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HOCHSCHULE –
WELTOFFENES
SACHSEN**



Leadership in Technological Innovation: The Importance of Managing Intellectual Property

Prof. Dr. Kelvin W. Willoughby

18 November 2023

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Leadership in Technological Innovation: The Importance of Managing Intellectual Property


Prowess in the

management of intellectual property

is an essential part of

leadership

in technological innovation.



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 and Entrepreneurship

Prof. Dr. Kelvin W. Willoughby

18 November 2023

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Prof. Dr. Dr. Kelvin W. Willoughby

Stiftungsfonds Deutsche Bank Chair of Innovation Management and Entrepreneurship

Previous Academic Affiliations



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- Professor of Innovation and Intellectual Property, **Skolkovo Institute of Science and Technology** (Skoltech), Moscow, **Russia**. Also: Director, Innovation and Intellectual Property Laboratory & Associate Dean of Education, Skoltech.
- Professor of Entrepreneurship and Intellectual Property, Curtin Graduate School of Business & Faculty of Science and Engineering, **Curtin University**, Perth, **Australia**. Also: MBA Program Director.
- Gastprofessor & Wissenschaftlicher Mitarbeiter, Lehrstuhl für Wirtschaftsrecht und Geistiges Eigentum, Fakultät für Wirtschaftswissenschaften, **Technische Universität München (TUM)**, Munich, **Germany**.
- Otto Mønsted Gæsteprofessor, Department of International Economics, Government and Business, **Copenhagen Business School**, Copenhagen, **Denmark**.
- Professor and Honeywell / W. R. Sweatt Chair in the Management of Technology, **The University of Minnesota**, Minneapolis, **United States**. Also: Program Director, Master of Science in Management of Technology, Center for the Development of Technological Leadership.
- Professor of Management, College of Management & Faculty of Science, **Mahidol University**, Bangkok, **Thailand**. Also: Program Director, Entrepreneurship Management Program.
- Associate Professor, College of Engineering and Applied Sciences, **State University of New York at Stony Brook**, Long Island, New York, **United States**. Also: Program Director, Master of Science in Management of Technology, Harriman School of Management and Policy.
- Director, Management of Technology Program, College of Engineering & David Eccles School of Business, **The University of Utah**, Salt Lake City, **United States**. Also: Clinical Associate Professor of Management.
- Visiting Professor, Department of Industrial and Systems Engineering, **The Hong Kong Polytechnic University**, Kowloon, **Hong Kong**, China S.A.R.



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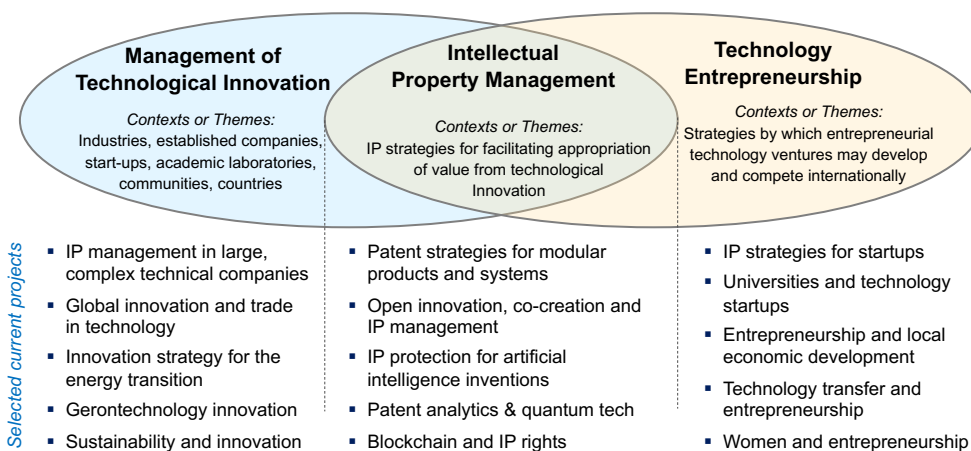
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The research of the Chair is focused on the management of technological innovation, entrepreneurship & intellectual property

We examine technological innovation from three different academic perspectives, using sound theory and rigorous methodology, to produce novel and useful results



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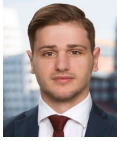






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 <p>Georgy Klushin Doctoral Researcher</p>	 <p>David Waweru Doctoral Researcher</p>	 <p>Rossitza Ivanova Doctoral Researcher</p>	 <p>Dardan Mulaku Doctoral Researcher</p>	 <p>Thorn-Ole Saup Doctoral Researcher</p>
 <p>Aleksei Kalinichenko Doctoral Researcher</p>	 <p>Manisha Mozumder Doctoral Researcher</p>	 <p>Dr. Dmitry Smirnov Postdoctoral Researcher</p>	 <p>Zeki Can Seskir Associated Researcher</p>	 <p>Siyang An Associated Researcher</p>



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CEO of an innovative and influential global company ...

... with leadership challenges



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Dara Khosrowshahi



Founded in 2009
By 2023 ...
Employees ≈ 33,000
Market cap ≈ 112 Billion US\$
Annual revenue ≈ 35 Billion US\$



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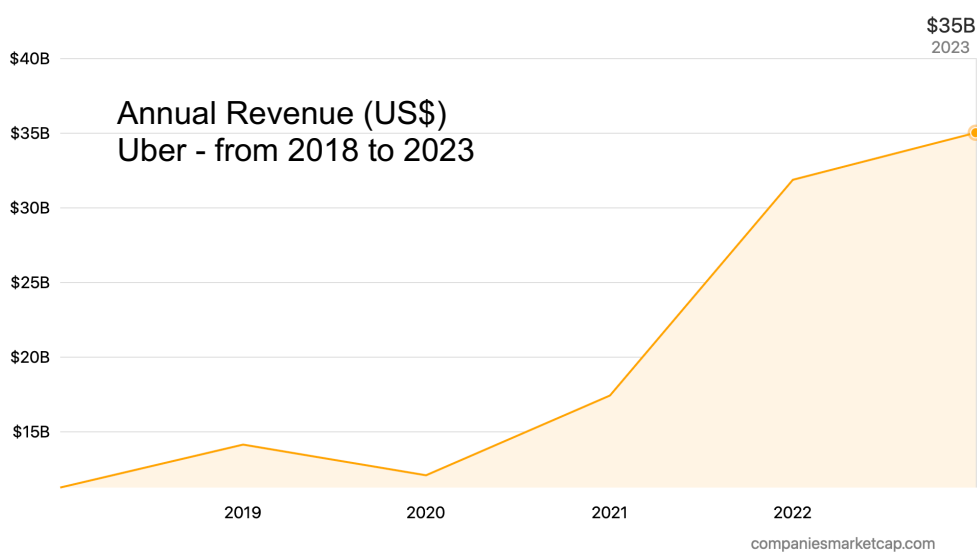
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Uber



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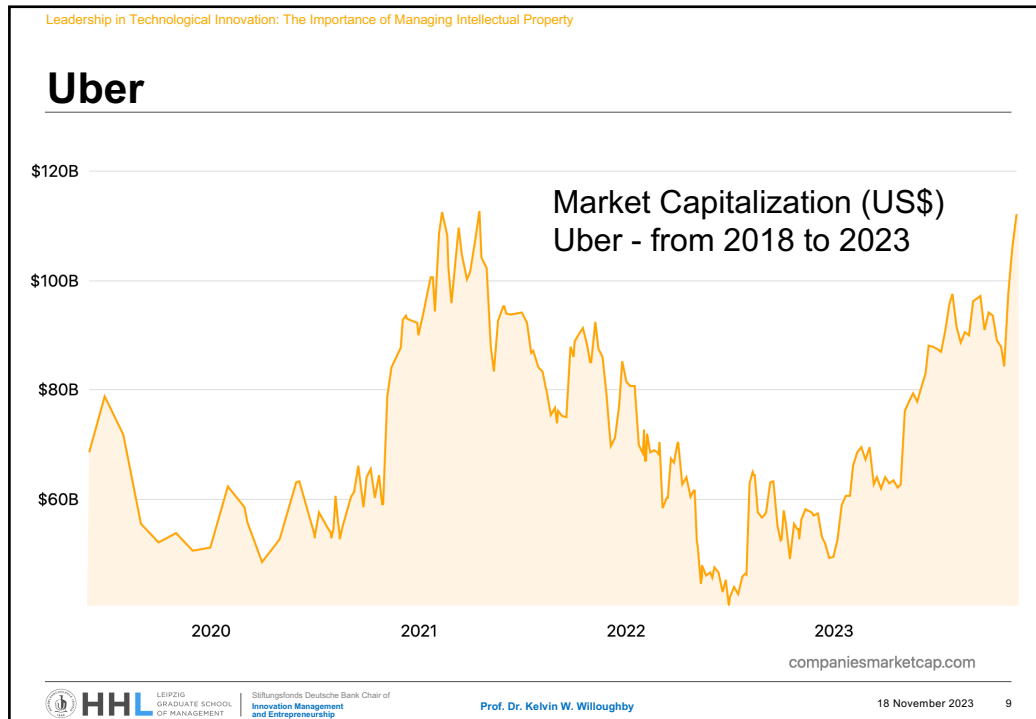
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Another Uber-related story ...

**A successful entrepreneur
and global technology leader in an
emerging field of digital business**

...

