

2019.07.25 The Joint EC JRC Workshop on Emerging Issues of Smart Specialization and 4IR

# Towards Responsible Adoption of AI:

A Survey of Emerging Regulatory Issues and Platforms for Governance

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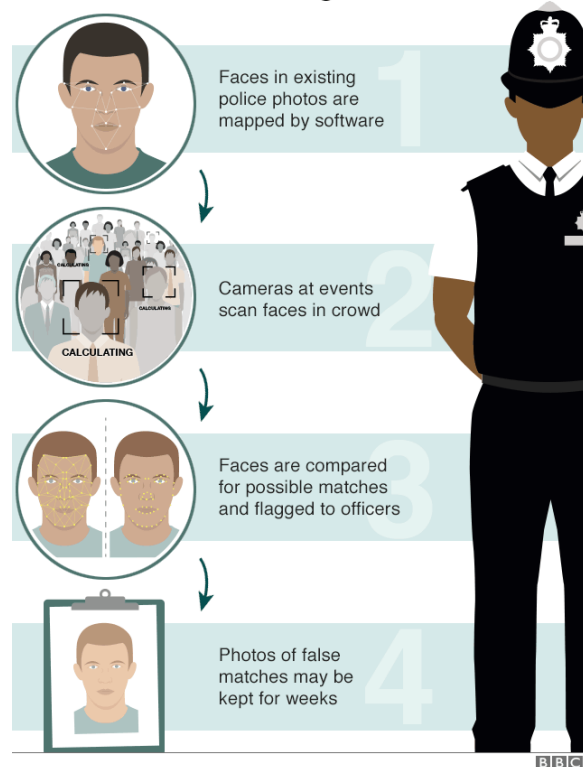
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AI Applications & Regulatory Blackboxs	AI Governance in Industry	Emerging Governance platforms	Emerging cases of AI Governance	Conclusion

## AI in Public Security and Justices

### How does live facial recognition work?



#### Crime detection

- Includes tools for crime detection
- Advanced Facial Recognition ( AFT)
- Examples- 117 Million Americans under AFT network.
- Deployment ( **USA, UK, China, Japan...**)

#### Predictive policing

- Includes tools for predicting crime
- E.g. PREDPOL- set missions, manage patrol operations, real-time officer location,
- Heat maps, Optimize resources ( **USA, UK..**)

#### Courts of Law

- Includes tools for to any judges decide on cases.
- Risk Assessment tools used in criminal justice.
- Courts using AI to sentence criminals.
- Deployment ( **USA....**)



#### User issues

#### Emerging issues

- Biased policing- The high profile case of Pro Publica- which proved AI tools are biasing people of color, exacerbating of bias.
- Accuracy of AI for example a report showed the AFT in UK are highly inaccurate
- Explainability of AI – How does AI arrives at decision on –serious consequences



#### Regulatory black boxes

- Right to Privacy? freedom of speech? Right to assembly? Do these technologies endanger these rights ?
- Do existing laws and regulations cover the current usage of these technologies?
- Governance frameworks? Authorization and supervision & post deployment monitoring?

## AI in Jobs and Employment sector

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### Sourcing 1 →

Who sees the Opportunity?

#### AI Tools & Capabilities

- Textio used in writing Job descriptions
- Job advertising AI, Facebook, google Ads, LinkedIn , ZipRecruiter industry needs
- Entelo for head hunting

#### Application

- Application is wide spread in all major companies and recruiting firms.
- Automated rejection
- Very little oversight from regulators-

### Screening 2 →

Review & Assessment

#### AI Tools & Capabilities

- Tools such as Mya- An interactive chatbot that enables employer interact and assess applicants
- Ideal – an AI tool that determines the closeness
- Koru and Pymetrics offer predictive assessment capabilities

#### Application

- AI tools for reviewing and assessing applicants are automating's this stage
- Can be easily integrated – Big companies such as Amazon, fashion brands are turning to AI assessment

### Interview 3 →

Interview and Select stages

#### AI Tools and Capabilities

- Tools such as HireVue enables employers to get and analyze video interviews, which are then graded based on interviews of successful interviews.
- Tools such as Fama and Predictim uses social media data to give employees , applicants background checks
- Tools check "Risk assessment ( "Risk of engaging in sexual harassment, workplace violence..)

#### Deployment

- By big companies

### Hiring 4

Getting a Job offer ?

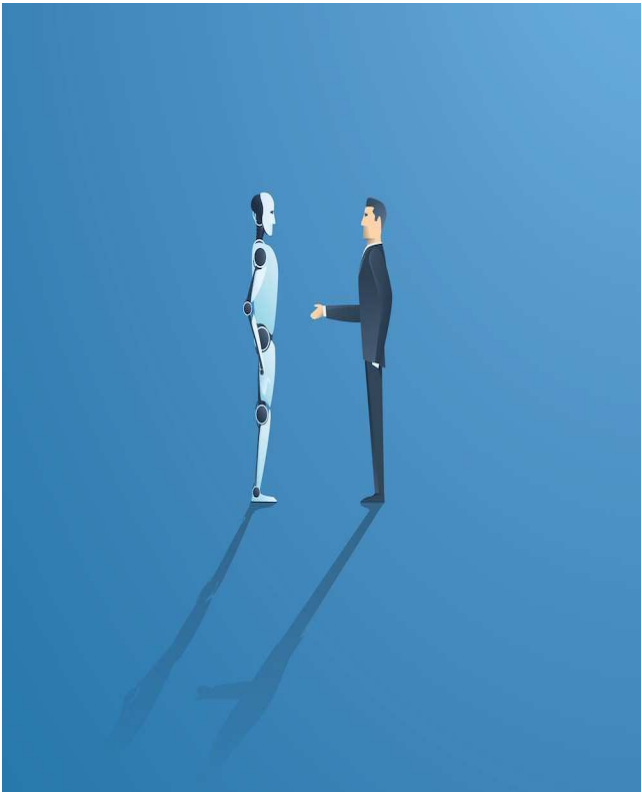
#### AI tools and Capabilities

- AI tools like Omnibus recruiting cloud help to predict if the applicant will accept job offer
- After hiring, IBM Watson and Amazon's work management tools can monitor and track every step of employee performance

