embryonic stage and provides it with a nurturing environment to help it to grow and mature into a fully-fledged business with marketable products that is able to fly on its own.

Beginning in 2012, the team at Khalifa Fund took four years to ‘incubate’ their idea for a local Kitchen Incubator concept. They first had to overcome a number of obstacles to adapting it to the UAE context. The team discovered that the very notion of a kitchen incubator was difficult to explain when tackling regulatory obstacles. The Abu Dhabi Food Control Authority (ADFCA) needed considerable time to review and grasp the full implications of the concept. As such, progress was slow in adapting or generating appropriate rules and guidelines for the initiative. This challenge was due to the novelty of the concept itself and the lack of any corresponding regulatory framework: an incubator produces meals that are sold to customers but it is not a restaurant or café for which regulations exist. An incubator does not have a permanent dining space so existing food...
safety rules cannot simply be copied across. Moreover, a Kitchen Incubator often operates from rent which generates revenue, therefore it is not only a restaurant kitchen but also a commercial area subject to other regulations.

After persevering with ADFCA to setup appropriate regulations and a process for obtaining a license for ventures supported under the scheme, the team at the Khalifa Fund moved to secure strategic partners with similar goals and values. The partners were brought to help them build the remaining elements of a fertile environment that could nurture and develop ideas in the food and beverage sector, and turn them into marketable ventures.

To provide a suitable working space for the incubator, they agreed to a partnership with the United Arab Emirates University (UAEU) because the two organisations shared a higher-level strategic objective to develop the local social community, and because UAEU had a food and science department that could house and support a local Kitchen Incubator. This partnership led to the setup of an advanced industrial kitchen facility with equipment of the highest quality that complied with the high industry standards required by the ADFCA (see figures 1-3).

Alongside the incubator space, there was need for a team of consultants who could help start-ups to understand the requirements of packaging, marketing, transporting, and other operational factors. After that, potential customers were needed to test and review prototype products developed in the incubator. Companies such as Lulu, ADNOC Oasis and Etihad agreed to support the Kitchen Incubator initiative in this capacity. At this point, the initiative had all of the elements needed to support the development of ventures producing anything from candy and pastries through to spreads and even herbal products.
The team at Khalifa Fund then moved to recruiting an intake of start-up ventures for their Kitchen Incubator facility. They wanted it to cater to a diverse sector of the UAE community, from homemakers to established bakers and cooks. Interested persons were asked to submit an application for assessment followed by an applicant interview. Upon acceptance, the applicant was required to pay an admission fee of 2,000 AED.

The first phase of the incubation program lasts around four months and consists of workshops in which applicants learn about food preparation quality, safety, laws, development, and factory production techniques and logistics. Applicants also learn how to write business plans and are mentored and given opportunities to network with companies in the food and beverage sector whom they could potentially market their finished products to.

Phase two of the incubation process gives users 12 months to develop and test their product and business concept and to begin to explore its potential in the food and beverage marketplace. The kitchen is setup to suit their individual project needs under the supervision of professionals from the sector. They also receive more focused business training and coaching, as well as networking opportunities to help them acquire the micro funding that is needed to launch a start-up venture.

Phase three is known as the graduation phase, where users user their secured funding to develop their concepts into an actual commercial business. The products that make it to this stage are expected to be commercially viable and capable of generating enough revenue to help the graduate to plan and execute an exit from the cosy environment of the incubator. Business mentors and coaches stay in contact with graduates during this transition to monitor their progress and to lend aid where required. For example, in expanding their networks in order to grow their businesses.
Results

The kitchen incubator project that was launched in 2015 is currently processing its first intake. To date, 12 Emirati women have been admitted into the program and are preparing to begin working on their ideas within the kitchen facility at UAEU. Regulators at the ADFCA are also in the process of approving their various product ideas and the proposed layout of the kitchen to accommodate their development.

The incubator itself was being managed by another company that can provide incubates with proper feedback about the industry and their work. The operators assessed the incubator and its activities in six different categories: facility supervision & technical support, product development, supply chains & sales channels, logistics, and reporting. When assessing all of these factors, the operators were able to conclude that the kitchen incubator is running efficiently and exceeding goal expectations at some points. For instance, the initial capacity of incubates was limited to eight users but the incubator was able to take in 12 total without sacrificing the incubator quality, output and safety. The operators jointly hosted open days with Khalifa Fund for potential clients and stakeholders to see the incubates’ products and progress. They were successful in eliminating the barrier of business development as well as creating the potential for business deals after the incubates graduated. This success was accounted for the effective logistical plan that was also setup by the operators that maintained quality and safety standards throughout the process. To ensure progress was constantly on track, the operators properly monitored activities with Khalifa Fund by generating several reports (action plans, evaluations, monthly reports, etc.).

The Kitchen Incubator has had a successful start so far as there has been high demand for what it offers, despite its public profile being kept low at this early embryonic stage. The team at the Khalifa Fund recognise that...
the concept is still novel and not well understood by many in the UAE. They plan to expand their promotional efforts once this first batch of incubates have successfully completed the program and they are confident that all of the necessary pieces for a successful incubator are in place. Their next goal will then be to setup multiple Kitchen Incubators in regional centres across the country.

**Replicable Success Factors**

The successful launch of the kitchen incubator concept and the high demand for its services, despite minimal promotional activity, suggests it is meeting an important need in the UAE. This suggests there is a similar need for other incubators in various industries where start-up barriers are also known to be high.