... a cautionary tale

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Anthony Levandowski



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Spotlight on student entrepreneurs: At 22, Anthony Levandowski is already a veteran businessman

[Bonnie Azab Powell](#), Public Affairs | 13 February 2003

BERKELEY – Berkeley graduate
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GhostRider



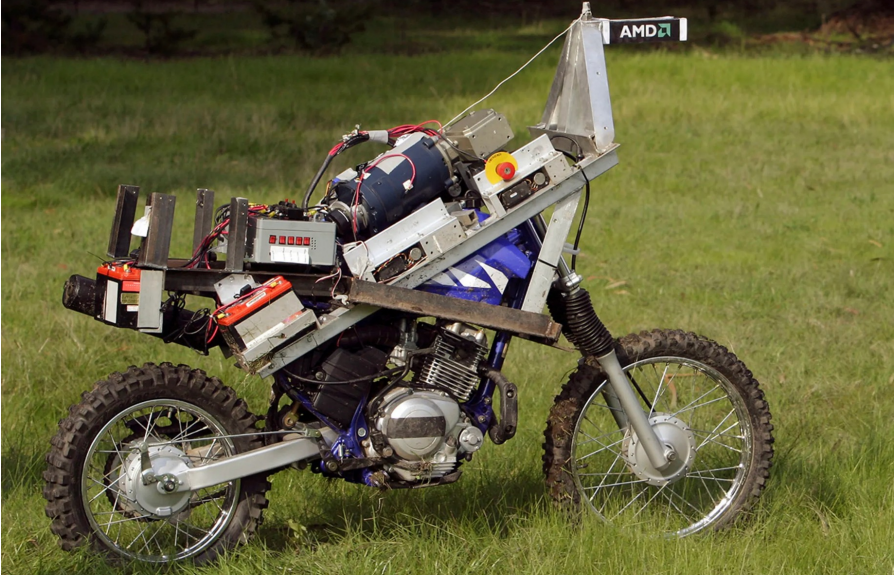
Berkeley
UNIVERSITY OF CALIFORNIA


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GhostRider: The Self-Driving Motorbike That Launched Anthony Levandowski

Mark Harris, *IEEE Spectrum*, 27 February 2018

<https://spectrum.ieee.org/ghost rider-the-self-driving-motorbike-that-launched-anthony-levandowski>



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Anthony Levandowski

Product Manager
Google and Business Lead for Driverless Cars

November 12, 2013


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Berkeley
UNIVERSITY OF CALIFORNIA


Anthony Levandowski

Product Manager
Google and Business Lead for Driverless Cars



WAYMO





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INDUSTRY, MATERIALS & UTILITIES AUGUST 18, 2016 / 6:50 PM / UPDATED 5 YEARS AGO

Uber buys self-driving truck startup Otto; teams with Volvo

By Bernie Woodall 5 MIN READ  

Source: <https://www.reuters.com/article/us-uber-tech-volvo-otto-idUSKCN10T1TR> (accessed 25 August 2021).

(Reuters) - Ride service Uber Technologies Inc said on Thursday it acquired self-driving trucks startup Otto and formed a \$300 million alliance with Volvo Car Group to develop self-driving cars.

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Uber acquires autonomous truck startup Otto, co-founder to lead self-driving efforts

Uber wants to be the self-driving leader

By Jordan Golson | Aug 18, 2016, 11:49am EDT
Source [Uber](#) and [Otto](#)

THE VERGE

Source: <https://www.theverge.com/2016/8/18/12533736/uber-otto-trucks-acquisition-anthony-levandowski> (accessed 25 August 2021).




Uber paid \$680 million for self-driving truck company Otto for the tech, not the trucks

And Uber helps Otto accelerate its path to market.

By Johana Bhuiyan | @JMBBooyah | Aug 18, 2016, 5:15pm EDT

Vox **recode**



Source: <https://www.vox.com/2016/8/18/12540068/uber-paid-680-million-for-self-driving-truck-company-otto-for-the-tech-not-the-trucks> (accessed 25 August 2021).

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Anthony Levandowski - Global Technological Innovation Leader

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Uber CEO Travis Kalanick with Anthony Levandowski

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Travis Kalanick – Founder and CEO, Uber

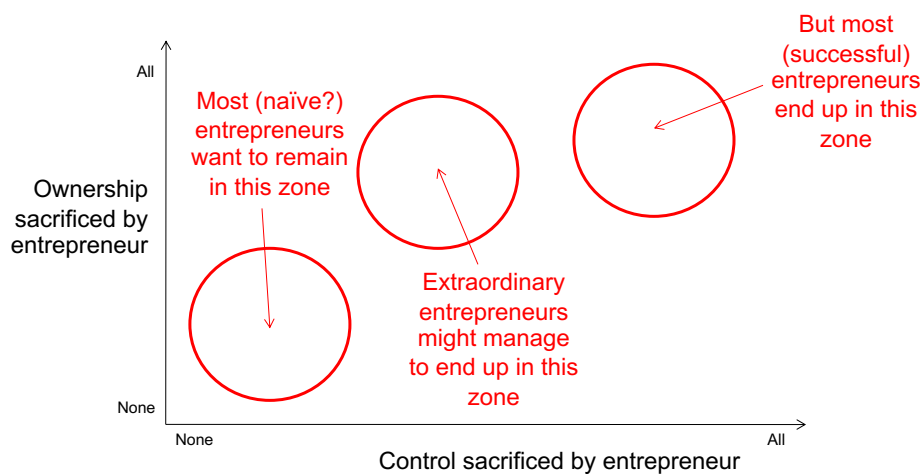
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Relationship Between Ownership of Resources & Control of the Enterprise

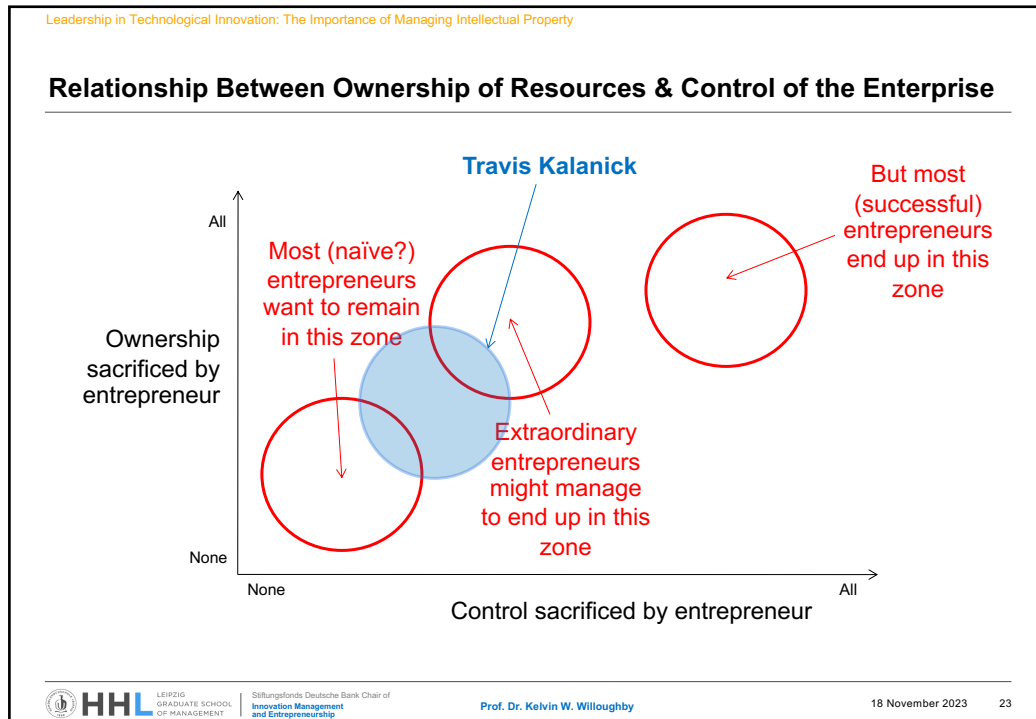
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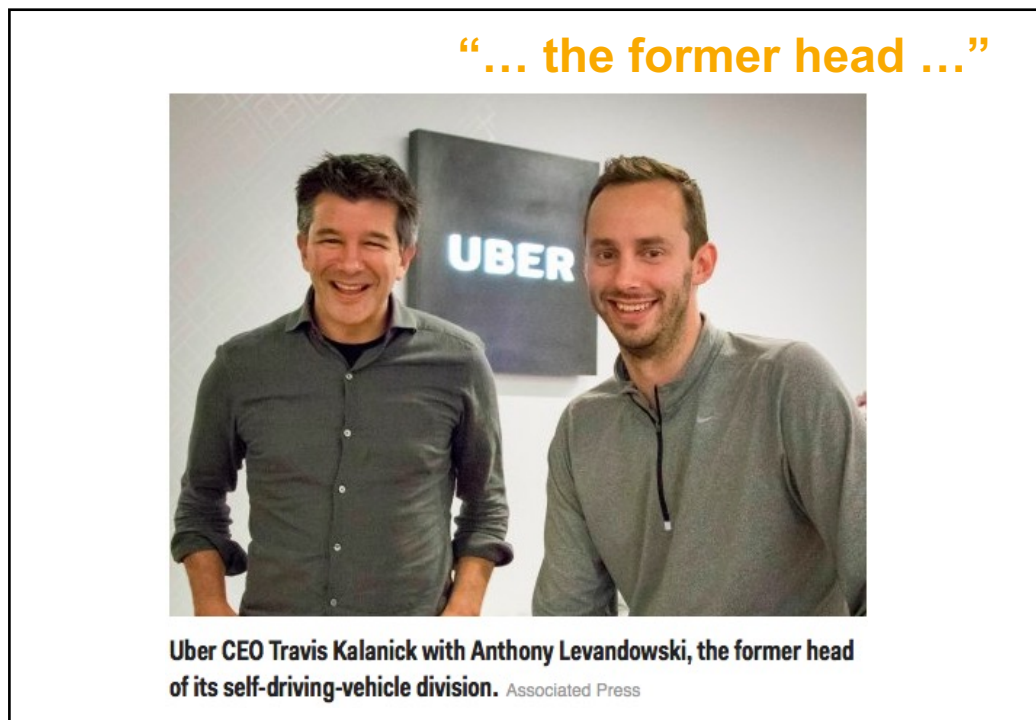
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The New York Times

Uber Founder Travis Kalanick Resigns as C.E.O.

By Mike Isaac June 21, 2017




Travis Kalanick, the chief executive of Uber, said last week that he would take an indefinite leave of absence. Kim Kyung-Hoon/Reuters

Source: <https://www.nytimes.com/2017/06/21/technology/uber-ceo-travis-kalanick.html> (accessed 25 August 2021).