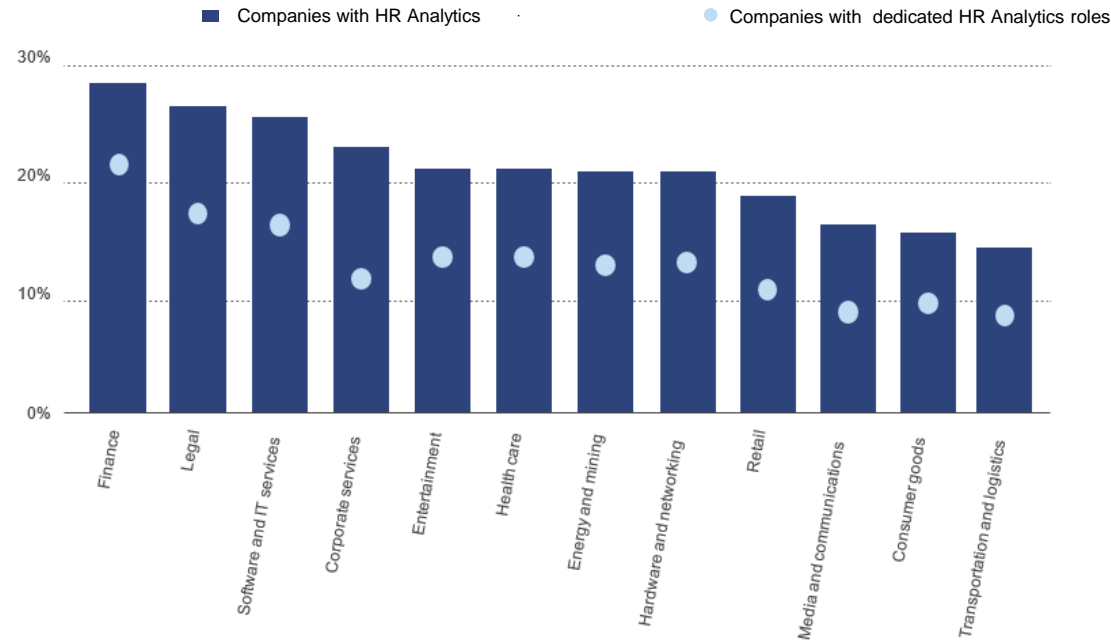
#### Deployment

- Out of 770 talent professionals interviewed by KORN Kelly, 63 favor adoption of these tools
- Amazon is employing some of these capabilities in its warehouses

# State of AI in Jobs and Employment sector



EMEA- All Companies with HR % of Companies applying AI in HR by Industry



Source: LinkedIn Talent Insights

## AI in the Job and Employment Sector

### CASES: What is and What might go wrong- Emerging Ethical and Governance Black Boxes

#### Sourcing 1

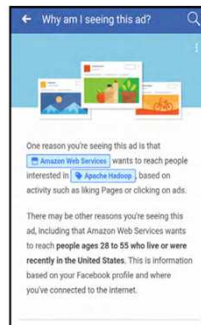
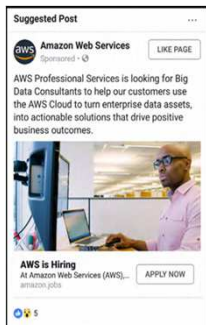


Who see the Opportunity

Case of Facebook Ads (Bais,)

##### AI Tools capabilities

- Automated rejection – which can be based on illegal parameters- age, location, race, -e.g. **Facebook Hiring**<sup>1</sup>



1. Face books,

#### Screening 2



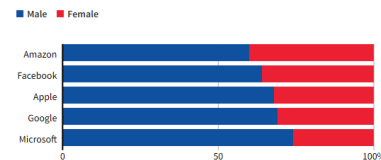
Review and Assessment

Cases of Assessment ( Accuracy, Transparency) What Parameters?

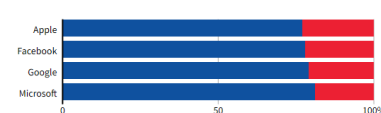
##### AI Tools Capabilities

- Algorithms that Assess who qualifies for what Job based on large datasets – e.g. **Amazon's sexist Algorithm**

GLOBAL HEADCOUNT



EMPLOYEES IN TECHNICAL ROLES



Note: Amazon does not disclose the gender breakdown of its technical workforce.  
Source: Latest data available from the companies, since 2017.

#### Interview 3

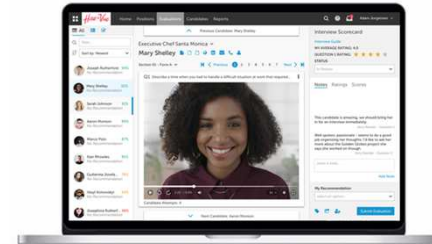


Interview & select

Case of Interview ( How accurate are these parameters ?

##### AI TOOLS

- Tools like HireVue uses Video interviews which are assessed based on successful



#### Hiring 4

Getting a Job / Keeping It!!