An important benefit of an incubator is that it facilitates collaboration between knowledge centres such as academic institutes, and government agencies responsible for regulations and the private sector that provides capital, contacts and applied expertise. While the focus of this collaboration was on breaking down the barriers to the development of start-up ventures, joining up in this way also helps to spread intellectual capital in an economy in creative ways that boosts growth in human capital as much as financial gains. In this respect, economic and community development planners should look to the incubator concept as an effective means of integrating knowledge, skills and capital assets in areas in need of social and economic development.
HOW HAPPINESS HAPPENS: INNOVATION, CULTURE & DESIGN AT KHDA
HOW HAPPINESS HAPPENS: INNOVATION, CULTURE & DESIGN AT KHDA

Summary

The Knowledge and Human Development Authority (KHDA) of the Government of Dubai is responsible for the quality and growth of private education in Dubai, comprising early learning centres, schools, universities and training institutes. Established in 2007, it works collaboratively with its stakeholders to support a forward-looking education sector that brings out the best from within.

KHDA understands that education is continuously growing, and that continuous growth demands continuous innovation. Numerous studies and reports have identified that it is not knowledge, but specific survival skills that will enhance students’ life and career success in future years. Some of these skills include: creativity, risk-taking, collaboration, communication and resilience. Because the organization promotes these skills externally, it followed that it should also deliver on these expectations itself. In line with its purpose to ‘bring out from within,’ KHDA began to transform its culture both to enable greater happiness and wellbeing in its team and its customers “guests”, and to set an example that the education sector could follow.

Problem Background

Harvard Business Review says that ‘cut-throat’ pressure driven work environments can drive employee performance in the short term, but that this comes at a price. Organisations like these incur around 50% greater expenditures in healthcare and suffer employee retention rates as low as 50%. Work-related stress is also identifiable in approximately 60% to 80% of all workplace accidents.

KHDA team is inspired by the vision of His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai who said “the function of government is not to rule, but serve people in innovative ways”. Also the customer’s satisfaction results were the main motivation for KHDA to change. KHDA was ranked by the Dubai Government Excellence Program as 20th in 2010 among the government entities. The management of KHDA saw their ranking as an opportunity to improve by making fundamental changes that would ultimately transform how the organisation functioned on the inside, and how it appeared on the outside.

Its first step was to understand how employees felt and what motivated them to thrive. KHDA started to appraise its employees through the “employee’s satisfaction survey”. This survey placed responsibility for ‘satisfaction’ on the employer, implicitly discouraging employees from taking a more active role to determine their level of satisfaction. This was then replaced with the “employee’s engagement survey”, which shifted responsibility to the employee and downplayed the role of the employer in enabling engaged employees. Neither survey fulfilled its main objective – to provide reliable data that would lead to happier team members, customers and stakeholders.

In 2014, KHDA began working with a reputed research agency, Happiness Works, to conduct the Happiness Survey, measuring employees’ happiness at professional and personal level based on “the Five Ways of Wellbeing”. The survey considers aspects such as work/life balance, job impact on society, good friends and relationships at work, work environment, personal health, job security, trust, organizational pride, learning opportunities and other interpersonal skills.
Strong evidence in international research expounded the benefits that happiness brings to organisations, employees - and crucially – students, parents and educators. Happy people performed better at school, at work, were healthier and contributed more to their communities.

KHDA's happiness drive was supported by a series of initiatives and activities based on the Five Ways of Wellbeing, the pillars of which include: Connect, Be Active, Take Notice, Keep Learning and Give. These enabled employees to take greater control of their own happiness, and promoted happiness as an achievable way of life, rather than an abstract goal. As these activities and initiatives evolved, greater number of KHDA employees took part, and a gradual, organic change in the culture of KHDA began to take place. KHDA believes that Happiness is a journey, not a destination.

Developing an Innovative Solution

The Happiness Survey was immediately followed by ‘Happiness Jams’ – internal design-thinking sessions which identified the areas of the organisation most in need of change. Involving employees at every level of the organisation working together to design solutions, the Happiness Jams effectively created a roadmap for KHDA's happiness and wellbeing journey.

KHDA has used an internal social network in which all employees could engage, post and share information and ideas around happiness and why it was important to them. As colleagues became connected, they became more aware of the changes taking place, many volunteered to take part in the planning and implementation, thereby increasing likelihood of success. This shared responsibility model of working would eventually set the tone for future decision-making across the organisation.

Changes to KHDA's culture soon began to be reflected in its work environment, enhancing the sense of happiness of team members and guests alike.

At early stages, territorial markers and barriers, such as cubicles, offices and doors, have given way to shared workspaces and a ‘no offices, no doors’ approach for all employees including the board of directors. The adoption of the Five Ways of Wellbeing have had a positive impact on the work environment, employee’s performance as well as KHDA’s results. All office space has become shared, encouraging collaboration, work/life balance, happiness and wellbeing. A track around the perimeter of the office, various exercise equipment and a thrive room have been integrated into the workspace, making it possible for employees to connect, conduct ‘walk and talk’ meetings, answer emails on a treadmill, practice yoga and other group activities before, during and after the working hours and weekends.