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Dara Khosrowshahi ... Uber's new leader

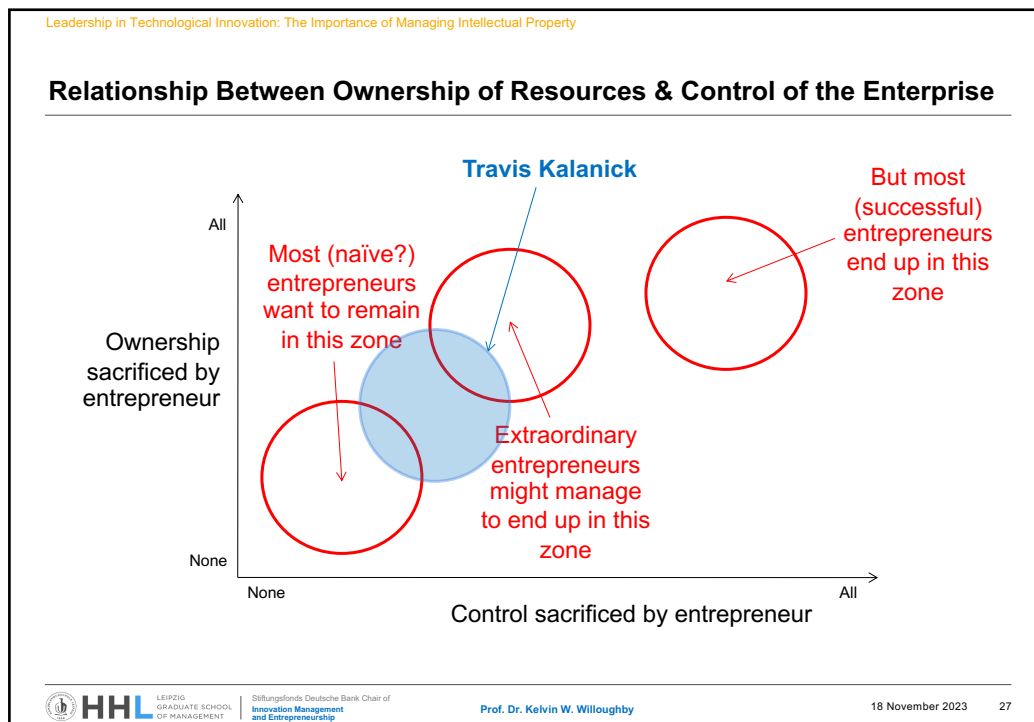


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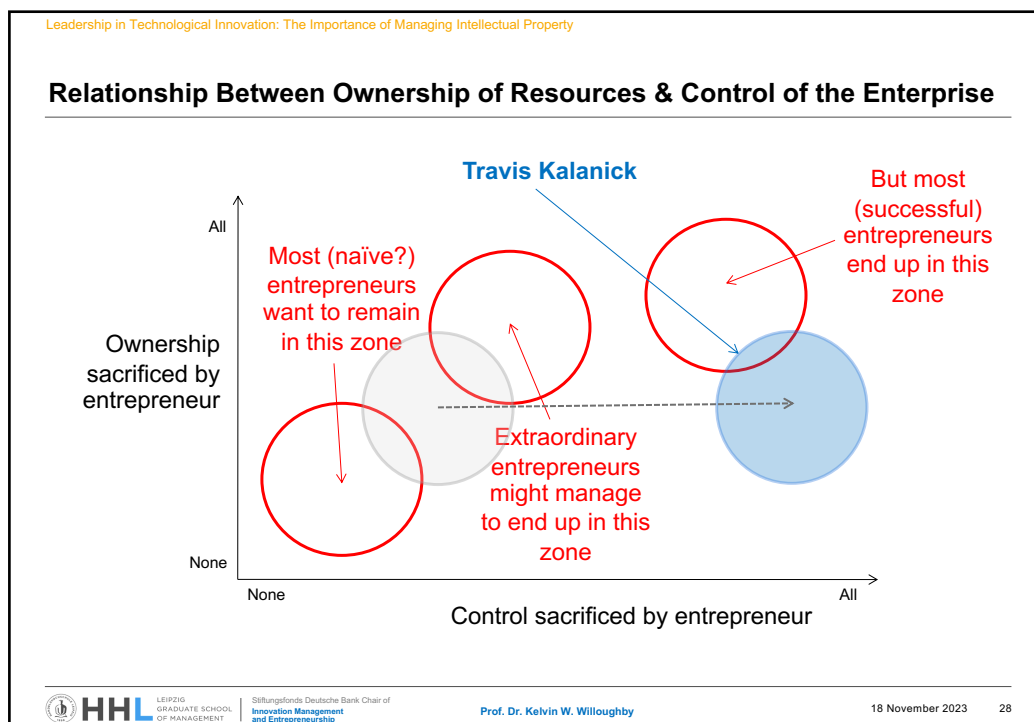
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Uber Founder Travis Kalanick Leaves Board, Severing Last Tie

He has sold more than \$2 billion of his Uber shares and on Thursday will complete the sale of his remaining stake in the company.



The New York Times
By Kate Conger December 24, 2019

Travis Kalanick was forced to resign as chief executive of Uber in 2017. Elijah Nouvelage/Getty Images

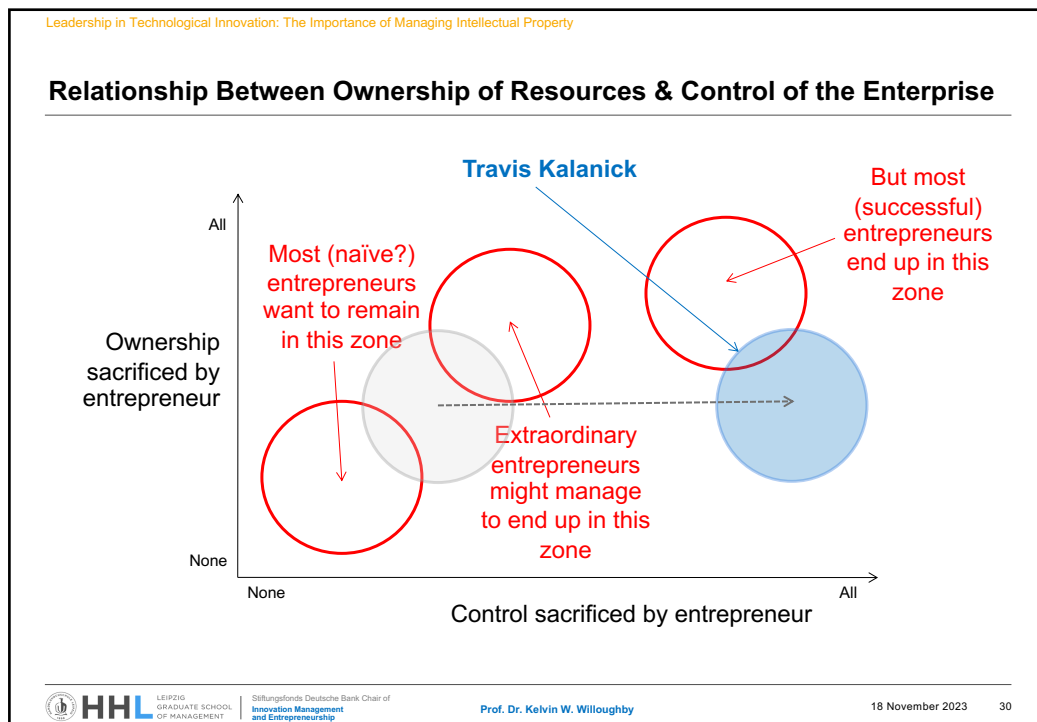
Source: <https://www.nytimes.com/2019/12/24/technology/uber-travis-kalanick.html> (accessed 25 August 2021).

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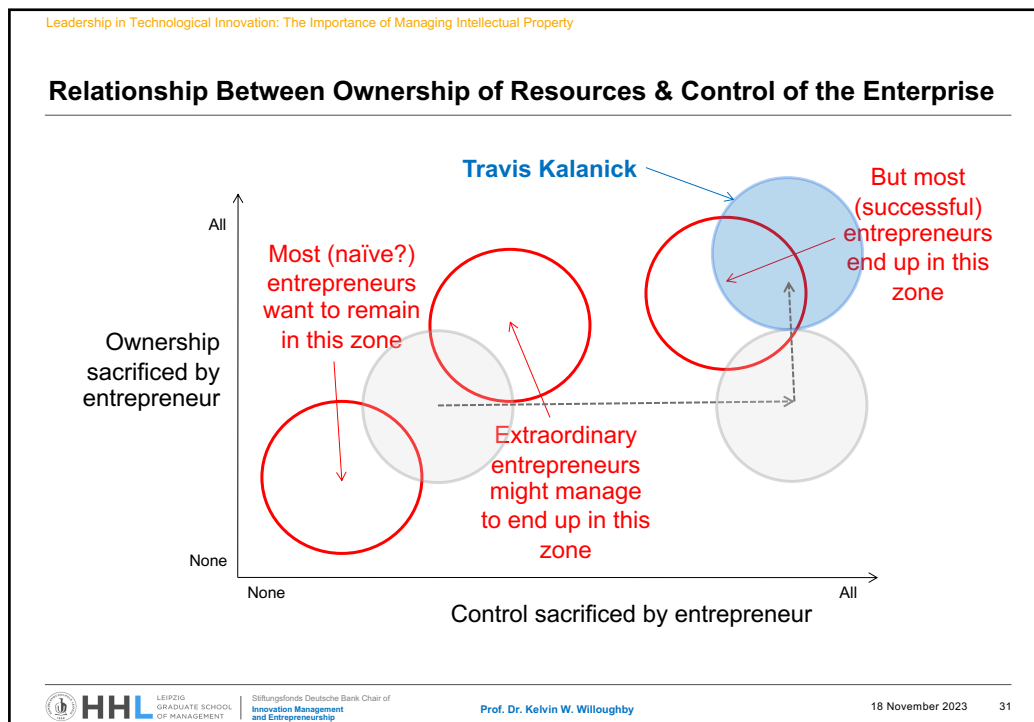
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What happened?

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Theft of Trade Secrets (a type of intellectual property)



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Waymo LLC v. Uber Technologies, Inc. et al , Case 3:17-cv-00939 Complaint Filed 02/23/17, United States District Court, Northern District of California



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Leadership in Technological Innovation: The Importance of Managing Intellectual Property

The New York Times

TECHNOLOGY

Waymo Asks Court to Block Uber's Self-Driving Car Project



Anthony Levandowski left Google in February 2016 to start his own self-driving truck company, Otto. He sold it to Uber for \$680 million six months later.
Ramin Bahrani for The New York Times

Source: <https://www.nytimes.com/2017/03/10/technology/waymo-uber-self-driving-car-lawsuit.html?hp&ref=technology&action=click&pgtype=Homepage&module=well-region®ion=bottom-well&WT.nav=bottom-well> (visited on 11 March 2017).

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Uber vs. Waymo (Alphabet / Google)

- Anthony Levandowski was an employee of **Waymo**, a subsidiary of **Alphabet** (Google's parent company)
- Levandowski stole trade secrets from **Waymo**
- He then launched a startup, **Otto**, resigned his position at **Waymo**, and then utilized the trade secrets stolen from **Waymo** at **Otto**
- **Uber** bought **Otto**, and Levandowski came to work for **Uber** ... as a star employee of **Uber**
- **Uber** made use of **Waymo**'s trade secrets that had been illegally appropriated by **Otto**
- **Waymo** sued **Uber** for utilizing stolen property as part of its technology for autonomous vehicles

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TECH INDUSTRY

Four days, \$245 million: How Waymo v. Uber came to an end

A surprise settlement ends the case before it reached the jury. Here's an inside look into how it went down.