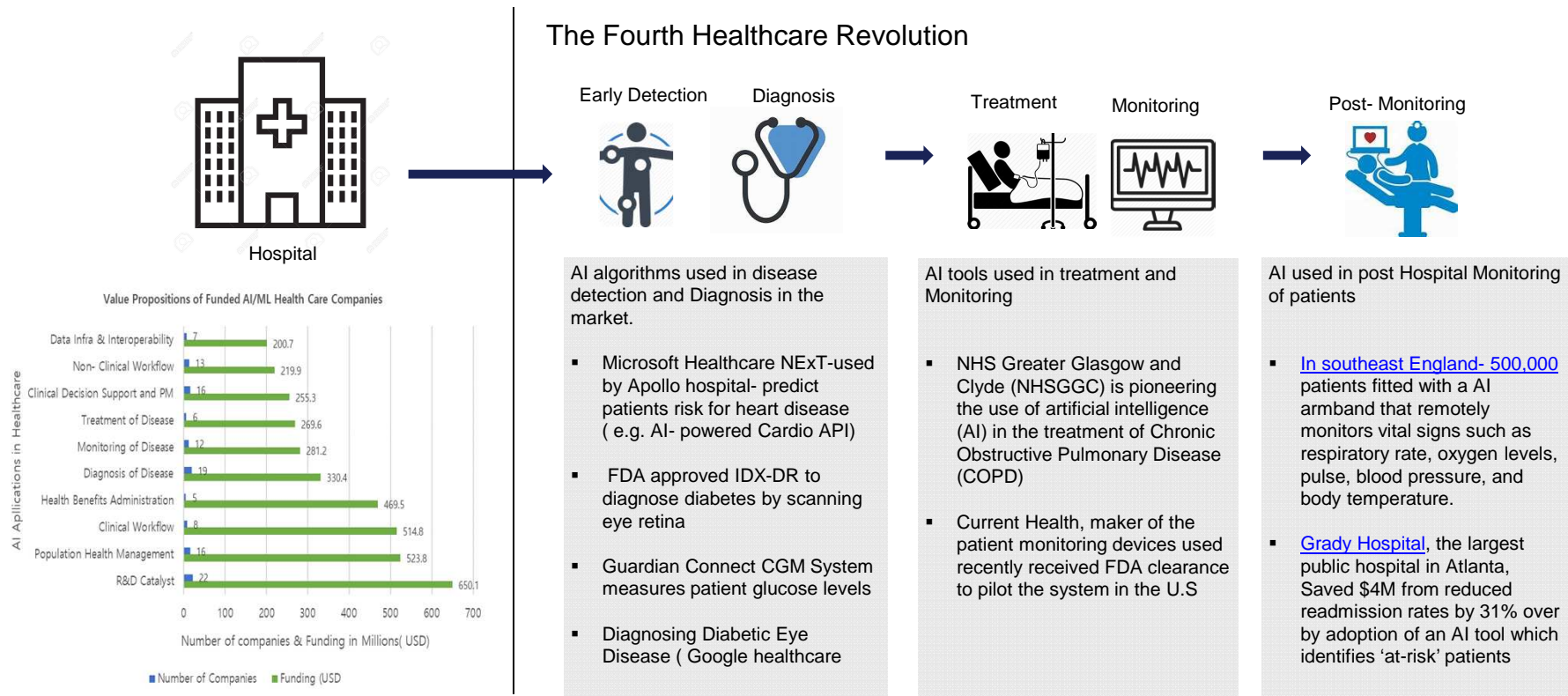
##### AI tools Capabilities

- IBM Hiring AI can Predict with 95 % accuracy works are about to quit their Jobs

##### ISSUES

- Privacy and data protection?
- Bias and Discrimination?
- How to measure and validate these AI?
- Post deployment Verifications
- Does EUs GDPR cover for these emerging issues? How about other Jurisdictions/countries laws ?

# AI in Healthcare Applications



Source: [Rock Health](#)



## AI in Healthcare

### Emerging issues and Regulatory Black boxes



#### Detection & Diagnosis

Emerging research has showed how some AI applications for healthcare can hacked, or mislead to make changes the algorithm using data

##### Critical Issues:

- Mis-faulty Diagnosis or fake diagnosis cause by wrong or tampered data as study published in nature
- Liability- in cases where AI or machine errors occur- Can machines be legally responsible for their choices and outcomes?
- In cases where both Dr. and AI machine are used, how the level of responsibility should be determined?
- Privacy and data protection?

#### Monitoring & Treatment

Emerging research has showed how some AI applications are as good as the data they get, and the data is biased – lead to biased results

##### Critical Issues

- Biased data leads to biased disease monitoring , treatment which has serious consequences
- Black boxes AI- A Study by MIT showed that algorithms are accurate by they cannot explain the reasoning and decisions.
- Very serious Ethical issues in AI that monitor and predict how long a patient is likely to live!!
- **privacy and data protection**, especially considering AI systems rely on data- how to guarantee issues of consent when providers collect and use personal data

#### Other Critical Issues

The potential of AI to revolutionize delivery of healthcare is without doubt but many regulatory black boxes remain to be resolved, before its potential is realised

##### Critical Issues:

- **Authorization and supervision** – The core unresolved question - are the AI softwares for healthcare are medical devices?- determines approval.
- **Safety** – How to ensure that the AI in healthcare are high quality ( accurate) and safe to use.
- **Monitoring** – systems for monitoring safety issues especially post deployment and if issues arise ( how to resolve?)
- **Market failures** - These market failures include; high entry costs,, human resource capabilities, R&D funding gaps



## AI in Education Sector



### Student's level

- Includes AI applications used in education content development and deliver enabling capabilities
- [Digital Teacher](#) in New Zealand
- Personalized learning (MOOCs)
- Blended learning
- Automated testing
- Deployment** - [Century Tech](#), is rolling out AI in 700 Flemish schools, others (UK, US, China)
- Other tools- IBM Watson, Third space learning, Microsoft ..etc.

### Teaching level

- Includes emerging AI applications and use cases e.g. content development and delivery, capabilities
- Classroom management (Class Charts in UK schools)
- grading, feedback, teacher evaluation. (IBM Watson)
- Deployment** – [Class Charts](#) & [Century Tech](#) in UK Schools, AI for teacher evaluation in Huston USA, others. Dubai...etc.

