Current Trends in the Insurance Market
Workers Compensation

William V. Taylor, President of the Pennsylvania Compensation Rating Bureau
Joseph C. Peiser, Head of Broking for Willis Towers Watson
Agenda

1a. The state of the PA Workers Compensation Market

1b. The state of the National Workers Compensation Market

2. Trends in Program Design including Reinsurance and captives

3. Current and future “disrupters” to Workers Compensation
Workers’ Compensation: State of the Pennsylvania Market
Pennsylvania Workers Compensation
Direct Written Premium

($ billion)

1.62 1.85 2.08 2.27 2.45 2.66 2.64 2.67 2.47 2.20 2.19 2.37 2.53 2.58 2.64 2.72
1.55 1.73 1.87 1.99 2.09 2.25 2.26 2.30 2.20 1.99 2.03 2.21 2.34 2.36 2.42 2.51

4.0% 6.2% 10.2% 12.4% 14.9% 15.6% 14.2% 13.9% 11.0% 9.6% 7.4% 6.7% 7.6% 8.5% 8.8% 7.9%

SWIF  Private Carriers
Pennsylvania Loss Cost Changes
Since 2000

Note: All changes are effective on April 1 of the year indicated, and represent the average overall impact.
Indemnity Loss Experience Components
Indexed to 1.00 at Policy Year 2003

- Claim Frequency Changing by -4.8% annually
- Claim Severity Changing by +2.0% annually
- Claim Costs Changing by -2.9% annually

Reference: 4/1/17 Filing, Exhibit 10
Medical Loss Experience Components
Indexed to 1.00 at Policy Year 2003

Claim Frequency Changing by -4.8% annually
prior to 12/24/15 (HB1846), and +4.1% afterward

Claim Costs Changing by -0.7% annually
prior to 12/24/15 (HB1846), and -0.9% afterward

Claim Severity Changing by +4.2% annually
prior to 12/24/15 (HB1846), and +4.1% afterward

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<td>2017</td>
<td>0.85</td>
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<tr>
<td>2018</td>
<td>0.84</td>
</tr>
</tbody>
</table>

Reference: 4/1/17 Filing, Exhibit 10
Pennsylvania Claim Settlement Rates
Portion of Reported Indemnity Claims That Are Still Open
Premium and Costs Summary

- Premium has risen steadily since 2010, due to rising payroll.
- Loss costs have declined by 39% since 2000, 20% of which is in the last 6 years.
- SWIF market share reached a high of 15.6% in 2005 and has declined to 7.9% in 2015.
- Claim frequency continues to improve by almost 5% per year.
- Overall claim cost trends are also improving by about 3% for indemnity and 1% for medical.
Ongoing System Issues

- Claim frequency
- Indemnity severity
- Medical severity
- Medical cost containment
- Workforce composition
- Data collection
- Terrorism
Workers’ Compensation: State of the National Market
The WC market is driven by macroeconomic trends.

US real GDP has grown at 2.1% since the end of the recession and 15 million jobs have been added to payrolls.

Greater output and hiring has resulted in WC exposure growth.
As WC exposures have grown, so too have net premiums written.

NPW have grown from a local trough of $32 billion in 2010 to $45 billion in 2015.

National Premium Rate Trends

progressing towards stability....

National Medical Cost and Prescription Drug Price Inflation

Source: PricewaterhouseCoopers Health Research Institute; World Bank, retrieved from FRED, Federal Reserve Bank of St. Louis; AARP Public Policy Institute.
Medical cost inflation is trending downward as insurers, employers and healthcare providers focus on value with managed care programs and similar initiatives.
Insurers’ Combined Ratios
The good news = decreasing frequency and severity nationally

Developments in Workers’ Compensation Program Designs
Assumption of Risk by Employers Continues

Large employers continue to retain losses in their working layer of risk, regardless of market conditions.