BY DARA KERR / FEBRUARY 9, 2018 3:36 PM PST



Under their agreement, **Waymo** gets 0.34 percent of **Uber**'s equity, worth about \$245 million given **Uber**'s estimated valuation of \$72 billion. **Uber** also agreed to not incorporate **Waymo**'s confidential information into hardware and software used in its self-driving cars. **Waymo** had been seeking \$1.8 billion in damages. The surprise settlement brings to a close one of the highest profile court battles in Silicon Valley history, pitting **Waymo** -- the self-driving car spinoff of Google's parent company, **Alphabet** -- against **Uber**, the world's most valuable startup. The case centered on 14,000 "highly confidential" files that Google's former star engineer **Anthony Levandowski** allegedly downloaded before quitting in January 2016 to form his own self-driving truck company, **Otto**. **Uber** acquired **Otto** seven months later. **Waymo** claims its trade secrets found their way into **Uber**'s self-driving cars.

Source: <https://www.cnet.com/news/waymo-v-uber-scenes-from-behind-the-settlement-deal-self-driving-cars-and-trade-secrets/> (visited on 20 February 2017).

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The New York Times | <https://nyti.ms/2Tp5ibg>

Star Engineer Who Crossed Google Is Ordered to Pay \$179 Million to Company

Anthony Levandowski, who helped pioneer self-driving cars and was accused of taking Google's trade secrets to Uber, also filed for bankruptcy.

 By Mike Isaac

March 4, 2020

SAN FRANCISCO — Anthony Levandowski, a former star Google and Uber engineer who helped pioneer self-driving cars, filed for bankruptcy protection on Wednesday after a court ordered him to pay \$179 million to Google over a contract dispute.

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Star Technologist Who Crossed Google Sentenced to 18 Months in Prison.

Anthony Levandowski, a onetime star Silicon Valley engineer of self-driving cars, had pleaded guilty to stealing trade secrets.

The New York Times



Anthony Levandowski, a former Google and Uber engineer, agreed to pay \$756,499 to Waymo, a self-driving business spun out of Google, as restitution for theft of trade secrets. Justin Sullivan/Getty Images

OAKLAND, Calif. — Anthony Levandowski, a pioneer of self-driving car technology in Silicon Valley, had once been feted by companies such as Google and Uber for his engineering expertise. But on Tuesday, Mr. Levandowski's fall from grace was capped when he was sentenced to **18 months in prison** for stealing self-driving car trade secrets from Google. He will not be required to serve his sentence until the coronavirus pandemic subsides, a federal judge ordered.

Mr. Levandowski, 40, also agreed to **pay \$756,499 to Waymo**, a self-driving business spun out of Google, as restitution. He had filed for **bankruptcy** in March, saying he had \$50 million to \$100 million in personal assets. He will also be required to pay a **fine of \$95,000**.

Source: Kate Conger, New York Times, 4 August 2020.
<https://www.nytimes.com/2020/08/04/technology/levandowski-google-uber-sentencing-trade-secrets.html?searchResultPosition=3> (visited on 1 February 2021).

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Anthony Levandowski, an engineer who stole trade secrets, receives a Trump pardon.

The New York Times



Anthony Levandowski in California in 2019. He was one of Silicon Valley's most prominent engineers but was sentenced in August to 18 months in prison.

Jason Henry for The New York Times

<https://www.nytimes.com/2021/01/20/business/economy-coronavirus/anthony-levandowski-an-engineer-who-stole-trade-secrets-receives-a-trump-pardon> (visited on 20 January 2021).

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Dara Khosrowshahi



Personal net worth \approx 100 Million US\$



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Management of Intellectual Property?



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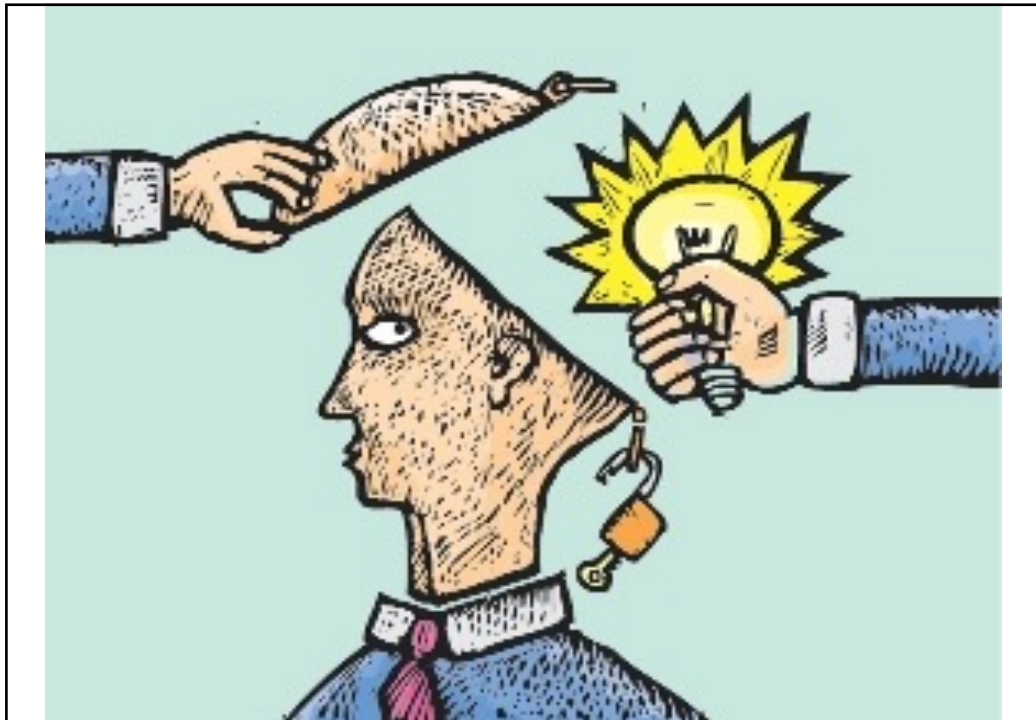
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What is Intellectual Property? ... a short-hand definition

Intellectual property is an intangible asset for which a government has granted a person or an organization exclusive rights.



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What is Intellectual Property? ... a formal definition

Intellectual property is that class of intangible assets on which legal rights have been conferred by a sovereign state whereby the recipients of those rights possess the authority to exclude others from using, making, selling, distributing, importing, copying or otherwise exploiting the associated assets without permission.



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What is Intellectual Property?

Intellectual property is that class of intangible assets on which legal rights have been conferred by a sovereign state whereby the recipients of those rights possess the authority to exclude others from using, making, selling, distributing, importing, copying or otherwise exploiting the associated assets without permission.

- Patents
- Trade secrets
- Copyright
- Design rights / Design patents
- Trade marks
- “Trade dress”
- Demarcations of origin / Certifications of authenticity
- “Petty patents” / “innovation patents” / “utility models”
- Plant varieties
- Licenses

*Many types of
intellectual
property rights,
not just patents.*



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Patents

**Enlightened leadership
in IP management by
student alumni
of a university?**




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US005781752A	
United States Patent [19]	Patent Number: 5,781,752
Moshovos et al.	Date of Patent: Jul. 14, 1998

[54] TABLE BASED DATA SPECULATION CIRCUIT FOR PARALLEL PROCESSING COMPUTER	5,666,506 9/1997 Hesson et al. 395/392
OTHER PUBLICATIONS	
[75] Inventors: Andreas I. Moshovos; Scott E. Breach; Terani N. Vijaykumar; Gurindar S. Sohi, all of Madison, Wis.	Gurinda Sohi et al., <i>Instruction Issue Logic for High-Performance Interruptable Pipelined Processors</i> ; ACM 1987, pp. 27-34.
[73] Assignee: Wisconsin Alumni Research Foundation, Madison, Wis.	Primary Examiner—Krisna Lim Attorney, Agent, or Firm—Quarles & Brady
[21] Appl. No.: 773,992	[57] ABSTRACT
[22] Filed: Dec. 26, 1996	A predictor circuit permits advanced execution of instructions depending for their data on previous instructions by predicting such dependencies based on previous mis-speculations detected at the final stages of processing. Synchronization of dependent instructions is provided by a table creating entries for each instance of potential dependency. Table entries are created and deleted dynamically to limit total memory requirements.
[51] Int. Cl.⁶ G06F 9/38	
[52] U.S. Cl. 395/392	
[58] Field of Search 395/392	
References Cited	
U.S. PATENT DOCUMENTS	
5,664,138 9/1997 Yoshida 395/395	9 Claims, 7 Drawing Sheets

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POLICY —

Apple must pay \$506M for infringing university's patent

University of Wisconsin may collect \$4.35 apiece for millions of iPads and iPhones.

JOE MULLIN - 7/26/2017, 9:35 PM



Enlarge / Wisconsin Alumni Research Foundation will be able to collect more than \$500 million in royalties on Apple products that used the A7, A8, and A8X chips. That includes the iPad Air, pictured here in 2013.

"Wisconsin Alumni Research Foundation, or WARF, sued Apple in 2014, accusing its A7, A8, and A8X chips of infringing US Patent No. 5,781,752, which claims a type of "table based data speculation circuit." The following year after a trial, a Wisconsin jury found that Apple had infringed the '752 patent and that it should pay \$234 million in damages. Yesterday's order, signed by US District Judge William Conley, more than doubles that amount. Conley awarded WARF \$1.61 per unit for many of the iPad and iPhone devices that use the accused chips, up until the entry of judgment in October 2015. He also tacked on \$2.74 per unit as a royalty payment covering the period from the date of judgment through December 26, 2016, which is when the '752 patent expired."

Source: Joe Mullin, 26 July 2017, <https://arstechnica.com/tech-policy/2017/07/judge-orders-apple-to-pay-506m-to-university-for-patent-infringement/> (accessed on 25 September 2017).


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Leadership in Technological Innovation: The Importance of Managing Intellectual Property

Another type of intellectual property ... trademarks

Trademarks

... student entrepreneurs taken by surprise, by mismanaging IP



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ABOUT ADMISSIONS EDUCATION RESEARCH INNOVATION FACULTY INDUSTRY STUDENT LIFE COLLOQUIA



Skoltech scientists unveil a new cardiac monitoring gadget

27/02/2019

A team of Skoltech researchers has created a device that can monitor a cosmonaut's cardiovascular system during pre-flight training, space missions and after-flight rehabilitation. The results of their study were published in the international journal *Acta Astronautica*.


With the imposin such as and trar

Skoltech process an ECG monitor cardiog

"Our sol Center, stroke p detectin general significantly improve the quality of life and life expectancy."

"Our solution can benefit both cosmonauts and ordinary people," says the start-up founder and PhD student at the Skoltech Space Center, **Natalia Glazkova**.