In addition to that, KHDA has introduced programs that encourages “being active and taking notice”. Employees can enjoy fresh fruit and juices which are available throughout the day, they can also take part of healthy eating programs and cross fit sessions facilitated by their colleagues. Besides that, employees can also participate in various external activities such as Spartan race, Ice Warrior Challenge, Desert Warrior Challenge and others.

People talents are well capitalised at KHDA. Employees are encouraged to follow their passion and thrive by enjoying their hobbies. They can learn and teach others planting, painting, cooking, designing, playing music and so many other hobbies and activities.

A similar transformation of work environment is also evident in the areas in which customers and guests are welcomed. KHDA have transformed the “customer service” approaches to “happy guest experience” approaches. This has affected the organizational culture and the way of designing services. KHDA’s approach toward guest’s happiness, which is driven by “giving from heart” consists of the following aspects:

- Create an experience beyond the guest’s expectation of a government entity environment and service delivery.
- The Customer may not be always right, but he/she is always our “guest”.
- The guest happiness journey starts before reaching the service centre.
- Services are designed and delivered based on the understanding of the guest's condition, emotions and other various factors that could affect his/her journey (such as weather, travelling distance, etc.).
• Create a first and lasting impression through an exceptional memorable experience.

While designing the services, KHDA identified various touchpoints, which describe the guest’s journey from the moment he/she arrives to the parking area that gives the priority to families and women, to the moment when the service is delivered and completed.

Guests are greeted at the car park by the concierge team member and driven to the main entrance of the building in a special designed buggy. The previous reception area, furnished with an imposing counter to receive guests, has been transformed to resemble a boutique hotel lobby, with service to match. Rather than taking a ticket and waiting their turn, guests are welcomed and serviced by various teams including the concierge team. The guest’s waiting time is then transformed to Happy Time, during which guests can enjoy a wide range of beverages, browse the internet with free “KHDA loves you Wi-Fi”, choose from the variety of reading materials or just sit back and take in the positive energy of the surrounding unique environment with birds flying around.

The Customer Delight team then personally attends to their enquiries, completing all paperwork behind the scenes. Printers, faxes, tickets, queues, badges and desks are absent from the guest journey. As KHDA believes that doing all steps of the service on behalf of the guest will certainly enhance the happiness experience. In addition, KHDA board members work among colleagues and customers in the lobby area, whom are all easily accessible.

Glass-fronted meeting rooms are configured differently, according to the type of meeting being held. Fitness balls, a treadmill, sofas and an eclectic mix of chairs furnish the board room, while other rooms, designed for short, sharp meetings, contain no chairs at all.

The office design of KHDA reflects its journey to become a more open, more trusting and less hierarchical organisation. The concept and delivery of this journey has been driven by team members,

Figure 1 Office Space at KHDA (Courtesy of KHDA)
and supported by processes that enable greater participation in organisational governance. KHDA also encourages innovation by using an intranet tool through which colleagues can suggest changes/innovative ideas they believe will be beneficial to the organisation. This ensures that the journey of positivity and wellbeing remains organic and sustainable.

Other innovations have led to unique and profound changes in how KHDA approaches its work and its people. It does not define its size by ‘headcount’; rather it assesses its impact by ‘heart count’ – the passion, commitment and positivity by which colleagues give to others and to the organisation.

KHDA’s hearts – as KHDA describes its employees – is made up of people from five generations and more than 30 nationalities who assure to bring the best out of their cultures. KHDA ensures that a diversity of voices and opinions are heard in all aspects of decision-making. Monthly board meetings are open to the whole organization with no exceptions and all colleagues are welcome to attend without invitations.

KHDA believes that empowerment and trust does not start from attendance. All employees – especially working mothers – are given flexibility and freedom to choose when and where to work. Attendance and punctuality inputs are not monitored. Importance is instead placed on outputs – the quality of work that team members do. In addition to the mutual trust relation between KHDA and the employees which is built on “giving from the heart”.

Recruitment of new staff is done by a ‘scouting team’, comprised of colleagues working in various roles across different areas of the organisation. The first step of recruiting new employees is through the ‘KHDA Connect’ app. Potential candidates upload their profiles and submit text or “selfie” video answering questions designed to enable the scouting team to glean whether the candidate’s ‘heart and mind’ would be compatible with that of KHDA, and the contribution that the candidate may add to the organisation. The app does not give candidates the opportunity to upload resumes and CVs, and does not enquire of past professional experience.

In addition to the freedom that all staff can work in any area of his/her interest, a ‘Reset’ panel enables existing colleagues who feel they have more to give and want to ‘do something different’ within KHDA to effectively ‘reset’ their role. This allows them to work different projects with a variety of teams, while taking on a new position on a permanent basis.

Reflecting the devolution of power within KHDA, employees’ performance is determined by consistent feedback from colleagues and peers, in addition to the annual assessments by line managers. The ‘Awesome Achievers’ programme encourages colleagues to nominate others who they believe have been ‘awesome’, given with their whole hearts, and advanced KHDA’s journey of positivity, happiness and wellbeing. Nominations are then used as evidence to determine the results of the performance.

The PEARLS programme is based on the ‘Giving’ pillar of the Five Ways of Wellbeing, and encourages team members to reward each other and express gratitude and appreciation throughout the year. Inspired by the attributes of Positivity, Creativity, Approachability, Reliability, Curiosity and Passion, colleagues give each other “PEARLS” – which carry a monetary amount – on an online, internal platform. Employees are able to see who is receiving Pearls, by whom, and the comment of appreciation that accompanies each reward.