Retaining losses allows employers to:

- Capture underwriting profits
- Assert control over claims
- Directly allocate costs to encourage loss control
- Avoid “trading dollars” with carriers for high frequency, low severity exposures

*Long Term Total Cost of Risk is about loss prevention and reduction; not premium*
Current Program Designs in Workers Compensation

- High deductibles are available in virtually all states
- Low growth of Qualified Self Insurance. Historical advantages are not present
- While stand-alone QSI capacity took at hit in early 2010, some of that capacity is starting to come back
- Following the financial crisis in 2008, many States overhauled the methodologies used to establish collateral. Now very formulaic in their approach and uncompetitive with the marketplace

E.g. to get approved as a new QSI in PA, you must post 2x the highest annual incurred losses you’ve had in the previous 3 years
Pennsylvania Excess Workers’ Compensation Market
for Qualified Self Insureds
Captive Utilization

Total Captives Worldwide


5,587 5,831 6,125 6,420 6,739 6,851 7,006


Captive Trends

Utilizing for Employee Benefits
Improved Tax Efficiencies - Securitas and Rent-a-Center ruling
WC & EB Stop Loss Reinsurance
Continued Deductible Buy Back Usage
The WC market is in the “soft and profitable” phase of the underwriting cycle, marked by:
- Decreasing rates
- Improving combined ratios
- Stabilizing underwriting cash flows
- Leveling off of reinsurance utilization
The Reinsurance Market

Reinsurance utilization has risen since 2010

Note: Ceded values reflect non-affiliated transactions
Source: SNL Financial and Willis Re
Future Issues for the Pennsylvania Market

Legislation with potential impact on WC claims handling & resolution
Duffy Case

- The Supreme Court of PA ruled in Duffey that an IRE physician must investigate conditions beyond the established injury for purposes of rendering a valid Impairment Rating.
- IRE invalid because P/E failed to rate impairments from all of the work related conditions including psychological conditions raised for first time at IRE.
- P/E must apply professional judgment regarding:
  - Complexity of injury
  - The Specific diagnosis
  - Whether acknowledged by the employer or not.
- P/E must exercise “professional judgment” to render appropriate decisions concerning causality and apportionment.
Protz Case

- On September 18, 2015, the Commonwealth Court issued an opinion in Protz v. WCAB (Dairy Area School District).

- The Court concluded that the portion of the Act which requires the use of the “most recent edition” of the AMA Guides was an unconstitutional delegation of legislative authority.

- The PA Supreme Court accepted employer’s appeal and the matter awaits a decision by the Supreme Court.

- Protz only dealt with which edition of the Guides can be used to establish a valid impairment rating.

- There was nothing in the Protz Decision which suggests that IREs themselves are no longer legal.
Other possible issues affecting WC Claims in PA

- RTW – Collateral Disincentives
- Occupational Diseases
- Medical Delivery Model (Healthcare reform)
- Treatment Guidelines
- Impaired Workforce (Marijuana, opioids, etc.)
- Attack on Exclusive Remedy
Future Issues for the National Workers Compensation Market
The National Opioid Crisis

Sales of prescription opioids quadrupled between 1999 and 2014.

- This rapid uptick, especially prevalent in the WC system, has driven record rates of opioid use and abuse.
- Prescription opioids account for a significant percentage of WC medical expenses and are a key driver of catastrophic claims.
- Opioid use can create long-term medical problems, including addiction, which means claims stay open longer and can include costly addiction treatment programs.

$1.54b
Amount spent on opioids by WC payers in 2015.

60%
Percentage of WC claim costs accounted for by medical expenses.

25%
Percentage of medical expenses accounted for by opioids.

4x
WC claims are 4x more likely to exceed $100k when opioids are prescribed.
The National Opioid Crisis

When I see the second opioid prescription come through the system, I start reserving for detox.

– Medical director at a WC insurer

Employers, insurers, physicians and injured workers need to work together to develop effective solutions for managing the cost and impact of the opioid crisis on the workers’ compensation system.

<table>
<thead>
<tr>
<th>Employers</th>
<th>Insurers</th>
<th>Physicians</th>
<th>Injured</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Educate employees about the risks of opioid use.</td>
<td>▪ Robust treatment guidelines to limit the use of opioids.</td>
<td>▪ Educate patients about the risks of opioid use.</td>
<td>▪ Willingness to pursue treatment plans that don’t involve opioid use.</td>
</tr>
<tr>
<td></td>
<td>▪ Utilization review to ensure appropriate treatment.</td>
<td>▪ Treatment plan to wean patients off of opioids.</td>
<td></td>
</tr>
</tbody>
</table>
Telemedicine involves the use of technology to remotely connect patients with healthcare providers.