### Administration Level

- Includes emerging AI applications in automating school management processes
- Deployment**- UK's Office for Standards in Education (Ofsted) using machine learning – [prioritize schools for inspection](#)
- Beacon AI – Digital Assistant used in some universities in UK
- Century Tech

### User Issues

- Bias**- Biased data may lead to prejudice in the school and education systems
- Explainability**- how transparency and explainable the algorithm is serious issues due to **GDPR**
- Liability**- who is responsible for AI failures in school systems?
- Others**- Privacy and data protection, data sharing

### Regulatory Issues

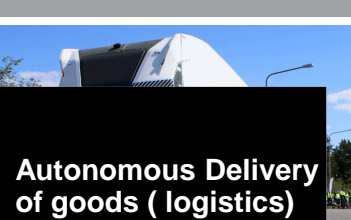
- Market Failures**- AI application in education still low and will require government intervention to correct market failures ( High entry costs, R&D costs to innovate technology for schools, Human resource training.
- Low Awareness**
- How to Share large dataset**-among multiple users

## AI in consumer service Industries

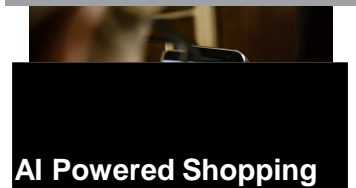
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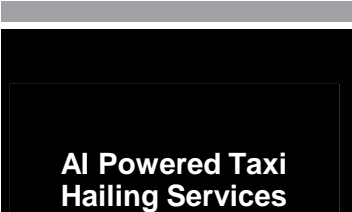
AI Powered Digital  
Personal Assistants



Autonomous Delivery  
of goods ( logistics)



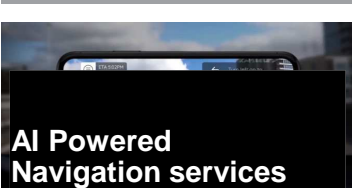
AI Powered Shopping



AI Powered Taxi  
Hailing Services



AI and Blockchain  
Powered Banking



AI Powered  
Navigation services



Consuming AI  
Powered Media  
Services



AI Powered Dating  
services



AI Powered Insurance

## Governance Issues

### Common Issues

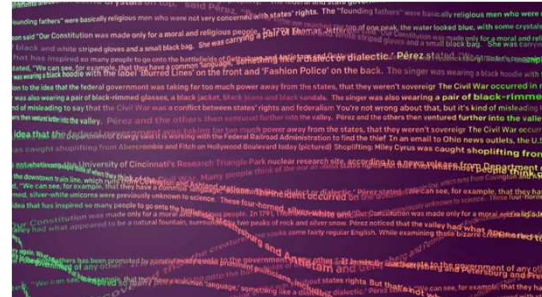
- **Data Protection and Privacy**- case of google – Is GDPR enough?
- Bias, Accuracy, liability ...
- Are existing laws adequate (Taxi service regulation)
- **Disruption and Polarization** ( every industry particularly- Media, Taxi service industry)
- Jobs – Amazon is laying off 300,000
- How to **tax these digital services** ?  
- France is taking the lead in Europe
- **Competition** – and Antitrust -

# AI in Media and Entertainment



AI algorithms that powering new media

- **Marketing and Advertising – content creation-** [Alibaba Laban](#)- create banners thousands of time faster than a human designer. [IBM Watson](#) creates Movie trailers.
- **Personalized Services** - AI creates personalized services for billions of customers, YouTube, Netflix, FB, etc. Recommender systems
- **Search and Classification-** AI is helping optimize the accuracy of search results.
- **New Experience innovation-VR and AI** gaming is one of the first areas like HTC Vive, Samsung Gear VR, Oculus Rift, etc.



AI algorithms that disrupting new media and key emerging issues

- **Content creation-** writing news including hard to detect fake news e.g. [GPT2 is a text generator](#)
- **AI and Bias in Media** - AI creates personalized services for billions of customers who want different things? How “personalized”???
- **AI and Capture-** AI enables media capture by third parties that shape or filter content to serve their own objectives. e.g. “Russia election scandal”, china control, Fake news, Facebook Algorithms
- **AI fueling Internet Addiction** – Rabbit hole algorithms YouTube al

## Emerging Issues

AI is in the early stages of revolutionising the media and entertainment industry and the future is filled with excitement and fear.

- One of the main question faced by governments and regulators all the world is how to regulate the AI powered media e.g.
- The UK government is proposing regulations to regulate AI powered media platforms such as YouTube.
- Singapore passed a law- targeting similar platforms in a contentious – “[fake news law](#)”
- Similar debate for tackling online disinformation is taking place with EU- Including the proposed [EU Joint and Coordinated Action against Disinformation](#)
- Tackling of internet addiction – powered by rabbit hole algorithms
- Massive digital disruption in Media industry- code cutting as resulted of AI powered media houses Netflix and new media ...etc.

## AI in Transportation Sector

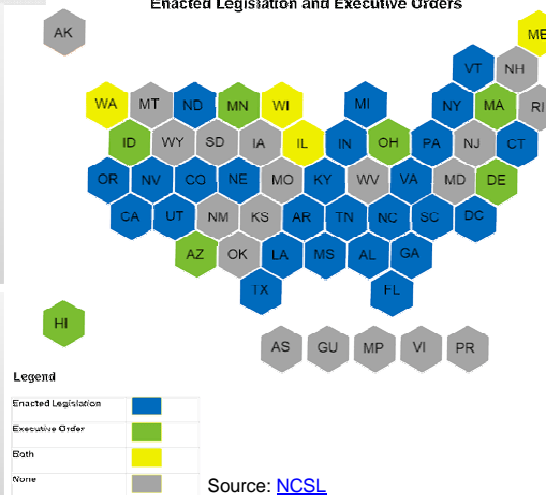
## 1. Road Transport

- **Autonomous Trucks-** AI powered Autonomous trucks have hit the road in Sweden
- **Self driving Cars-** Trial drives in all major countries In USA, China, Korea, Japan, German, France
- **Semi-autonomous** – Cars with some form of AI
- **AI Navigations systems-** Are on the market
- **Drones-** Trials runs for drones in logistics are going in different countries, for passengers in Dubai
- **Aviation Management-** used in different customer touch points- Pre-Flight, In-Flight, Post-Flight
- Algorithm for Auto-pilot – and powerful data driven processes that find optimal definition of AI