KHDA also looks outward the “Next Practises” rather than only seeking to the “Best Practises”. The unique learning opportunities provided to employees from the local and the international organizations such as Disney Land in USA, Orange Frogs training and others have contributed to the organization approaches toward innovation, happiness and future shaping.

This learning is always shared on the internal social network, keeping other team members informed and enabling them to ask questions and make suggestions. KHDA also shares its journey with the community through weekly safaris which are benchmarking visits from stakeholder groups, including government bodies, educators, parents and private sector representatives locally, regionally and internationally. Its social media channels are used to engage with stakeholders, and to ‘bring out’ positive practices from within the education sector by sharing and connecting stakeholders to each other.
Results

On the Employees Happiness Survey, KHDA is presently ranked amongst the top 10% of organizations in the world. Also the internal surveys at KHDA show that employees are reporting much higher rates of happiness with very low turnover rate.

In 2016, KHDA was one of handful of government entities to earn a Seven Star Rating by the Global Star Rating Program launched in the United Arab Emirates.

Based on the results of the Dubai Government Excellence Program, KHDA ranked 4th in 2011, 3rd in 2012, and the 1st in 2013 and 2014 with the percentage of 95.2% which kept growing consistently.

Replicable Success Factors

KHDA’s journey of positivity and wellbeing – not so much ‘reform’ as ‘transformation’ – has thus far been profound, remarkable and ultimately, transferable. The management decision to start on the journey, then enable team members to direct it, required moral courage and trust, as well as complete faith that the process was as important as the outcome. With this in mind, the management team understood the learning that would follow should projects fail, positioning and “celebrating” failure as an essential step in the process of innovation, and building more trust among team members.

The success of KHDA in transforming its workplace and way of doing business is something that other agencies could foreseeably adopt to their advantage. Furthermore, given that KHDA has now shown that it can work, less courage would be required to pursue a similar course.

A number of other elements in this case study are noteworthy. The leeway given by management to KHDA staff to find and design solutions suggests that power in this organisation was already being devolved as early as 2012, a mere five years after it was established. Faced with finite ideas for change, the management team then sought solutions from all employees – those who understand its core business best.

They then listened to and acted on staff proposals – even when some were well beyond the norms of conventional public service practice. The organisation took a risk, and it worked. The hearts of KHDA are bringing their best to innovate by always asking “what if?” and “why not?”

As sometimes, asking for many permissions is begging for denial. This also becomes a lesson in how organisations can harness and benefit from the collective creative capacity and problem-solving power that otherwise may rest dormant if management alone does the designing and deciding. So in effect, KHDA’s leadership were shrewd and judicious in their management of risk even if the end result was atypical. This may be something that other public service managers in crisis can learn from.

KHDA’s reorganisation of everything from its work spaces to recruitment to performance around the pursuit of outcomes and values such as happiness and having “a big heart” and passion is virtually without precedent in the public service anywhere in the world. Its results since 2012 suggests that its approach has merit and as such, is something that other similar organisations should also explore.

It is necessary to recognise that this initiative – supported by a self-regulating internal communications social network – has seen success because the underpinning message of happiness resonated strongly with both staff and management, and because KHDA was still a relatively young organisation when this change was implemented. While other agencies with long histories of using performance management methods that reward or chasten may find KHDA’s approach too challenging, the example it has set remains replicable in spirit if not in content.

KHDA’s journey of positivity and wellbeing started from a real need to address employee happiness and customer relations challenges. The solutions it identified were home-grown and customised, in line with its culture, and the vision of its leadership. The lack of a ‘one-size-fits-all’ solution can inspire leaders of other organisations to place trust in their own people to develop strategies and policies to suit the needs of their organisations, and ultimately help create an environment of greater positivity and wellbeing across Dubai.
BUILDING A FUTURE BY INSPIRING AN ECO-FRIENDLY GENERATION: ECO-RUNNER GAME
BUILDING A FUTURE BY INSPIRING AN ECO-FRIENDLY GENERATION: ECO-RUNNER GAME

Summary
The Ministry of Energy released an application-based game in 2016 named Eco Runner, which can be played on either iOS or Android smart-phones. The game teaches children between the ages of 6-16 about the importance of energy and water conservation. The game uses UAE landmarks to help players visualize the impact of energy conservation and how it applies to the real world. The game was developed to convey a conservation message targeting children in order to promote a more eco-friendly behaviour in UAE homes, school facilities, cities, beaches, and deserts to prepare the next generation of energy consumers to be aware of the need for conservation of energy and water. The game provides interactive sessions that mixes both education and fun; as learning through gamification.

Problem Background
A 2015 report by the consultancy firm Strategy& showed a sharp rise in electricity consumption in the UAE. The report estimated that gross domestic electricity consumption, which was last reported in 2014 as 103 terawatt-hours, would climb significantly to 141 terawatt-hours by 2020 due to the country’s expected population growth. Coupled with the rising cost of fossil fuels used to generate power, significantly more revenue would be required to pay for this additional power in the years ahead if steps were not taken to curtail consumption. As a result, the Ministry of Energy was concerned about meeting the 2021 Energy Vision objective about educating youth, citizens and residents within the UAE about energy use. The ministry of energy believes that one way of saving the resources is to reduce the demand by making use of energy and water more efficient. The demand of energy and water will only increase, and so it has been crucial to reach out to the community sectors addressing this challenge in the most effective approach. Kids are the heart of the community compromising the future generation with a mind-set that can be taught at an early age. Thus, this game is a seed of innovation that the ministry will continuously monitor to ensure its success in meeting its objectives.

