Drone Technology is here to Disrupt and MBAs need to be Prepared
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The Easton Technology Management Center at UCLA Anderson, in partnership with UCLA Extension recently (May 19, 2017) invited the following four panelists to discuss the Drone Ecosystem.

David Bruemmer, Co-Founder and Chief Technical Officer, 5D Robotics
Mike Quindazzi, Business Development Leader & Managing Director, PwC
Van Espahbodi, Co-Founder and COO, Starburst Accelerator
Keith Kaplan, CEO and Co-Founder, Tesla Foundation
Moderator - Andreas Neumann, CEO, UAV-IQ ('14)

As I started researching Drones, I found that this technology has actually been around for nearly a century, being used for military purposes (Desjardins, Dec 15, 2016). AeroVironment Drones are used widely for military surveillance. The company recently unveiled a small surveillance Drone that can be launched from the palm of the hand and carried in a small pouch (Alexander, May 9, 2017). Nicola Tesla is considered to be the father of the Drone technology as he invented a radio-controlled boat in 1898 which instigated Drones. 86 countries have Drones today, some armed and others unarmed.

Jeff Bezos, CEO of Amazon, made Drones a household name when he spoke about using Drones to deliver Amazon products. That was in 2013. About the same time, DJI demoed two of their Drones at UCLA Anderson. Since that time, Drones can be viewed pretty commonly at bat mitzvahs and weddings to take photos.

According to TechTarget, Drones, which are formally known as Unmanned Aerial Vehicles (UAVs) are unmanned aircrafts which can be air or water-based. A Drone may be controlled remotely or can be autonomous, controlled by software, together with sensors and GPS technology.

David Bruemmer whose company 5D Robotics is in the GPS space cited position are a key part of the Drone technology. David described 5D Robotics as the 'Microsoft for vehicles'; the company can control anything that moves.

Through the panel, I realized that the Drone market is currently primed for growth mainly because its use has become feasible for commercial and hobbyist purposes, in addition to military use. In-fact, a Parrot AR Drone for consumers was first exhibited at the CES event in Las Vegas in 2010 (Dillow, Oct 9, 2014), an academic version of the CES event is organized by the Easton Center each year at the UCLA Anderson. Accel Partners' $75 million investment in DJI (the leader with 70% marketshare) and Intel's $60 million investment in Yuneec are indicating that Venture Capitalists are beginning to take interest in the Drone technology. Other leading commercial Drone makers include 3D Robotics, Lily, Parrot and GoPro (BBVA Innovation Center News, July 5, 2016). Gartner expects the 2017 revenues generated by Drones to be at $6 billion in 2017 and predicts the revenues will grow to $11.2 billion by 2020 (Forni & Meulen, Feb 9, 2017). Panelist Mike Quindazzi referred to PwC's global mega trends report (Eckert, Curran & Bhardwaj, Jan 2016) which found that Drones were one of the 8 technologies expected to have impact on the business world in the upcoming years.

Adoption of Drones by commercial and hobbyist users has become feasible due to several incremental advancements in technology - to lower costs, to reduce weight of the device or to make certain components more accessible. The availability of powerful batteries that are lightweight; reduction in the cost of MEMS accelerometers and gyroscopes; reduced cost of sensors; small, cheap and powerful microcontrollers; and, advancements to the GPS system, have contributed (Gao, Mar 22, 2015).

Sectors using the Drone technology (in many cases, integrated with the Internet of Things (IoT)) include Agriculture, Construction, Media, Real Estate, Search and Rescue, Surveillance, Manufacturing and Retail. Drones can go where humans cannot and are expected to continue to impact us through applications such as Delivery (last mile as well as supply chain (Camhi, May 18, 2017)), Monitoring (fires, climate, wildlife), Spraying (chemicals), Data Collection (making cities and grids smarter) and Saving lives. China's JD.com, its number 2 ecommerce company after Alibaba, started delivering small packages to rural areas via a Drone, and Amazon made its first delivery via a Drone in rural England in December (Baskin & Lin, May 22, 2017). Southern California has been home to the defense sector and has an ecosystem of aerospace talent (Smith, Mar 1, 2016), according to panelist Van Espahbodi, and hence has the infrastructure and supply chain for Drone development.

Challenges remain today such as safety, security, privacy, ethics, regulations as well as technology. According to panelist David Bruemmer, developing the Artificial Intelligence component of the Drone to make it intelligent and autonomous is 80% of the job but is the easier part. It is bringing in the collaborative components, which is, to make the Drone do what the human wants it to do, is the greater challenge.

When asked by one of the attendees, panelist Keith Kaplan listed needing talented people from the following backgrounds in the Drone industry - computer science, data science, cognitive

psychology, industrial engineering physics (optical) and software engineering. With regulations (The FAA or Federal Aviation Administration needs to balance safety and innovation as Drones move into the airspace) and policy being some of the challenges today, experts from law and policy will also need to be involved. Business experts would be needed to determine business models for revenue generation, bring in investments and ensure delivery of value from Drone to individuals, corporations and society. Current and future MBAs working in various sectors including Retail, Energy, Transportation, Agriculture, Entertainment/Media and others need to be prepared for this upcoming disruption.

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