"Cardiovascular diseases remain the number 1 cause of death in Russia and globally. ... our device performs extended 7-day monitoring, thus raising the chances of detecting the problem at an early phase."



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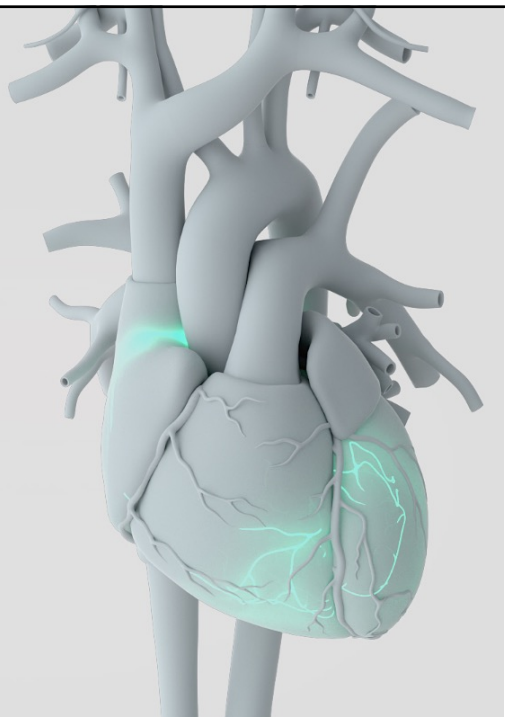
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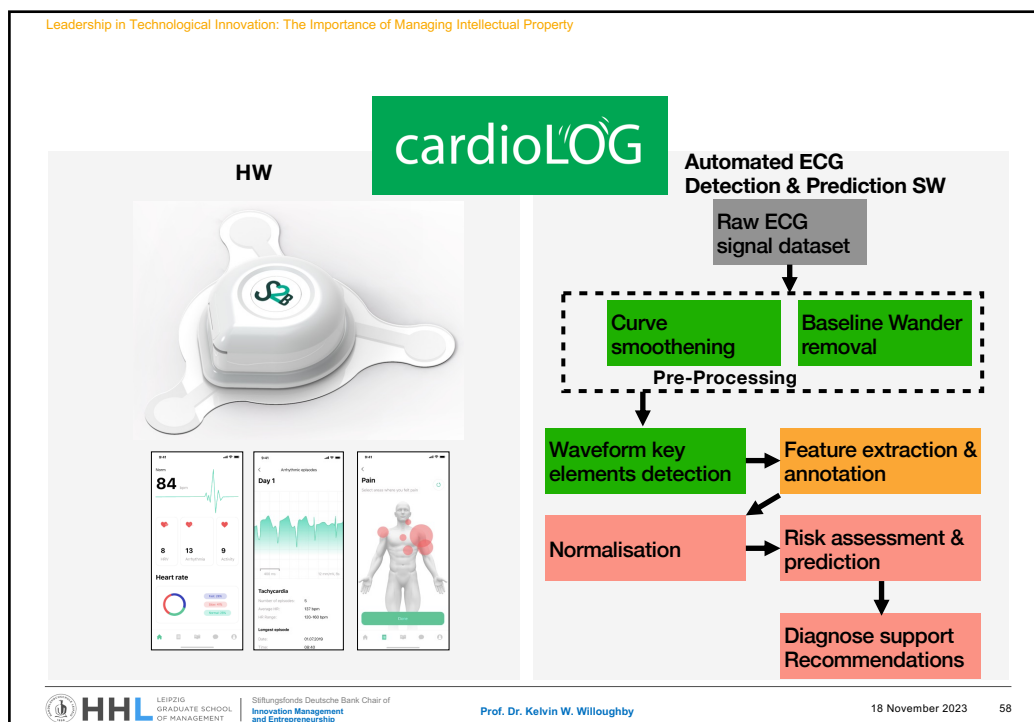
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CARDIOLOG TECHNOLOGIES

A digital health startup
developing a wearable ECG
monitoring system for
preventive cardio screening
and arrhythmia
management



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Trademark

The logo for cardioLOG, featuring the word "cardio" in a lowercase sans-serif font and "LOG" in a larger, uppercase sans-serif font. The "O" in "LOG" is stylized with three curved lines above it, resembling a heartbeat or a signal. The entire logo is white and set against a solid green rectangular background.


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<http://cardiolog-technologies.ru>

The logo for cardioLOG, featuring the word "cardio" in a lowercase sans-serif font and "LOG" in a larger, uppercase sans-serif font. The "O" in "LOG" is stylized with three curved lines above it, resembling a heartbeat or a signal. The entire logo is white and set against a solid green rectangular background.


Manufactures and commercializes products and services related to ECG monitoring with an adaptive algorithm for atrial fibrillation detection.

Booth at the **IDTechEx** trade show
in Berlin on 11-12 April 2018

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Leadership in Technological Innovation: The Importance of Managing Intellectual Property

IDTECHEx Exhibition, Berlin



- A premier business exhibition with over 200 exhibitors engaging with over 2,500 attendees.
- First international event for us
- Became one of the Launchpad Winner.

CardioLOG Technologies
cardioLOG Technologies, LLC is a digital health start-up developing wearable ECG-monitoring systems for arrhythmia management and stroke prevention. The company focuses on stroke prevention in patients with atrial fibrillation through up to 7-days continuous ECG monitoring. They have developed a body-worn multi-lead adhesive ECG-sensor with clinical grade accuracy and an adaptive algorithm for noisy data analysis and arrhythmia detection. The proposed solution can help to perform arrhythmia screening, therefore potentially reducing number of heart-related complications as well as healthcare system load.

PRINTED ELECTRONICS WORLD TAGS
Advanced Materials
Graphene and Carbon Nanotubes
Printed, Flexible and Organic Electronics

CityQ
CityQ is about making a new type of bikes to replace car traffic but CityQ is also about offering such new vehicles as part of MaaS - "mobility as a service" (MaaS is one of several such partners). Bosch just entered the MaaS market (expected to be USD 140MRD in 2022 according to PwC). All electric vehicles from buses to cars and bikes will be connected and many self-driving. CityQ will be built to support this in the years to come. According to PwC there will be 470 million connected vehicles by 2025.


IDTechEx Announces the Winners of Launchpad
Printed on March 19, 2018 by IDTechEx

IDTechEx Launchpad will showcase innovations from 21 start-up companies at the IDTechEx Show held in Berlin, Germany on 11-12 April 2018 (www.IDTechEx.com/europe). All winners will be showing a new working prototype or product, many for the first time.

The IDTechEx Launchpad initiative features early-stage start-ups, universities, newly spun-out companies, and research labs or government labs who will demonstrate a working prototype or product that highlights new advances in any of the related event topics of 3D printing, electric vehicles, energy storage, graphene, internet of things, off-grid energy independence, printed electronics, sensors, or wearable technology.

The initiative provides the opportunity for the winning companies to exhibit their state-of-the-art technologies at this international event, alongside an estimated 200 exhibitors reaching out to over 2,500 attendees, including product developers, technology scouts and integrators.

The winners of IDTechEx Launchpad 2018 are:



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Leadership in Technological Innovation: The Importance of Managing Intellectual Property

Trademarks

7 DAYS BEFORE THE INTERNATIONAL TRADE FAIR EXHIBIT ...

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APRIL 4th, 2018

Dear Sirs,

We act for the French company CardioLogs Technologies.

CARDIOLOGS TECHNOLOGIES is the owner several trade mark applications and registrations CARDIOLOGS, including inter alia the following Trade Marks:

- French Trade Mark registration CardioLogs No. 144125148 of October 12, 2014
- European Trade Mark registration CARDIOLOGS No. 017424763 of November 2, 2017
- UK Trade Mark application CARDIOLOGS No. UK00003267897 of November 2, 2017
- U.S. Trade Mark application CARDIOLOGS No. 87669701 of November 2, 2017

(collectively "the Marks")

The services protected by the various Marks include a wide range of SaaS software, algorithms, analysis and monitoring. Full details of the Marks are enclosed.

CardioLogs Technologies has acquired valuable reputation and goodwill in the European Union and throughout the world in the mark CARDIOLOGS and its associated family of CARDIOLOGS marks which it strives to maintain. CardioLogs Technologies is a forerunner in the use of artificial intelligence for ECG monitoring.

CardioLogs Technologies has recently become aware of your website <http://cardiolog-technologies.ru>, which mentions that you are running a Russian company called "CardioLOG Technologies". It informs the public that you manufacture and commercialize products and services related to ECG monitoring with adaptive algorithm for atrial fibrillation detection, and that you will have a booth during the IDTechEx event in Berlin on 11-12 April.

The words CARDIOLOGS and CARDIOLOG are merely identical. Moreover, the goods and services offered in your website are identical of highly similar to those of CardioLogs Technologies. Your use of the mark CARDIOLOG is therefore likely to lead consumers to believe – erroneously – that the goods and services offered by you emanate from CardioLogs Technologies or from an economically linked undertaking. Consequently there is a likelihood of confusion between CARDIOLOG and the Marks on part of the public and notably CardioLogs Technologies's clients.

Therefore, your use of the mark CARDIOLOG infringes CardioLogs Technologies's prior rights, and notably its Marks.

In light of the above, we have advised CardioLogs Technologies that it has a claim against you. Notwithstanding CardioLogs Technologies's rights, all of which are hereby reserved, CardioLogs Technologies may be prepared to refrain from taking further action against you provided that you immediately :

1. Stop any use of the mark "CardioLOG" or "Cardiologs" whatsoever
2. Surrender the domain name cardiolog-technologies.ru and any other domain name containing the word "cardiolog" or "cardiologs"
3. Change your company name to delete the word "Cardiolog"
4. Withdraw any application you may have made containing these words

And provide us the evidence of the same.

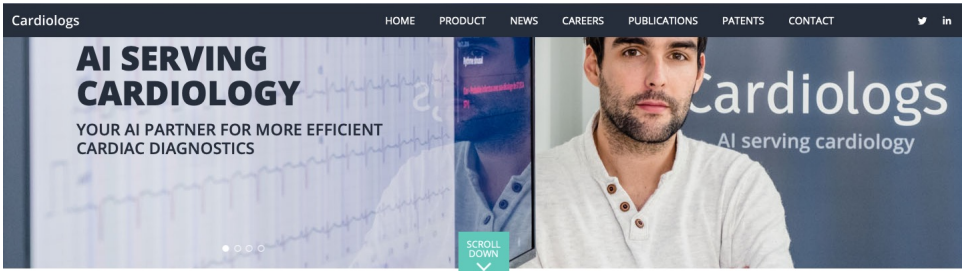
Written confirmation of the above should be provided no later than 8 days from the date of this letter, i.e. by April 08, 2018.