Developing an Innovative Solution
Nations around the world are working hard to tackle the problem of rising energy prices and the need for greater conservation. Efforts usually begin with campaigns that raise public awareness. However, it often takes a long time to change behaviour because people are creatures of habit and it is difficult for many adults to change once they are set in their ways. Recognising this, staff at the Ministry of Energy decided to target part of their overall conservation efforts toward younger children who are typically less affected by change inertia and more amenable to new ways of doing things.

This formed the basis of a Ministry goal to create awareness of the need for energy conservation among younger children aged between 6 and 16. The Ministry however needed an appropriate delivery vehicle and content because the print media approaches that are typically used to convey data to adults about energy consumption, would not work with this audience. Aside from being unlikely to understand complex information, most young children would likely find it dull and boring. As several members of the Ministry
team were mothers, they used their observations of their own children. To have more concrete data they also surveyed children from schools and the community too as a sample for observation (roughly 50 children) to come up with a novel approach. They recognised the attractiveness of digital media to youth and the happiness that children drew from game playing activities. They concluded that a successful way to engage and communicate information to children would be through a mobile game application.

To develop the game, the team engaged a firm with expertise in the development of software applications to visualize a concept that was first represented on a storyboard. For the storyboard, the team needed to choose an avatar to serve as the main character for the game. The team decided that the character needed to reflect the game’s objective of taking on a challenge in the national interest. They eventually settled on an avatar dressed in the UAE’s national costume to satisfy this objective.

Their next task was to create content with a sense of progression that electronic games are known for. This requires creating a series of progressively more difficult challenges that must be passed by the player in order to advance to a higher level. The team worked with the developers to create an appropriate environment, stages and sub-stages around the theme of energy and water conservation. In addition, the levels themselves were designed to be highly interactive such that the player has to make an effort to think through a solution, this may involve moving obstacles around or solving riddles in order to continue progressing through the game. Given that energy and water conservation is a goal of the UAE as an advanced modern state, the team decided to include national landmarks across the UAE such as Burj Khalifa and Burj Al Arab from Dubai, Emaar building Abu Dhabi, Central Souq of Sharjah. The landmarks help children visualise their impact in the game and understand how energy and water consumption apply in a real world context.

After the concept for the game had been developed, the overall aesthetics, icons and menus were revised to ensure the theme was consistent as well as eye catching, and that it appeared to be focused on fun rather than “studying” activity only. To achieve this they asked the developers to reward players who had achieved particular levels of progress with intermittent rewards, such as the ability to customize their avatar and to unlock additional game features.

With the design of the game complete, the team wanted to ensure that players retained the conservation messages conveyed in it. Moreover, they wanted to reinforce these messages by encouraging players to play the game again. For this, the team created a five-question quiz that players must answer correctly at the conclusion of each stage before they can move on to the next one. If the player fails in answering correctly, they must review the stage to acquire the correct information. To avoid repeating the same questions if a user plays the game again, a bank of 55-questions was added to the application from which it randomly selects five questions when required. So far, the 55 questions cover inquiry subjects of primary resources of energy (oil, gas, nuclear, solar, clean coal and wind) and the general theme of water and its use alongside energy and its consumption. The game also includes questions about energy efficiency, units of energy and water, some mental math energy calculations, names of scientists. Phase two of the game would definitely increase the number of questions so kids have a larger pool of questions to tackle. The questions are versatile and were inspired by reviewing the current curriculum of the schools at this stage. This is also an area of development as there is a part of the phase two plan which would engage schools and the Ministry of Education as stakeholders to assist us with questions that resonate with the changing inquiry subjects at schools such as science, the environment, energy and water.

After the application was finalised, the concept was transitioned into a working model and submitted to the Apple App Store and the Google Play Store for review. Simultaneously, the Ministry team began creating a social media presence for the application by promoting it at outlets that would help it to reach its target market.

The final application has five levels as shown in figure 1. Each level has four different stages. Each stage is comprised of different activities. Each level has a specific environment with its own consistent theme. Each stage has its own puzzles and obstacle to overcome. The stages offer different activities as shown in figures 2 and 3, where the user completes an “energy saving run” (in two different ways), or find the source of unnecessary energy consumption, and finally the 5-item quiz at the end.
When each stage is completed, the player earns a trophy. When the user earns four trophies they may then progress to the next level. The user can replay the game multiple times as the quiz level has a 55-item question bank for the application to draw upon. The game currently has five levels, but the team intends to add more over time as well as an online mode so kids around the world can play together and run through competitions using their computer devices, iPads and smartphones.

Results

The Eco-Runner application was designed to be a learning platform that is attractive and entertaining to children. It represents a clever way of educating youth about the importance of energy and water conservation without them even realising that they are being ‘educated’. The feedback received by the Ministry from children about the game has been positive to date which suggests the approach has worked.
By changing behaviours in the present to reduce consumption patterns in the future, the Ministry developed and launched a product that targets future generations who need to be more concerned about the looming energy crisis. In doing so, the Ministry met one of the targets stated in the 2021 Energy Vision that is concerned with educating youth in the UAE about energy use.