## 2. AI in Aviation

- **Drones-** Trials runs for drones in logistics are going on in different countries, for passengers in Dubai
- **Aviation Management-** used in different customer touch points- Pre-Flight, In-Flight, Post-Flight
- Algorithm for Auto-pilot – and powerful data driven softwares that fits in stretched definition of AI



### 3. Emerging Issues

- **Mis use**- Softwares and data can be grossly miss-used as emission scandal in the car industry shows
- **Explainability**- The investigations in recent airlines has pointed to complex unexplainable algorithms partly responsible for accidents.
- **Liability**- who is liable for death caused by AI autonomous car? ( Tesla, Uber, etc.)

#### 4. Emerging Regulations and Black boxes

- **German** - on June 21st 2017, new regulations for automated driving came into force.
- **USA**- About 50 states have introduced legislation for autonomous vehicles and 26 of which has enacted the legislation. More issues that Jurisdictions haven't
- **Civil Liability**- will the manufacturer be liable for accidents caused by defects or faulty Algorithms ?  
How about cases of AI black boxes? Explainability
- **Criminal Liability** – who is liable when autonomous vehicle with occupant cause accident?
- Data protection, Insurance, Cybersecurity issues!!

## AI in Political and Social Space



Photo credit: [The New York Times](#)

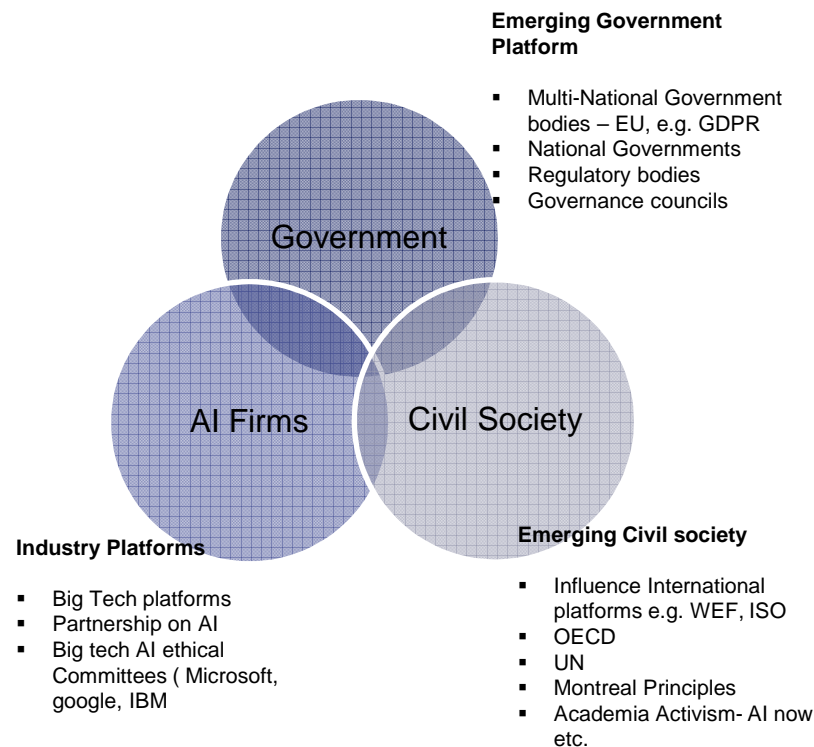
- **AI is a Political communication tool-** e.g. Facebook algorithms are capable of targeted political communication and experts now agree on their role in [Arab Spring, Brexit and 2016 USA election](#), feared and loved by dictators in equal measures!!. Twitter is taken down millions of “Propaganda” Bots (Automated tools for information and disinformation)- [Is it good or bad for democracy?](#)
- **AI in Political Analytics** – The high profile case of Cambridge Analytica – which harnessed millions of Facebook for targeted political campaigns – highlights emerging issues of [Privacy, data protection, disinformation\( fake news\)](#), [emerging political polarisation in USA, Europe powered by AI powered social media...etc.](#)
- **Deep fakes** – AI algorithms capable of doctoring videos are resulting in [calls for regulations](#) – e.g. recent viral video of speaker Nancy Pelosi
- **Do existing laws, regulations and governance framework hold up in face of AI powered tools capable of influencing political choices ?**





## Emerging Regulatory Issues and Platforms for Governance

## Emerging Platforms for Governance in the Era of AI



### ▪ Government

Given the emerging cases of high profile abuse of AI and the increasing potential, Governments main concern is how to ensure double objectives of **promoting innovation** and **ensuring safe and responsible** adoption of AI, and What platform will they adopt?

- **Comprehensive rules** e.g. independent regulatory authorities with powers to regulate AI, investigate regulatory breaches, enforcement, citizen concern handing, impose sanctions?
- **Limited regimes**- light approaches – lack of regulatory power – focus limited to ensuring compliance to established rules ?

### ▪ Emerging Civil Society platforms

Include a number of civil society organizations and international platforms that are advancing the principles for responsible adoption of AI, e.g. OECD, ISO, UN , Academia activism ( AI now, AI ethics ..etc) .