**Rapid growth** – by 2018, 80% of employers will offer a telemedicine solution for their employee health programs.

Growth in telemedicine is driven in part by a **physician shortage** – one-third of US-based physicians are 55 or older.

Employees are increasingly willing to embrace telemedicine – **90% satisfaction** for injured workers.

- Millennials are more willing than older workers to adopt telemedicine
Telemedicine

Telemedicine holds the potential to **drastically shorten** the length of healthcare appointments.

- The average length of a healthcare appointment is **121 minutes** – 37 in travel time and 84 for the wait, check-in and visit
- The average length of an emergency room visit is **2+ hours**
- Average length of a telemedicine visit – **15 minutes**

Telemedicine is **new, but growing** in the WC space – it’s beginning to gain traction among employers, insurers and TPAs.

- Regional TPAs have been quicker than national TPAs to adopt the technology
Judicial Trends

Trend in judicial rulings that favor workers.

- Pennsylvania – Protz decision
- Florida – Supreme Court ruling
- Oklahoma
- New York

Legislative trends threatening the Grand Bargain?

- Non-subscription thrives in Texas
- Opt out law failed in OK
- Other States on Hold but for how long?
Disruptive Technologies – Impact on Workers’ Compensation
Disruptive Technologies
Disruptive Technologies
Disruptive Technologies
Disruptive Technologies
Disruptive Technologies
Exponential Technologies

Ray Kurzweil’s Exponential Technologies

Exponential Growth of Computing for 110 Years

Moore's Law was the fifth, not the first, paradigm to bring exponential growth in computing

Logarithmic Plot

Calculations per Second per $1000

1000
10
10^3
10^6
10^9
10^12
10^15


Year

Electromechanical
Relay
Vacuum Tube
Transistor
Integrated Circuit
Staggering Promise of Exponential Technologies in a Succinct 5-Minute Video

By Jason Dorrier - Jun 10, 2014 • 17,556

Have you ever wanted to explain exponential technology to someone—but didn’t know where to start? We’ve got a video for you. Watch Peter Diamandis and DrawShop discuss six key technologies at the heart of today’s exponential boom.

A few highlights? In 25 years, computers will be microscopic, nearly infinite in supply, and basically free. Artificial intelligence, more like Iron Man’s J.A.R.V.I.S. than IBM’s Watson, will gather “incomprehensible amounts of data from the internet to make accurate split-second decisions.” Synthetic biology will program DNA to produce tailor-made foods, fuels, and vaccines.

This is, true to form, an unabashedly optimistic and exceptionally broad forecast. But better to begin by dreaming the possible than to linger overlong debating the “impossible.” In any case, Diamandis thinks the next quarter century promises to be a wild ride. Hard to disagree with that. Be sure to check it out and decide for yourself.
Exponential Technologies

Company and year it crossed about $500 million in sales
- 2010: Amazon Web Services
- 2007: Salesforce.com
- 2005: VMware
- 1992: Cisco Systems
- 1988: Oracle
- 1986: Sun Microsystems
- 1953: IBM

Now: AWS dominates the cloud
Then: IBM ruled with the mainframe
Exponential Technologies

OVER 4000 LIVES LOST ON THE JOB IN THE U.S. ANNUALLY

$250+ BILLION SAFETY COST FOR U.S. BUSINESSES PER YEAR

GUARDHAT COULD SAVE HUNDREDS OF LIVES

GUARDHAT COULD SAVE BILLIONS OF DOLLARS

SAVES LIVES

REDUCES COST

IMPROVES EFFICIENCY

addresses leading causes of accidents and enables faster response to incidents.

Saves insurance expenses and cost due to lost time by reducing number of accidents and their severity.

Enhances preventative maintenance and enables real-time communication with frontline workers.
Exponential Technologies

- Highlights and benefits

  ▶ Hosts can opt-in to the cover on an affordable pay-as-you-use basis.
  ▶ Unlike other products on the market the Host has the right to claim, with access to a 24 hour hotline.
  ▶ This policy will not create conflict with the Host’s existing insurance cover.
  ▶ Our product does not have a policy aggregate.