As part of the 2017 strategy for Eco-Runner, the ministry will start assessing the number of downloads and feedback from students, teachers and parents too on how to move to the next stage. The idea is to expand the game to create several channels of education in the topic of “Energy and water”. A survey will be created in the first quarter of 2017 to generate valuable quantitative data surrounding Eco-Runner.

The survey amongst students was the main data source to gain information about the targeted users. The feedback that was received generated ideas and showed user perspectives that were critical to setting up an educational game for children. To make sure the ministry’s soft launch of Eco-Runner was successful, they only surveyed students from one school. The students were so receptive that they were very confident in the direction the application was headed.

When the game is first played, the children will acquire a lot of knowledge from each stage they progress to. This is considered as a “learn how to learn” way resembling knowledge absorption that would occur when a student reads a book or a brochure about the environment. The engaging aspect of Eco-Runner is that its learning experience is not based of classic “textbook” education. It relates to a “user journey” which takes place at home, at school, city life and entertainment venues which demonstrates to the user what types of behaviours are expected in specific areas when considering the environment. Kids are expected to learn other values such as “safety” and “hygiene” in addition to the core values of “saving our planet with focus on energy & water”. There is a plan to expand the application for learning purposes in which mobile devices (iPads & tablets) are connected to eBooks.

Schools can generate value from Eco-Runner as they are already developing programs that focus on education through “gamification”. The ministry is aiming to work with teachers since there would be greater potential for value of the game itself in later phases. The Ministry of Education is considered a strong partner in this project as the Ministry of Energy has established direct contact with the curriculum team that will assist the further development of the content of Eco-Runner.

Replicable Success Factors

Given the positive response to this game, the Ministry has released another application that revolves around the same concept of energy consumption. Named Shuaa, it helps users to calculate the power generation of solar panels. The successful use of digital applications and electronic games to raise awareness about energy conservation among youth shows the effectiveness of the underlying methodology for the target group. Other public sector agencies who also need to convey messages to a younger audience could use a similar approach to reach them.

The management of the Ministry of Energy supported a team of staff and an external developer to develop a novel solution. The team’s ability to develop such an innovative solution justifies the faith shown by their management. This constitutes an important lesson for other organisations about the importance of supporting talent within.
SMART GUIDANCE: INCREASING AWARENESS OF LABOUR WORKERS ON THEIR RIGHTS
SMART GUIDANCE: INCREASING AWARENESS OF LABOUR WORKERS ON THEIR RIGHTS

Summary

In 2015, the Ministry of Human Resources and Emiratisation (HR&E) launched a network of Smart Guidance kiosks that play a video on labour rights, benefits and expectations to the large numbers of low-skilled labourers that come to the UAE each year to work. The video is recorded in the eight languages most commonly spoken by such workers. Upon listening to the information video, the workers receive a certificate that verifies that they have been informed of their rights and obligations.

Problem Background

The UAE labour market comprise of approximately 4.8 million labourers. Those workers come from various countries, as a result, the UAE has one of the most diverse populations in the world, with over 150 different nationalities represented. With such diversity, language presents an obvious barrier to informing new workers of their rights and responsibilities. This means that some workers who do not fully understand their basic rights under UAE laws to vacation days, overtime, and other worker benefits, are at risk of exploitation that is illegal.

The Ministry of HR&E is responsible for conducting worksite inspections and educating such workers to prevent their exploitation and to ensure that they know what their obligations are. However, communicating information to such a large number of people represents an enormous logistic task. While the Ministry employs a number of instructors whose role is to inform workers of their rights and responsibilities, their task seems insurmountable when there are millions of foreign workers who need to be communicated with. Hiring enough instructors and arranging information sessions for every single labourer in all of the languages that they are known to speak, is fiscally untenable.

Developing an Innovative Solution

In 2014, one of the instructors who educates labourers sent a suggestion through the suggestion system at the Ministry of HR&E. The suggestion was to create a standalone kiosk that delivers a video in various languages to explain the rights and responsibilities of workers in the UAE. The instructor himself was very familiar with how labour workers lead their daily lives since he constantly interacted with them. He was able to identify the struggles that they endured in regards to language barrier and lack of technology know how. The instructor recalls once that he had seen a labour worker struggling with an ATM. The worker did not know the language that was presented on screen. As he rushed to assist him, he thought of how simple the ATM was to use and yet there were people still unable to access its features. This was the main source of inspiration that had him submit such a suggestion. Management approved the concept and a project to develop it was embedded in the Ministry’s annual strategy plan, together with a corresponding budget.

A working group of managers and instructors was formed in the Ministry. Their work began with a brainstorming exercise to flesh out the concept from “A-Z”, so that the final product included all of the necessary functionality. Their objective was to build a tool that could educate workers who might be
illiterate. They worked through various possibilities including an interactive robot that played an audio file when prompted, but the team decided it was more prudent to keep the concept as simple as possible so that it was reliable and could be completed within budget.

The final concept was for a standalone kiosk that resembled an automatic teller machine (ATM), connected to a power supply and the internet. After management approved the concept, the team moved to finalizing the information package that they wanted to communicate using the kiosk. Many government entities shared their interest in educating workers in other UAE regulations in addition to the labour law. When this was completed, the team developed specifications for a basic design and a public tender was released to secure a supplier to build a prototype. A prototype was produced and finalized over several iterations to improve its functionality. This process took a year to complete and resulted in the production model shown in figure 1 at a cost of 18,000 to 20,000 AED per unit to customers.