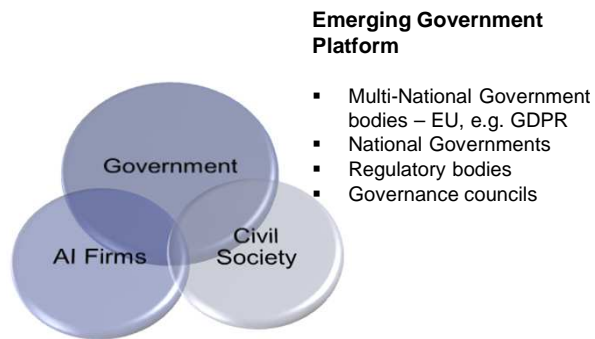
### ▪ Industry

The industry especially has established Partnership on AI to “ **self regulation**” approach to responsible, ethical ...Adoption and diffusion of AI



## Emerging AI Governance of AI in Selected Countries

**The official policy is heavy on promoting innovation & light on Regulations**

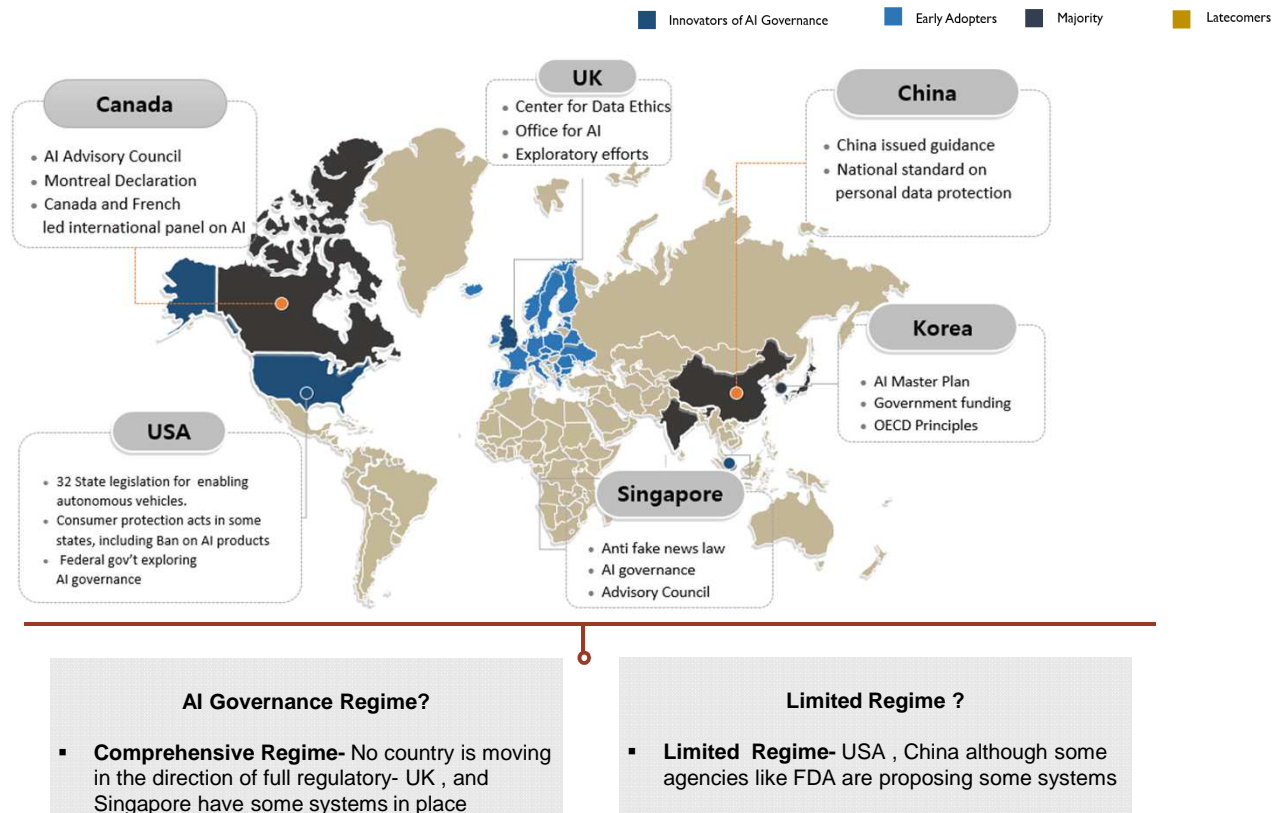


	Innovation Policy	Data Protection& localization	Ethics framework
 United Kingdom	£ 950m and private funding; AI funding via £ 1.7 bn industrial Strategy challenge fund	Some initiatives to encourage data sharing in public and private sector; open approach to data flows in trade agreements.	Established the center for Data Ethics and Innovation which will develop industry guidance and recommend regulation and legislation
 Germany	Network of 12 R&D innovation centers; €3.5 bn in investment incentives over six years	Creation of data sharing platforms; review of domestic competition framework; commitment to promote technologies respecting data privacy	Federal government reviewing regulatory framework and “taking account” of recommendations from the Data Ethics Commission.
 European Union	€2.5 bn in Digital Europe Programme for AI, including testing and experimentation facilities; AI R&D funding	GDPR polices external flows; free flow of data regulation removing barriers within the EU; European Commission assessing link between anti-trust and data concentration.	European Commission’s High-Level Expert Group on artificial intelligence developing ethical guidelines.
 United States	2017 defence budget commits \$7.4 bn on AI, big data and cloud computing; 40% increase since 2015	Open approach to cross border flows; support for data flow provisions within trade agreements	National Science and Technology Council prioritizing “removing barriers to AI innovation”; ethical framework not included as a priority
 China	Megaproject artificial intelligence 2.0; political support for Chinese tech giants’ foreign investments in AI chips	Heavy restrictions on cross border flows, e.g. the Internet Security Law; emergence of a debate	Commitment to national data ethics framework by 2015