<table>
<thead>
<tr>
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<th>SafeShare</th>
<th>Umbrella Cover</th>
<th>Guest Liability/Travel Cover</th>
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<td>✓</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>No conflict with existing Host insurance</td>
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<tr>
<td>Host opt-in to cover</td>
<td>✓</td>
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<tr>
<td>Host direct access to claims</td>
<td>✓</td>
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<tr>
<td>Full cover for the Host</td>
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<td>✗</td>
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<td>Covers the Host in the event of injury to the Guest</td>
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<td>✗</td>
</tr>
<tr>
<td>Covers property damage caused by the guest</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Covers damages during the Guest’s stay but not caused by the Guest</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>
Exponential Technologies

Lemonade

Forget Everything You Know About Insurance


CHECK OUR PRICES

Watch the video
Exponential Technologies


Here's the script for The State Of Insurance Technology, which was first delivered at the OnRamp Insurance conference, April 6th, Chicago. ^^ So let's jump right to it. But...

OnRamp Conference

[Infographic] Insurers Established in the Last 5 Years

Recall insurers established in the last 5 years.
Exponential Technologies

Blog | Automaton
How Analog and Neuromorphic Chips Will Rule the Robotic Age
AI is going to make analog computing popular again
17 Oct 2016 | 2
artificial intelligence, analog, ai, neuromorphic, analog computing, neuromorphic computing, deep learning, moore's law, chan deng cheng

Article | Transportation
Learn How 3D Printing & Automotive Design Are Merging
With people spending more time behind the wheel, design of autonomous cars is on the rise. But, will sheet metal be replaced with 3D printing?
3 Oct 2016 | 1
3d printing, autonomous vehicle, robotics, engineered, automotive design, self driving cars, 3d printed cars

Blog | Automaton
How Locus Robotics Plans to Build a Successor to Amazon’s Kiva Robots
Locus Robotics founder Bruce Welty explains how his company is developing better warehouse robots from scratch
10 Aug 2016 | 1
locus robotics, warehouse robot, kiva, locusbots, brakeâs, logistics

Blog | Automaton
Video Friday: RoboCup Finals, Crowdsourced Robotics, and Growing Drones in Vats
Your weekly selection of awesome robot videos
8 Jul 2016 | 0
robot, robot building, robocup, robosapien, deng, science, robotics, 3d printing, robots, robot videos

Article | Semiconductors
How We’ll Put a Carbon Nanotube Computer in Your Hand
Computers built from carbon nanotubes will also silence real competition
Exponential Technologies

Article | Semiconductors
The Death of Moore’s Law Will Spur Innovation
As transistors stop shrinking, open-source hardware will have its day
31 Mar 2016 | 32
open-source, FPGAs, transistors, Moore's Law, open-source hardware, transistor scaling

Article | Computing
Gordon Moore: The Man Whose Name Means Progress
The visionary engineer reflects on 50 years of Moore’s Law
30 Mar 2015 | 9
semiconductors, Intel, Moore's Law, computing, history of technology, Gordon Moore, Fairchild, Shockley, transistors, Sherman

Article | Semiconductors
The Multiple Lives of Moore’s Law
Why Gordon Moore’s grand prediction has endured for 50 years
30 Mar 2015 | 11
semiconductors, Moore’s Law, computing, hardware, Moore’s scaling, exponential technological progress

Blog | Automaton
Facebook AI Director Yann LeCun on His Quest to Unleash Deep Learning and Make Machines Smarter
The Deep Learning expert explains how convolutional nets work, why Facebook needs AI, what he dislikes about the Singularity, and more
18 Feb 2015 | 26
Facebook, artificial intelligence, singularity, AI, speech recognition, image recognition, computer vision, machine learning
Exponential Technologies
Technology Adoption

Figure 1.2: Customers with Positive Experience, by Age and Region (%), 2015

- Global: 33.9% Gen Y, 55.4% Others, PP Gap 21.5
- North America: 33.0% Gen Y, 63.8% Others, PP Gap 24.2
- Europe: 33.3% Gen Y, 56.6% Others, PP Gap 23.3
- Latin America: 33.2% Gen Y, 58.5% Others, PP Gap 23.3
- Developed Asia-Pacific: 33.2% Gen Y, 50.9% Others, PP Gap 17.3
- Developing Asia-Pacific: 34.9% Gen Y, 45.0% Others, PP Gap 10.2

Note: Developed Asia-Pacific includes Australia, Hong Kong, Japan, Singapore, South Africa, South Korea, and Taiwan; Developing Asia-Pacific includes China and India.