At first glance, the machine appears to be an ATM. However, when observed more closely, one notices that the Smart Guidance kiosk has two sets of headphones attached to its side, along with a port to insert an Emirates ID card and a printer tray at the bottom. The two pairs of headphones allow two persons to be processed simultaneously by the kiosk so long as they are able to watch the video in the same language. The kiosk has a touch screen that allows users to navigate through the information that it provides. The card port accepts only the Emirates ID card, which is used to identify the worker by searching for their details on the database of Emirates ID. Upon completion of the information video, the worker receives a certificate to verify that they have been informed of their rights and responsibilities under UAE regulations, and this is noted in the database of Emirates ID.

The Smart Guidance kiosk is designed to be simple. A worker activates the machine by inserting his or her Emirates ID card into the corresponding port. He or she is then prompted on-screen to choose their preferred language as shown in figure 2. Within a few seconds, biometric details containing their employment data are displayed for them to confirm their identity. At the next screen, they are prompted to watch the video that is pre-loaded in their chosen language. The video provides information about their rights and responsibilities including social expectations for guest workers. The user may rewind the video to review information but cannot fast-forward to skip any of the material. When the worker completes the video, the machine prints a certificate of completion for them to take. Locating these machines at airports and various other points of entry into the country, allows workers to be notified of this very important information as soon as they arrive.
Results

This simple kiosk appears to be the key to resolving the Ministry’s logistical dilemma of having to advise the large numbers of new workers of their rights and responsibilities. Moreover, at the sites where these machines are located, the need for instructors and other resources has been reduced, allowing the Ministry to reallocate them elsewhere.

In just 10 months since its introduction in 2016, around 30,000 workers have benefitted from the Smart Guidance system and received full information about their legal rights and entitlements as foreign labour in the UAE. This is 10,000 more workers trained than the previous year. This is a remarkable achievement given that prior to the introduction of the smart guidance system, an instructor would be able to train up to 2,000 workers a year only. The seven-piloted machines were able to train as many workers as 15 individual instructors within one year. This translates to large savings especially when it comes to the cost of pay and transportation for each instructor. This savings allowed the ministry to allocate its resources to other areas in need such as informational sessions and campaigns that help create awareness among workers regarding health and safety. Additional benefits can be observed in terms of convenience for the workers. The machine works around the clock and does not have a scheduled time for use, and in addition its gives information out in the worker’s mother tongue.

Replicable Success Factors

Even though the Smart Guidance system is still in a trial phase, there is much to be learned from its early success. To begin, other government entities who use employees to provide standardized information about rights and regulations, could save resources by replacing them with similar kiosks that convey information to particular members of the public.
SMART LITIGATION
SMART LITIGATION

Summary

The Smart Litigation application for mobile devices represents a major innovation in the delivery of judicial and legal services, which is likely to change the way that judicial entities provide services to adjudicate in disputes involving individuals or entities. The application will allow legal disputes to be resolved without the parties involved having to physically meet in a courtroom, saving time and costs for all involved. Obviating the need for physical courtrooms in these cases, has the potential to generate considerable savings for the public. The Smart Litigation application will also make justice more accessible by alleviating the potential reputational harm or embarrassment which some people fear from appearing publicly in court on matters that are sensitive or private, such as those involving juveniles or families.

This innovative solution was born out of a cross-agency effort between the Ministry of Justice and the Smart Litigation Team, whose members are the first graduates in Government Innovation from the Mohammed bin Rashed Al Maktoum Center for Government Innovation. The team felt that it can advance the provision of e-services and to improve access to justice on matters falling within the UAE’s legal jurisdiction. The application has been designed to work on all popular mobile platforms. It is the first of its kind in the world and has been positively received by stakeholders in the legal community especially due to preliminary results. It will undoubtedly inspire governments everywhere to become e-smart about the way they provide legal services.

Problem Background

Courtrooms and judges are part of the judicial apparatus of the state that exists to adjudicate civil disputes that cannot otherwise be resolved through negotiation. However, access to civil justice in the UAE and many jurisdictions around the world is hindered by scheduling delays and the costs incurred in having to go to court.

Delays and the frequent re-scheduling of cases occur in many countries and cause significant inconvenience to all who are involved in court proceedings. While these challenges are sometimes due to issues arising for a plaintiff or defendant, in most cases it happens because there are not enough courtrooms for the number of cases that are waiting to be heard. Appearing in court is also a time-consuming affair because affected parties are required to appear early even though their case may not actually be heard until later in the day. When cases run on for several days, this problem and the burden it imposes, become cumulative.

Extended court appearance may also incur costs and losses. As a result, some people also forgo the justice that may be rightfully theirs. Furthermore, there is concern about the potential reputational harm or embarrassment to some people or their families from appearing publicly in court. This occurs particularly in cases involving juveniles or in disputes between family members or if matters are of a personally sensitive nature.

Developing an Innovative Solution

As part of an initiative to develop innovative ideas, the Sheikh Mohammed bin Rashed Center for Government Innovation, held a government innovation program with representatives from many government entities. The result was the Smart Litigation Team.

Participants in the exercise brainstormed ideas for solutions that could increase the efficiency of judicial services. With a view to recent advances in remote video conferencing technology, the team decided to explore the feasibility of developing an e-service solution that would permit anyone anywhere in the world to appear before a court in the UAE. A concept brief was established for a virtual courtroom where a judge, plaintiff and defendant could be present in a legal sense, regardless of their actual physical location.