If you do not cease and desist the infringement, CardioLogs Technologies will take appropriate legal action against you and will seek all available damages and remedies.

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Leadership in Technological Innovation: The Importance of Managing Intellectual Property

Trademarks – Infringement of Foreign Trademark Rights



ABOUT CARDIOLOGS

Cardiologs is a medical technology company committed to transforming cardiac diagnostics by utilising medical-grade artificial intelligence and cloud technology.

From the very early stages, Cardiologs partnered with leading cardiology and emergency medicine experts to develop a cutting-edge solution that empowers clinicians worldwide to deliver expert cardiac care faster and more efficiently.

The Cardiologs ECG Analysis Solution is built on an ever-growing and proprietary database of more than 1,450,000 recordings and is supported by a number of clinical publications that demonstrate leading diagnostic performance.

It was the world's first medical device powered by deep learning technology to receive regulatory clearance (CE Mark in August 2016) and among the first to receive FDA clearance (June 2017).

Today, Cardiologs is partnering with clinicians and healthcare practitioners across four continents to realize the vision of making expert cardiac diagnostics scalable and accessible to everyone.


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Trademarks – Infringement of Foreign Trademark Rights

Russian Company: **CardioLOG Technologies**
 Website: **<http://cardiolog-technologies.ru>**
 Email address: **cardiolog-technologies@gmail.com**
 Unregistered trademarks: **cardioLOG** 

French Company: **Cardiologs Technologies SAS**
 Website: **<http://cardiologs.com>**
 Email address: **contact@cardiologs.com**
 Registered trademarks: **CardioLogs** **CARDIOLOGS**
 (in EU, France, UK, USA)