1 Gen Y refers to people aged 15 to 34; Only customers aged 19 to 34 (born between 1981 and 1997) were surveyed in the VoC Survey and therefore reflect the Gen Y customers for the purpose of this document, while non-Gen Y customers are those aged 35 and above.
Technology Adoption

Figure 2.3: Customer Likelihood to Adopt New Technologies by Age Group and Affluence (%), 2015

<table>
<thead>
<tr>
<th>Smart Ecosystems</th>
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<th>Driverless Cars</th>
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<td>Baby Boomers</td>
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<tr>
<td>29.3%</td>
<td>35.3%</td>
<td>21.2%</td>
</tr>
<tr>
<td>24.5%</td>
<td>20.1%</td>
<td>14.8%</td>
</tr>
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</table>

Note: Question asked: “On a scale of 1–7 (1 being Most Unlikely and 7 being Most Likely), how likely are you to adopt emerging technologies such as driverless cars, home sensors, and wearable technologies?” Ratings of 6 and 7 are shown in the chart above.

Blockchain

A look at blockchain technology

What is it?

The blockchain is a decentralized ledger of all transactions across a peer-to-peer network. Using this technology, participants can confirm transactions without the need for a central certifying authority. Potential applications include fund transfers, settling trades, voting, and many other uses.

How it works:

1. Someone requests a transaction.
2. The transaction is complete.
3. The requested transaction is broadcast to a P2P network consisting of computers, known as nodes.
   - **Validation**: The network of nodes validates the transaction and the user’s status using known algorithms.
4. A verified transaction can involve cryptocurrency, contracts, records, or other information.
5. Once verified, the transaction is combined with other transactions to create a new block of data for the ledger.
Blockchain

**Benefits**
- Increased transparency
- Accurate tracking
- Permanent ledger
- Cost reduction

**Unknowns**
- Complex technology
- Regulatory implications
- Implementation challenges
- Competing platforms

**Cryptocurrency**

Cryptocurrency is a medium of exchange, created and stored electronically in the blockchain, using encryption techniques to control the creation of monetary units and to verify the transfer of funds. Bitcoin is the best known example.

- Has no intrinsic value in that it is not redeemable for another commodity, such as gold.
- Has no physical form and exists only in the network.
- Its supply is not determined by a central bank and the network is completely decentralized.

**Potential applications**

- **Automotive**
  Consumers could use the blockchain to manage fractional ownership in autonomous cars.

- **Financial services**
  Faster, cheaper settlements could shave billions of dollars from transaction costs while improving transparency.

- **Voting**
  Using a blockchain code, constituents could cast votes via smartphone, tablet or computer, resulting in immediately verifiable results.

- **Healthcare**
  Patients' encrypted health information could be shared with multiple providers without the risk of privacy breaches.
ChainThat – Insurance Blockchain Framework

Internal Systems & Processes

Placement  Claims  Accounting  Settlement  Reporting

Existing Systems

User Interface

Application Interface

Business Collaboration Services

Structured Data

Semi-Structured Data

Decentralised Technologies

Blockchain
Smart Contracts
Messaging
Data Sharing & Storage

Security & Identity Management

Risk / Contract
Premium
Claim
Accounting

Monitoring & Auditing

Placement
Premium Processing
Claim Agreement
Credit Control
Contracts

MI / BI

Cloud
3rd Party Host
On Premise

Distributed Applications
Blockchain
Autonomous Vehicles
Leading the way forward.

Peloton is a hands-on team of innovators leading the automated vehicle revolution by bringing groundbreaking safety, efficiency and data intelligence to the trucking industry.
Autonomous Vehicles
Autonomous Vehicles

What a spot! The superior engineering of the #inspirationtruck meets another technical masterpiece: the #hooverdam
Peloton Technology Secures $60M to Fuel Commercial Truck Industry Collaboration on the Road to Automation

Peloton teams with global industry leaders to put the safest, smartest and most fuel-efficient trucks on the road.