With the problem and an objective identified, a survey was developed to seek feedback and input from stakeholders in the legal sector about their proposed concept. Judges, lawyers and other legal policy
specialists from the Ministry of Justice responded positively about the need for such an e-service solution. Most significantly, regarding its potential to reduce the time and costs to parties involved in litigation as well as in reducing overall congestion in the court system. They also noted its capacity to afford greater privacy in sensitive cases.

However, concerns were expressed about various technical and legal issues for which the team would need to find solutions. While some of these were technical, the team also had to work with regulatory agencies to amend or write new laws to allow the potential application to operate with the desired functionality.

To overcome privacy and interception risks, the team specified that the transmission signal would be encrypted so that only the court and the person communicating with it from a remote location would be able to see and hear each other.

The team were also challenged about the ability of their proposed system to ensure that persons appearing in court from remote locations were actually who they claimed to be. To address this, the team devised a mixed method approach to identity verification. Firstly, sending login credentials to access the system by registered mail to the official address of the person due to appear before the court. Next, confirming the unique ID number on the officially issued Emirates Identification Card of UAE residents at the start of the video conference call to directly verify the identity of local persons. Finally, depending on the technology available on the users smart phone, tablet or computer, a protocol was proposed to perform a fingerprint or iris scan.

Finally, at a practical level, the team had to ensure that the application worked reliably given that it relied on a mobile phone battery as well as a phone signal that might not be stable or possess sufficient bandwidth in areas where signal strength is weak. To address this issue, the team specified that the application had to...
be able to monitor signal and battery strength and to only allow a user to connect to the court if their phone is adequately charged and/or they are in a location where signal strength is within acceptable limits. The team also created a user information sheet to advise users to keep a charger beside them or to keep their phone plugged in throughout the session, and to find in advance a location with a strong mobile phone signal. Given the need to safeguard bandwidth and minimize interruptions to the mobile phone signal, the application was also designed to block notifications from other applications. To this end, the team consulted with the concerned authorities to block all incoming calls and SMS messages while the application is connected to the court.

Having worked through various risks and challenges that might occur before a court session begins, the team moved to tackle potential challenges that could occur within session. To begin, users need to appear on video as if they were in front of an actual judge. This requires being properly dressed, being respectful of the judge and court, and not hanging-up calls from their end. To minimize the likelihood of plaintiff and defendant interrupting or speaking to each other inappropriately, the interface that the judge uses has the ability to mute either party, including when the other one is giving testimony. To make sure that users are aware of the abovementioned requirements, a “terms and conditions” prompt pops up when installing the application, together with a shorter prompt just before session begins.

The team realized that developing the proposed smart litigation application would require significant investment and time. For pragmatic reasons, the team decided that they could limit the cost of developing a unique technology platform if they could customize existing software with well-developed video conferencing interfaces, which potential users find easy to handle. The team is currently consulting with a provider to develop a reliable and high quality application. A development prototype is currently in a testing and revision phase, and will be made available for public use when its requirements are fully met.

### Results

The interagency team succeeded in building a working prototype with the functionality to accommodate the needs of a judge, lawyer, plaintiff, defendant, witness and a translator if necessary (shown in figures 1 to 3). While the application is not yet available for public use, feedback about what it is being designed to deliver was positive in a survey with local lawyers. The vast majority were in agreement that it was likely to reduce delays and congestion in the court system, and that it would cut costs and other burdens on the parties seeking a court determined solution, and that it marked a significant step in the UAE Government’s transition toward smart service delivery.

### Replicable Success Factors

The abovementioned survey of lawyers conducted by the work team with the Ministry of Justice indicated that the Smart Litigation application should be tried in simple civil and criminal cases because the technology and approach is so new. As a first step, they...
suggested that its use should be optional or based on the judge's decision.

This suggests that the Smart Litigation application and other such smart e-government tools will be more easily received if they are initially designed to address a limited array of issues, and then progressively developed to offer greater functionality as the public becomes more used to them.

The Smart Litigation application demonstrates the drive for progress in the UAE and the determination to support creativity within the public sector. It also emphasizes the importance of transitioning to smart government solutions that serve the community more efficiently and effectively. A noteworthy feature of this remarkable initiative is that most of the work in conceptualising and developing a solution was completed by a team of public sector employees. Only in the final stages when it became necessary to obtain technical expertise, did the team consult private sector firms.

As such, the development of this innovative e-government application highlights the capability of the public sector in identifying challenges and finding innovative solutions inspired by the vision of their creative leadership.
ABOUT THE AUTHORS

The Mohammed Bin Rashid Centre for Government Innovation

The Mohammed Bin Rashid Centre for Government Innovation was established to stimulate and enrich the culture of innovation within the government sector through the development of an integrated innovation framework. The goal is for innovation to become one of the key pillars of the UAE government in line with the vision of H.H. Sheikh Mohammed Bin Rashid Al Maktoum, UAE Vice President, Prime Minister and Ruler of Dubai, which aims to develop government operations and enhance the UAE’s competitiveness, making the UAE one of the most innovative governments around the world.

The Centre aims to make innovation an everyday practice by experimenting with new approaches, enabling people with the right capabilities, networks and resources, thereby enriching the culture of innovation.

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