Source: Global Counsel 2019

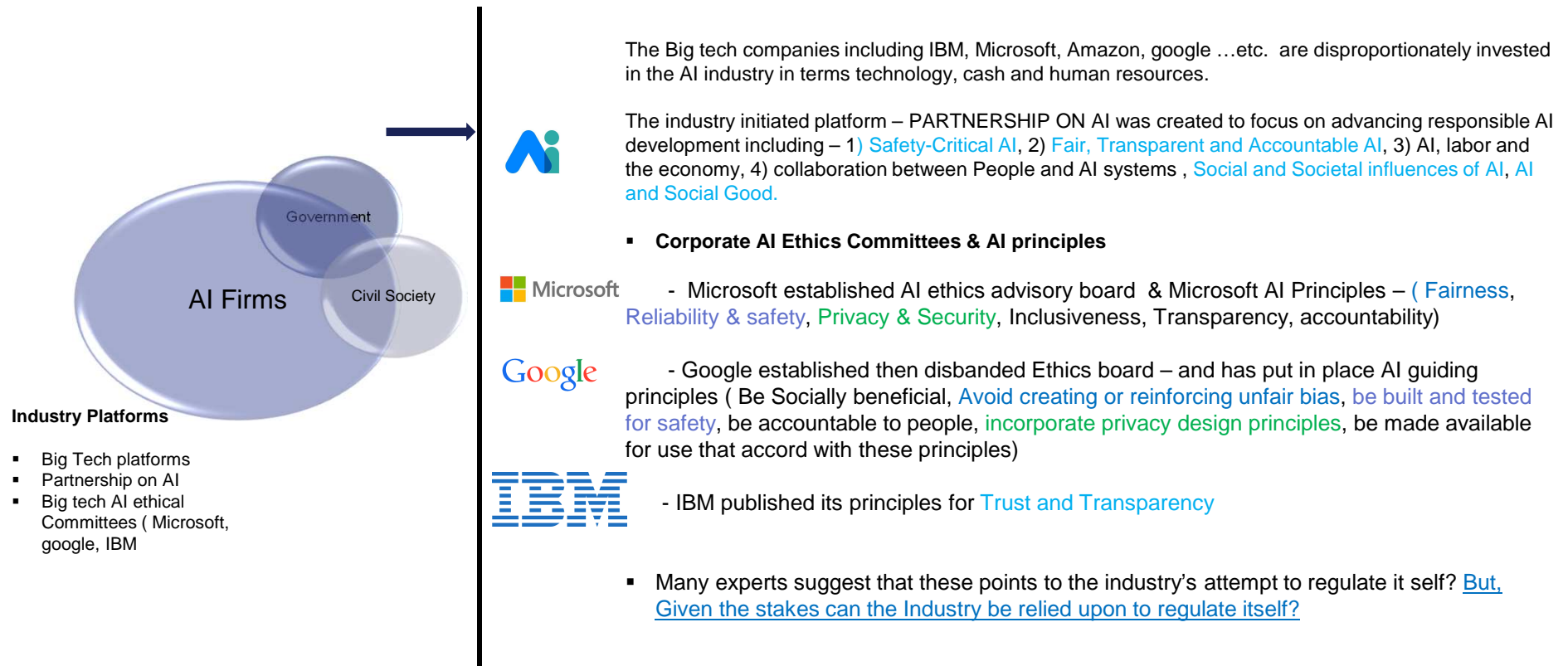
## Emerging AI Governance of AI in Selected Countries

The official policy is heavy on promoting innovation & light on Regulations



## Emerging AI Governance of AI in the Industry

### The industry appears to be pivoting to self-regulation



## Emerging AI Governance of AI in the Industry

### Exploring self-Regulation – limits and key things !

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In the world of self regulation- these will be key :

- **Binding Agreements to implement principles and ethics**

Are big tech companies in AI bound by agreements to regulate themselves?

What are the mechanisms to make sure that the principles are implemented, no cheating and free riding ?

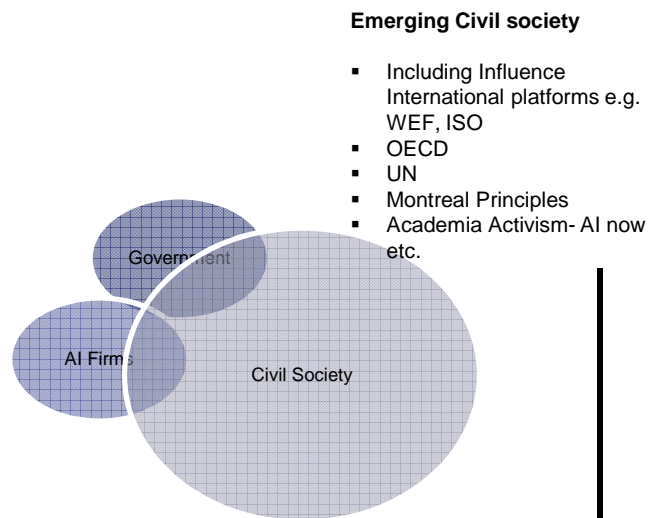
- **Verification/Auditing of AI ethics adherence ?**

Big tech and AI firms have ethics and principles that have developed but what are the verification mechanism.

- **Concrete commitment**

Companies have to show genuine communicate and not mere marketing – the case of amazon workers and stakeholders vote against facial recognition, and google workers protests against weapon AI ...

## Emerging Platforms for Governance in the Era of AI



### ▪ Intergovernmental Platforms

**OECD principles** on AI promote artificial intelligence that is **innovative** and **trustworthy** and that **respects human rights** and **democratic values** were adopted on 22 May 2019

- **Adopted by OECD member countries** and other countries including Argentina, Brazil, Colombia, Costa Rica, Peru and Romania. **They are non-binding but likely to shape policies**

On 9 June 2019 , **The G20** adopted human-centered AI principles – **Human-centered Future Society, Data Free Flow with Trust, Human-centered AI, Governance innovation...etc..**

### ▪ Emerging Civil Society platforms

**Montreal Declaration** for responsible development of AI **PRINCLES** - **well being, respect for autonomy, protection of privacy and intimacy, solidarity, Democratic participation, equity, diversity inclusion, prudence, Responsibility, and sustainable development principle**. **ISO**-has drafted some d standards- **ISO/IEC JTC 1/SC 42** focused on responsible adoption and use of AI