MOUNTAIN VIEW, Calif.--(BUSINESS WIRE)--Peloton Technology, a connected and automated vehicle technology company dedicated to improving the safety and efficiency of freight transportation, today announced the closing of a $60 million Series B funding round. Omnitrac, a global pioneer of fleet management solutions, led the round, which also included existing investors Intel Capital, DENSO International America, BP Ventures, Lockheed Martin, Nokia Growth Partners, UPS Strategic Enterprise Fund, Volvo Group, Sand Hill Angels, Band of Angels and Birchmere Ventures along with new investors B37 Ventures, Mitsui USA, Okaya, Schlumberger, US Venture and Breakthrough Fuel.

“We are excited to be working with a growing group of leading companies from across the industry as well as forward-looking state and federal regulators to bring pragmatic, driver-assistive truck automation solutions to market,” said Josh Switkes, co-founder and CEO of Peloton. “This new round of global strategic investment bolsters Peloton’s position as the leading provider of near-term automated truck technology in North America and soon beyond.”

**Commercial Truck Fleet Focus**

Peloton has raised a total of $78 million since inception. Series B funds will fuel Peloton’s growth plans, including the rollout of the world’s first commercial two-truck driver-assistive platooning system later in 2017, as well as development of more advanced automation solutions.

Peloton’s flagship platooning system empowers drivers and trucking fleets to address three major industry challenges of safety, fuel savings and operational efficiency by delivering new tools, capabilities and data.

“Peloton has taken an innovative and disciplined approach in combining vehicle connectivity and driver-assistive automation technologies to offer immediate value to trucking fleets,” said Larry Burns, Peloton board member and former vice president of research and development and strategic planning at General Motors. “Peloton’s truck platooning product helps fleets and drivers to improve safety, fuel efficiency and operations today while setting the stage for transformational trucking improvements in the future.”
Autonomous Vehicles

Peloton Platooning Introduction Video HD
Autonomous Vehicles

SELF-DRIVING TRUCKS - AUTONOMOUS VEHICLES

Self-Driving Trucks, Delivery Vans at Vanguard of Autonomous Vehicle Revolution

April 13, 2017

EDITOR'S PICKS, SELF-DRIVING TRUCKS - AUTONOMOUS VEHICLES, TRUCKING TECHNOLOGY

Commercial vehicles aren’t the only mode of transportation that can be automated, but when it comes to urban space, such self-driving trucks and delivery vans will be the early movers in the autonomous driving revolution, according to panelists at the Empire State of Mobility Conference in New York.

Starsky Robotics Developing Remote Controlled Self-Driving Truck

February 28, 2017

SELF-DRIVING TRUCKS - AUTONOMOUS VEHICLES, TRUCKING TECHNOLOGY

San Francisco startup Starsky Robotics unveiled a remote control system for self-driving trucks Tuesday, just days after Embark, another California startup announced its own strategy for autonomous truck highway driving.

U.S. and Europe Race to be First to Self-Driving Trucks

February 13, 2017

SELF-DRIVING TRUCKS - AUTONOMOUS VEHICLES, TRUCKING TECHNOLOGY

Opinions are split as to whether the U.S. or Europe is ahead in self-driving truck development. But there’s agreement that the U.S. is setting the pace in building a high-speed highway network designed to operate with autonomous trucks.

Editor's Picks

Trucking Industry Non-Profit Fights Food Waste Through Collections for Needy

April 17, 2017

Elon Musk Says Tesla Will Unveil Electric Semi-Truck in September

April 13, 2017

Peloton Technology Raises $60 Million for Truck Platooning Tech Development

April 13, 2017

Self-Driving Trucks, Delivery Vans at Vanguard of Autonomous Vehicle Revolution

April 13, 2017

Workhorse W-15 Electric Pickup Truck Will Be Sports Car Fast

April 13, 2017

Most Recent

Trucking Industry Both Skeptical and Wary of Tesla Truck Plans

April 10, 2017
GM expands operation and research into autonomous vehicles

GM to open US$ 14 million facility dedicated to self-driving automobiles

The race to manufacture self-driving automobiles continues and General Motors isn’t about to be left behind.

GM has just announced that it will invest US$ 14 million to repurpose an existing facility to increase assets dedicated to research and development of Cruise Automation and complement the existing staff with more than 1,100 new employees over the course of five years.