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~~cardioLOG CardioLOG Technologies~~
~~~~
~~<http://cardiolog-technologies.ru>~~
Sense2beat ✓

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Leadership in Technological Innovation: The Importance of Managing Intellectual Property

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**INTELLECTUAL PROPERTY MANAGEMENT
AND TECHNOLOGICAL ENTREPRENEURSHIP**

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Received 9 September 2010
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Published 8 October 2013

This paper investigates the distinctive technology protection strategies of entrepreneurial technology firms. In contrast with much popular opinion, it is reported that intellectual property features more prominently in the business of small entrepreneurial firms than it does in the business of large, established mature firms. The intellectual property portfolios of technology firms of all sizes and ages exhibit a rich array of instruments in addition to patents for protecting technology, including trade secrets, trademarks and copyright, together with licenses to externally sourced technology. The intellectual property profiles of technology firms appear to be influenced by their context, organizational profiles and corporate goals and by the character of their technology.

Keywords: Intellectual property; entrepreneurship; trade secrets; patents; copyright; trademarks; licensing; bioscience; SMEs; IP profiles.

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Leadership in Technological Innovation: The Importance of Managing Intellectual Property

Prominence of IP Management in the business of technology firms

Category	Large established firms	Large emerging firms	Small established firms	Start-ups	Mean
Proportion of full-time-equivalent employees devoted to IP	2.8%	2.3%	14.1%	18.6%	11% (mean)
Proportion of CEO's time devoted to IP	9.9%	12.2%	15.9%	19.1%	14% (mean)

Source: Kelvin W. Willoughby, "Intellectual property management and technological entrepreneurship," *International Journal of Innovation and Technology Management*, 10, 6 (2013), 1-42.

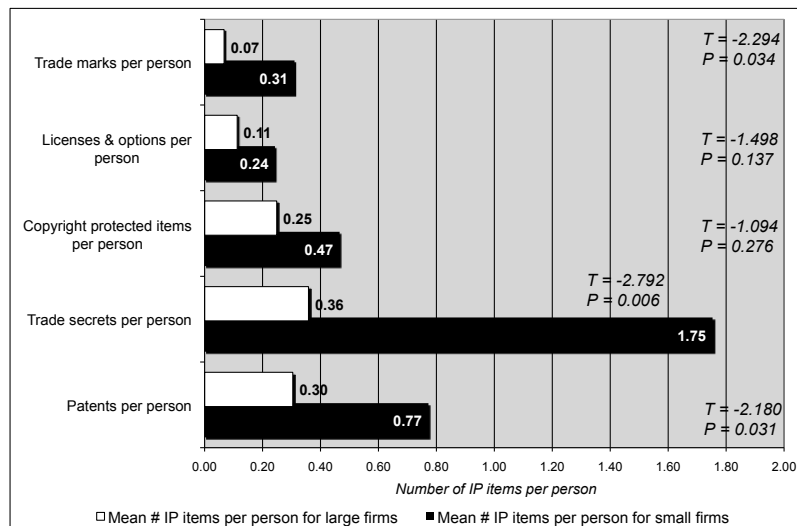
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Size of the Enterprise and IP Profile



Source: Kelvin W. Willoughby, "Intellectual property management and technological entrepreneurship," *International Journal of Innovation and Technology Management*, 10, 6 (2013), 1-42.



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**What happens when a company is
blessed with skillful and wise
leadership in intellectual property?**



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Strategic Management of Intellectual Property

What happens when a company is blessed with skillful and wise leadership in intellectual property?

Kelvin W. Willoughby,
 "What impact does intellectual property have on the business performance of technology firms?"
Int. Journal of Intellectual Property Management, 6, 4 (2013), 316-338.
<https://doi.org/10.1504/IJIPM.2013.057634>

316 *Int. J. Intellectual Property Management*, Vol. 6, No. 4, 2013

What impact does intellectual property have on the business performance of technology firms?

Kelvin W. Willoughby

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 Faculty of Science and Engineering,
 Curtin University,
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 E-mail: k.willoughby@curtin.edu.au

Abstract: This paper reports the results of an original empirical study of the relationship between intellectual property and the financial performance of technology firms in the bioscience-technology industries. The study found a statistically significant positive relationship between the firms' investments in intellectual property and their performance. The performance measure was based upon revenue-growth data collected from each firm, and the categories of intellectual property analysed included patents, trade secrets, trademarks, copyright and licenses to externally sourced technology. This study also found that the financial benefits of accumulating a strong intellectual property portfolio were enjoyed by technology firms regardless of whether they were strategically oriented towards R&D or strategically oriented towards the commercial production of products and services.

Keywords: intellectual property; patents; trade secrets; trademarks; copyright; licenses; financial performance; R&D; production; strategic management of IP.

Reference to this paper should be made as follows: Willoughby, K.W. (2013) "What impact does intellectual property have on the business performance of technology firms?", *Int. J. Intellectual Property Management*, Vol. 6, No. 4, pp.316-338.

Biographical notes: Kelvin W. Willoughby is a Professor of Entrepreneurship and Intellectual Property in Curtin University's Faculty of Science and Engineering. His research and teaching concentrate on the management of intellectual property, technology-based entrepreneurship, and strategic planning for technology-based industry development. He holds Doctorates in both Strategic Management and Technology Studies, and Master of Laws degree in Intellectual Property Law. He has extensive experience as an Educator, Researcher, Consultant and Programme Leader in the USA, Europe, Asia and Australia, including a variety of university-industry collaboration projects, technology commercialisation projects and executive education projects.



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Relationship between accumulation of IP assets and financial performance

Type of Intellectual Property	Category of Technology Firms in the Study Sample				
	All Firms (whole data set)	Firms with Low R&D Intensity	Firms with High R&D Intensity	Firms with Low Production Intensity	Firms with High Production Intensity
Patents	Positive, highly significant	Positive, significant	Positive, highly significant	Neutral / insignificant	Positive, very highly significant
Trade secrets	Positive, highly significant	Positive, significant	Positive, more significant	Neutral / insignificant	Positive, highly significant
Trademarks	Positive, very highly significant	Neutral / insignificant	Positive, very highly significant	Neutral / insignificant	Positive, highly significant
Copyright protected items	Neutral / insignificant	—	—	—	—
Licenses	Neutral / insignificant	—	—	—	—
All types of IP (aggregated)	Positive, significant	Neutral / insignificant	Positive, highly significant	Neutral / insignificant	Positive, very highly significant

Source: Kelvin W. Willoughby, "What impact does intellectual property have on the business performance of technology firms?" *International Journal of Intellectual Property Management*, 6, 4 (2013), 316-338.



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Relationship between accumulation of IP assets and financial performance

Type of Intellectual Property	Category of Technology Firms in the Study Sample				
	All Firms (whole data set)	Firms with Low R&D Intensity	Firms with High R&D Intensity	Firms with Low Production Intensity	Firms with High Production Intensity

Investment in intellectual property (patents, trade secrets, trademarks) generally improves the financial performance of technology firms.

The more production-intensive a firm is the more it will benefit financially from investment in intellectual property.

The more R&D-intensive a firm is the more it will benefit financially from investment in intellectual property.

All types of IP (aggregated)	Positive, significant	Neutral / insignificant	Positive, highly significant	Neutral / insignificant	Positive, very highly significant
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Source: Kelvin W. Willoughby, "What impact does intellectual property have on the business performance of technology firms?" *International Journal of Intellectual Property Management*, 6, 4 (2013), 316-338.



Intellectual Property Strategy

What do we mean by intellectual property strategy?



International Intellectual Property Strategy

Type of IP included in a firm's corporate strategy	Jurisdiction/country for obtaining and/or enforcing the IP right					
	Home jurisdiction A	B	C	D	E	F
Patents (utility patents)						
Petty patents / Utility models						
Design patents						
Registered designs						
Copyright						
Related rights ("copyright")						
Trade secrets						
Trademarks						
"Trade dress"						
Demarcations of origin						
Certifications of authenticity						
Plant varieties						
Database rights						
Domain names						
Licenses						



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Intellectual Property Strategy – Passive / Weak

Type of IP included in a firm's corporate strategy	Jurisdiction/country for obtaining and/or enforcing the IP right					
	Home jurisdiction A	B	C	D	E	F
Patents (utility patents)	✓					
Petty patents / Utility models						
Design patents						
Registered designs	✓					
Copyright	✓					
Related rights ("copyright")						
Trade secrets						
Trademarks	✓					
"Trade dress"						
Demarcations of origin						
Certifications of authenticity						
Plant varieties						
Database rights						
Domain names						
Licenses						



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Intellectual Property Strategy – Aggressive / Crude

Type of IP included in a firm's corporate strategy	Jurisdiction/country for obtaining and/or enforcing the IP right					
	Home jurisdiction A	B	C	D	E	F
Patents (utility patents)	✓	✓	✓	✓	✓	✓
Petty patents / Utility models	✓			✓	✓	✓
Design patents	✓			✓		
Registered designs		✓	✓		✓	
Copyright	✓	✓	✓	✓	✓	✓
Related rights ("copyright")		✓	✓			
Trade secrets	✓	✓	✓	✓	✓	✓
Trademarks	✓	✓	✓	✓	✓	✓
"Trade dress"	✓		✓		✓	
Demarcations of origin						
Certifications of authenticity	✓	✓	✓	✓	✓	✓
Plant varieties						
Database rights		✓			✓	✓
Domain names	✓	✓	✓	✓	✓	✓
Licenses	✓	✓	✓	✓	✓	✓



Intellectual Property Strategy – Artful / Sophisticated

Type of IP included in a firm's corporate strategy	Jurisdiction/country for obtaining and/or enforcing the IP right					
	Home jurisdiction A	B	C	D	E	F
Patents (utility patents)	✓	✓			✓	✓
Petty patents / Utility models						
Design patents	✓	✓				
Registered designs					✓	
Copyright	✓	✓		✓	✓	✓
Related rights ("copyright")		✓				
Trade secrets	✓	✓		✓	✓	✓
Trademarks						
"Trade dress"						
Demarcations of origin						
Certifications of authenticity						