### ▪ Academia

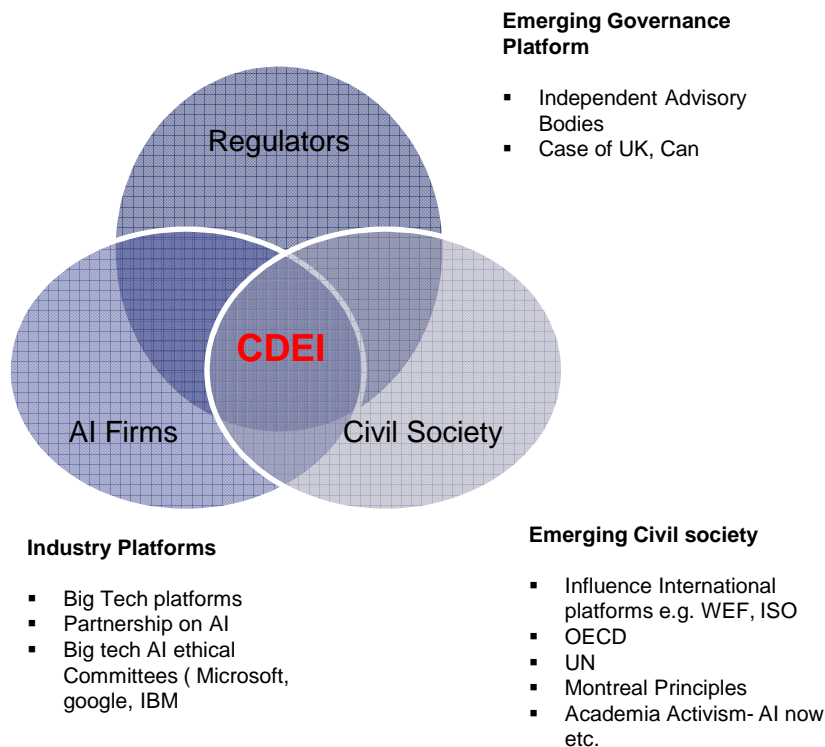
Activist Academia including Ainow Institute at NY university, Facebook funded AI ethics center in Munich, TUM university. Etc.



## Emerging Case for AI Governance



## Emerging Platforms for Governance in the Era of AI



### ▪ Independent “Government” Platforms

UK’s Center for Data Ethics and Innovation (CDEI) objective is to identify how we can enjoy to the [full the potential benefits of data-driven technology](#) within the ethical and social constraints of a liberal democratic.

**Analyze and Anticipate** - will convene communities and expertise to provide an overview and insight of [opportunities and risks](#), and [review existing regulatory and governance frameworks](#) to identify Gaps.

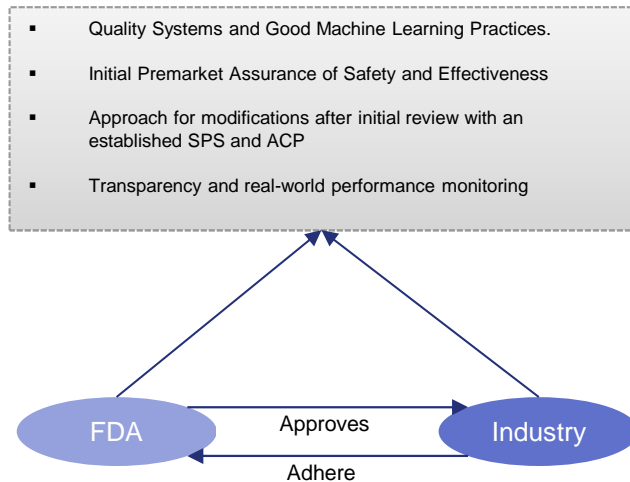
**Reviews** - will identify and articulate best practice for the responsible use of data-driven technology within specific sectors or for specific applications of technology.

- Review of existing regulatory platforms and advise on needs for upgrade

- This model is emerging in UK and Canada, whether other countries will pick it on is an open question.
- Will it morph into large regulatory watch tower – with super regulatory powers!!!



## Emerging Platforms for Governance in the Era of AI: The case of US's FDA proposal for AI in Healthcare



How about other sectors e.g. **Transportation** ? Is a Similar approach to Governance applicable ?

### Independent “Government” Platforms

The FDA’s proposed TPLC approach is based on the following general principles that **balance the benefits and risks**, and provide access to safe and effective AI/ML based SaMD:

1. Establish **clear expectations on quality systems** and good ML practices (GMLP);
2. **Conduct premarket review** for those SaMD that require premarket submission to demonstrate **reasonable assurance of safety and effectiveness** and establish clear expectations for manufacturers of AI/ML-based SaMD to continually manage patient risks throughout the lifecycle;
3. **Expect manufacturers to monitor the AI/ML device and incorporate a risk management approach** and other approaches outlined in “Deciding When to Submit a 510(k) for a Software Change to an Existing Device” Guidance<sup>18</sup> in **development, validation, and execution of the algorithm changes** (SaMD Pre-Specifications and Algorithm Change Protocol);
1. **Enable increased transparency** to users and FDA using post market real-world performance reporting for maintaining continued assurance of safety and effectiveness.

## Conclusions

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AI is without doubt revolutionizing every sector of Society. At KAIST FIRIC '- We are actively researching these issues across different areas and domains

1. We are **Monitoring the trends of emerging technologies** underpinning the Fourth Industrial Revolution on a real-time basis.
2. We are **researching on governance** to pioneer new approaches to policy and governance issues accompanying the Fourth Industrial Revolution.
3. We are **fostering collaboration locally and Globally** to learn from each other on how to foster innovation as well as manage emerging risks
4. EU and EC is a solid partner in this area given the history of research and Governing of high Risk high impact technologies

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**Thank You**  
**감사합니다**  
**Gracias**