Located in San Francisco, the New Cruise Automation Development Facility aims to expand self-driving technologies of the present for a future that offers personal mobility.

“Expanding our team at Cruise Automation and linking them with our global engineering talent is another important step in our work to redefine the future of personal mobility. Self-driving technology holds enormous benefits to society in the form of increased safety and access to transportation. Running our autonomous vehicle program as a start-up is giving us the speed we need to continue to stay at the forefront of development of these technologies and the market applications,” said GM Chairman and CEO Mary Barra.

Currently, GM has 50 Chevrolet Bolt EVs with self-driving technology on public roads in San Francisco, Scottsdale, Arizona and metro Detroit.

“We are excited to significantly expand our footprint in California and continue on our rapid growth trajectory. As autonomous car technology matures, our company’s talent needs will continue to increase. Accessing the world-class talent pool that the San Francisco Bay Area offers is one of the many reasons we plan to grow our presence in the state,” said Kyle Vogt, CEO of Cruise Automation.
Disruptive exponential technologies...

- Interesting...real?
- Believe it when I see it...
- If its mostly true, OK, so?
- Sounds great, innovation, nothing to worry about...right?
Impacts

- Increased safety
- Increased efficiencies
- Skilled labor
- Less labor?
The future of employment

The Parts of America Most Susceptible to Automation

No, they’re not in the Rust Belt.

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Economists expect that millions of American jobs are going to be replaced by automation in the coming decades. But where will those job losses take place? Which areas will be hardest hit?

Much of the focus regarding automation has been on the Rust Belt. There, many workers have been replaced by machines, and the number of factory jobs has slipped as more production is offshore. While a lot of the rhetoric about job loss in the Rust Belt has centered on such outsourcing, one study from Ball State University found that only 13 percent of manufacturing job losses are attributable to trade, and the rest to automation.

A new analysis suggests that the places that are going to be hardest-hit by automation in the coming decades are in fact outside of the Rust Belt. It predicts that areas with high concentrations of jobs in food preparation, office or administrative support, and/or sales will be most affected—places such as Las Vegas and the Riverside-San Bernardino area may be the most vulnerable to automation in upcoming years, with 65 percent of jobs in Las Vegas and 69 percent of jobs in Riverside predicted to be automatable by 2025. Other areas especially vulnerable to automation are El Paso, Orlando, and Louisville.

Still, the authors estimate that almost all large American metropolitan areas may lose more than 35 percent of their current jobs because of automation in the next two decades. “We feel it was really stunning since we are underestimating the probability of automation,” said Johannes Mossialos, the director of the Institute for Spatial.
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Abstract

We examine how susceptible jobs are to computerisation. To assess this, we begin by implementing a novel methodology to estimate the probability of computerisation for 702 detailed occupations, using a Gaussian process classifier. Based on these estimates, we examine expected impacts of future computerisation on US labour market outcomes, with the primary objective of analysing the number of jobs at risk and the relationship between an occupation’s probability of computerisation, wages and educational attainment. According to our estimates, about 47 percent of total US employment is at risk. We further provide evidence that wages and educational attainment exhibit a strong negative relationship with an occupation’s probability of computerisation.

Keywords: Occupational Choice, Technological Change, Wage Inequality, Employment, Skill Demand

JEL Classification: E24, J24, J31, J62, O33.
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About half of today’s jobs will likely be done by computers in a decade or two. Automation has so far taken over mostly well-defined routine tasks, shifting jobs from middle-income manufacturing to lower-income service jobs. As computers get better at, for example, perception – think self-driving cars – those service jobs are likely next up to be replaced by machines. Frey and Osborne (2013) estimate the probability of each job becoming automated. Here are how their predictions apply to 2016 US employment statistics.

Black fields are jobs likely to be automated and white fields are jobs that are likely to remain.

Retail salesperson is the most common job today, but has a 90+% chance of becoming automated.

Instead, nurses and teachers might soon become the most common jobs.

These predictions are only the probability of each job becoming automated. Fewer managers will probably also be needed when there is fewer staff to manage.

It is mostly low-income jobs that risk being automated. Jobs that require social skills, creativity or higher education are less likely to.

Technologies and Workers Compensation

- Disruptive?
- Exponential?
- How are they impacting you, your company, and the jobs in your industry?