Plant varieties						
Database rights		✓				
Domain names	✓	✓	✓	✓	✓	✓
Licenses	✓				✓	✓



Intellectual property management, dynamic capabilities and competitive innovation in the commercial aircraft industry

Punyapat Saksupapchon and
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Abstract: In this paper we combine insights from two streams of literature within the broad academic domain of strategic management – namely *intellectual property management* and *dynamic capabilities* – to advance our understanding of the dynamics of competition and innovation in technology-intensive industries dominated by large companies with highly complex products and businesses, large operational scale, and broad international reach. We argue that a firm's IP management capability ought to be viewed as a dynamic capability, as propounded by Teece et al. (1997) and Teece (2007), and we accordingly propose a generic competition-influenced evolutionary pattern of patent application strategies, embodying three development phases: 1) passive strategy, during the early phase; 2) aggressive strategy, during the growth phase; 3) sophisticated strategy at the maturity phase. We test our ideas through a study of the patenting behaviour of two major competing firms in the commercial aircraft industry.

Keywords: intellectual property; patent application strategies; dynamic capabilities; technological innovation; commercial aircraft industry; IP management; Airbus; Boeing.

Reference to this paper should be made as follows: Saksupapchon, P. and Willoughby, K.W. (2021) 'Intellectual property management, dynamic capabilities and competitive innovation in the commercial aircraft industry', *Int. J. Intellectual Property Management*, Vol. 11, No. 3, pp.236–262.



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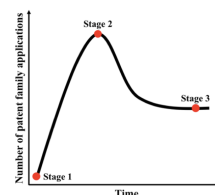
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International Intellectual Property Strategy

Three Patent Application Strategies

Phase	Patent application strategy	Number of countries for patent applications	Number of patent applications	Cost	Level of IP management capability
1	Passive	Minimal (only home country)	Low	Low	Low-level
2	Aggressive	Maximal (all possible countries)	High	High	Low-level
3	Sophisticated	Strategic	Adequate	Optimal	High-level (Dynamic capability)

Source: Punyapat Saksupapchon & Kelvin W. Willoughby, "Intellectual Property Management, Dynamic Capabilities and Competitive Innovation in the Commercial Aircraft Industry," *International Journal of Intellectual Property Management*, 11, 3 (2021), 236-262.



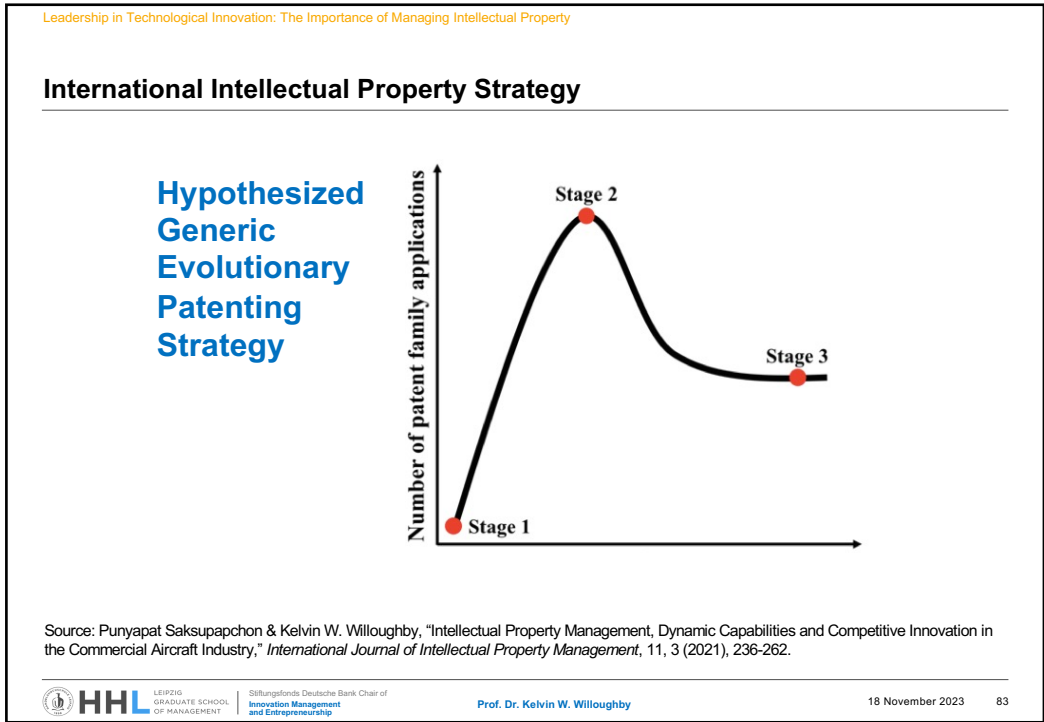
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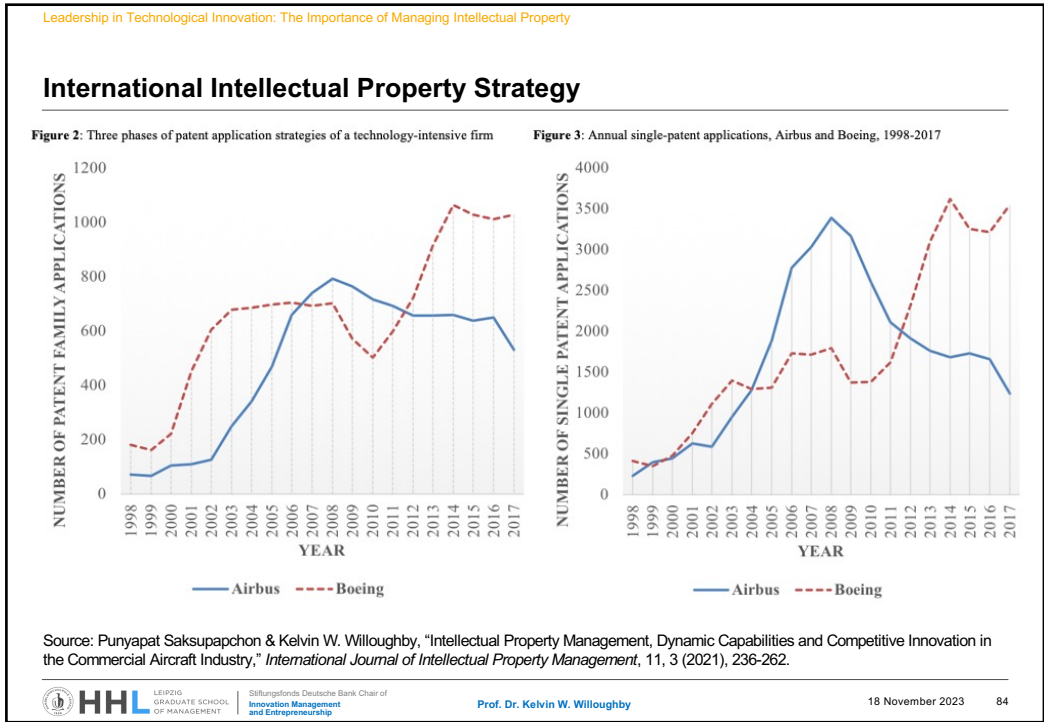
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Contextual factors affecting patent licensing provisions in collaboration agreements of complex technological organisations

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Kelvin W. Willoughby*

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Abstract: This paper addresses one of the challenges of open innovation, namely, the issue of the right to access and exploit technological innovations owned by collaborative partners inside and outside the boundary of research collaboration. Licensing is widely viewed as a solution to this problem. To design appropriate intellectual property licensing provisions in collaboration agreements with partners in complex research projects, project managers need to configure a set of critical intellectual property licensing elements based on consideration of a strategic set of contextual factors. This study is focused primarily on the licensing of patent rights in company-led research collaborations in complex technological industries. Drawing upon literature analysis and practical professional knowledge, we propose a heuristic framework to guide practitioners in deciding whether or not to grant technology licences to collaborators, whether or not to acquire collaborators' technology licences, and also what the scope of the licences should be.

Keywords: open innovation; intellectual property; licensing; collaboration agreements; joint product development; patents.

Reference to this paper should be made as follows: Saksupapchon, P. and Willoughby, K.W. (2021) 'Contextual factors affecting patent licensing provisions in collaboration agreements of complex technological organisations', *Int. J. Intellectual Property Management*, Vol. 11, No. 3, pp.280–315.



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An example of the final decision based on managerial judgment

No.	Contextual factor	Selected option	Critical IP Access Elements													
			Company Background IP							Collaborator Background IP						
			Need to grant a license to Collaborator or not?	Exclusivity	Geographic scope	Field of application	Time frame	Sub-licensing scope	Level of compensation for IP assets	Need to acquire a license from Collaborator or not?	Exclusivity	Geographic scope	Field of application	Time frame	Sub-licensing scope	Level of compensation
1	Participation of Collaborator in Company's activities outside the project boundary	Scenario 1: Collaborator participates in Company's activities both during the project's tenure and after the project ends. (Decisions for both inside and outside the project boundary)	Yes	Exclusive	Irrelevant	Irrelevant	Longer term	Broad	None	Yes	Exclusive	Irrelevant	Irrelevant	Longer term	Broad	None
2	Centrality of the technology to the Company	Core technology	Variable	Non-exclusive	Narrow	Narrow	Within the project's tenure	None	High	Yes	Exclusive	Broad	Broad	Longer term	Broad	High
3	Ease of substituting Collaborator's technology (modules) in the project with other technologies	Collaborator's technology is not substitutable or is difficult to substitute	Irrelevant	Irrelevant	Irrelevant	Irrelevant	Irrelevant	Irrelevant	Irrelevant	Yes	Exclusive	Irrelevant	Irrelevant	Longer term	Irrelevant	High
4	Type of Collaborator based on market intent	Noncompetitor	Yes	Irrelevant	Broad	Broad	Irrelevant	Broad	Irrelevant	Yes	Irrelevant	Broad	Broad	Irrelevant	Broad	Irrelevant
5	Type of Collaborator based on business purposes	Industrial corporation	Variable	Irrelevant	Irrelevant	Broad	Irrelevant	Irrelevant	Irrelevant	Variable	Irrelevant	Irrelevant	Irrelevant	Irrelevant	Broad	Irrelevant
6	Number of collaborators in the project	One collaborator	Variable	Exclusive	Irrelevant	Irrelevant	Irrelevant	Irrelevant	High	Variable	Exclusive	Irrelevant	Irrelevant	Irrelevant	Irrelevant	High
7	Share of financial investment in the project	Company invests significantly more than Collaborator.	Variable	Non-exclusive	Narrow	Narrow	Within the project's tenure	Narrow	High	Variable	Exclusive	Broad	Broad	Longer term	Broad	Low
8	Involvement of any third party in the Company's activities that require the relevant Collaborator IP	Third party is involved.	Variable	Non-exclusive	Irrelevant	Irrelevant	Irrelevant	Irrelevant	Irrelevant	Yes	Irrelevant	Irrelevant	Irrelevant	Irrelevant	Broad	High
9	Level of IP management capability of Company	Advanced	Variable	Non-exclusive	Narrow	Narrow	Within the project's tenure	Narrow	Variable	Variable	Exclusive	Broad	Broad	Longer term	Broad	None
Final decision based on managerial judgment			Yes	Non-exclusive	Narrow	Narrow	Within the project's tenure	Narrow	High	Yes	Exclusive	Broad	Broad	Longer term	Broad	High



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An example of the final decision based on quantitative scoring

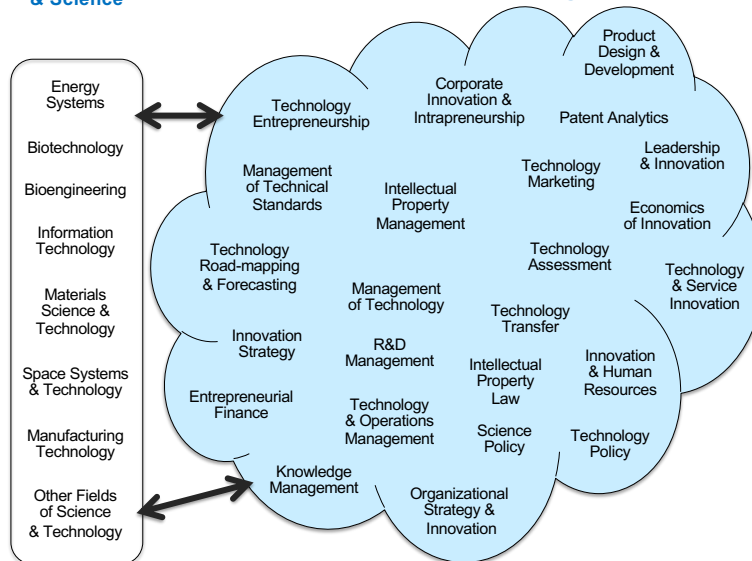
No.	Contextual factor	Weight (0 - 10)	Selected option	Critical IP Access Elements													
				Company Background IP							Collaborator Background IP						
				Need to grant a license to Collaborator or not?	If yes, the critical licensing solutions are:						Need to acquire a license from Collaborator or not?	If yes, the critical licensing solutions are:					
				Exclusivity	Geographic scope	Field of application	Time frame	Sub-licensing scope	Level of compensation for IP access		Exclusivity	Geographic scope	Field of application	Time frame	Sub-licensing scope	Level of compensation	
1	Participation of Collaborator in Company's activities outside the project boundary	10	Scenario 1: Collaborator participates in Company's activities both during the project's tenure and after the project ends. (Decisions for both inside and outside the project boundary)	10	10	0	0	10	10	-10	10	10	0	0	10	5	-10
2	Centrality of the technology to the Company	5	Core technology	0	-10	-10	-10	-10	-10	10	10	10	10	10	10	5	10
3	Ease of substituting Collaborator's technology (modules) in the project with other technologies	5	Collaborator's technology is not substitutable or is difficult to substitute.	0	0	0	0	0	0	10	10	0	0	10	0	10	
4	Type of Collaborator based on market intents	4	Noncompetitor	10	0	10	10	0	10	0	10	0	10	10	0	5	0
5	Type of Collaborator based on business purposes	3	Industrial corporation	0	0	0	10	0	0	0	0	0	0	0	0	5	0
6	Number of collaborators in the project	1	One collaborator	0	10	0	0	0	0	10	0	10	0	0	0	0	10
7	Share of financial investment in the project	3	Company invests significantly more than Collaborator.	0	-10	-10	-10	-10	-5	10	0	10	10	10	10	5	-5
8	Involvement of any third party in the Company's activities that require the relevant Collaborator IP	4	Third party is involved.	0	-10	0	0	0	0	0	10	0	0	0	0	5	10
9	Level of IP management capability of Company	1	Advanced	0	-10	-10	-10	-10	-5	0	0	10	10	10	10	5	-10
Weighted average score				18	-3	-13	-4	3	14	-2	31	42	33	33	48	21	4
Final decision based on quantitative judgment				Yes	Non-exclusive	Narrow	Narrow	Longer term	Broad	Variable	Yes	Exclusive	Broad	Broad	Longer term	Broad	Variable



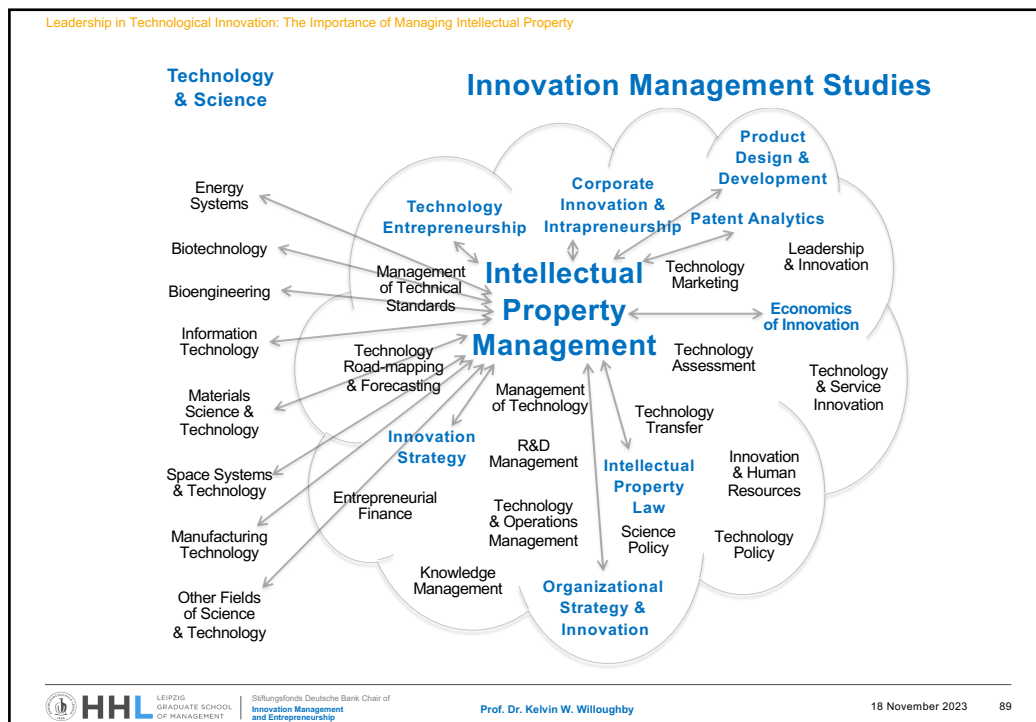
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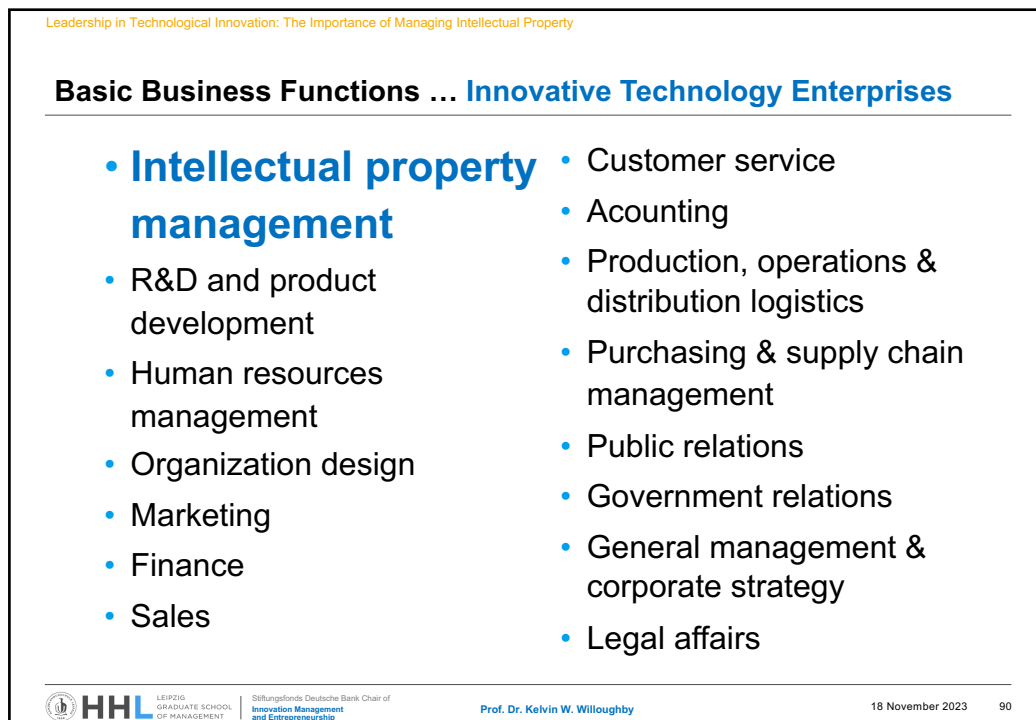
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Concluding comment (1) ...

To maximize the social and economic benefit of technological innovation for individuals, organizations and communities it is necessary for business leaders to develop prowess in the **management of intellectual property**.



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Concluding comment (2) ...

Prowess in the
management of intellectual property
is an essential component of leadership
in technological innovation.



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