



# Demystifying Technology in the Workplace



## About the Organizations

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The Society for Human Resource Management (SHRM) is the world's largest HR professional society, representing 300,000 members in more than 165 countries. For nearly seven decades, the Society has been the leading provider of resources serving the needs of HR professionals and advancing the practice of human resource management. SHRM has more than 575 affiliated chapters within the United States and subsidiary offices in China, India and United Arab Emirates. Visit us at [shrm.org](http://shrm.org).



CPHR Canada represents 27,000 members in the Human Resources Profession across nine provinces and three territories in Canada. Established in 1994, CPHR Canada is the national voice on the enhancement and promotion of the HR Profession. With an established and credible designation and collaboration on national issues, we are proactively positioning the national human resources agenda in Canada and representing the Canadian HR Profession with HR Associations around the world. Visit us at [cphr.ca](http://cphr.ca).

SHRM and CPHR Canada have collaborated on this report to bring new insights into the relationship between technology and the workplace, and the role of HR in guiding forward-thinking practices and policies related to technology. HR has the opportunity to drive fundamental changes in organizations through their engagement with technology, and SHRM and CPHR want to provide guidance and leadership.

# Introduction

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## The dynamic definition

- Technology has fundamentally changed the way businesses operate.
- Once considered just another organizational function, today technology is a strategic need that permeates all levels and functions.
- Whether firms embrace technology or not, technological change is coming. Successful businesses exist today based on technology that was unheard of as little as 10 years ago.
- Very soon it will be impossible to be strategic in HR without being competent in technology.



## Our framework

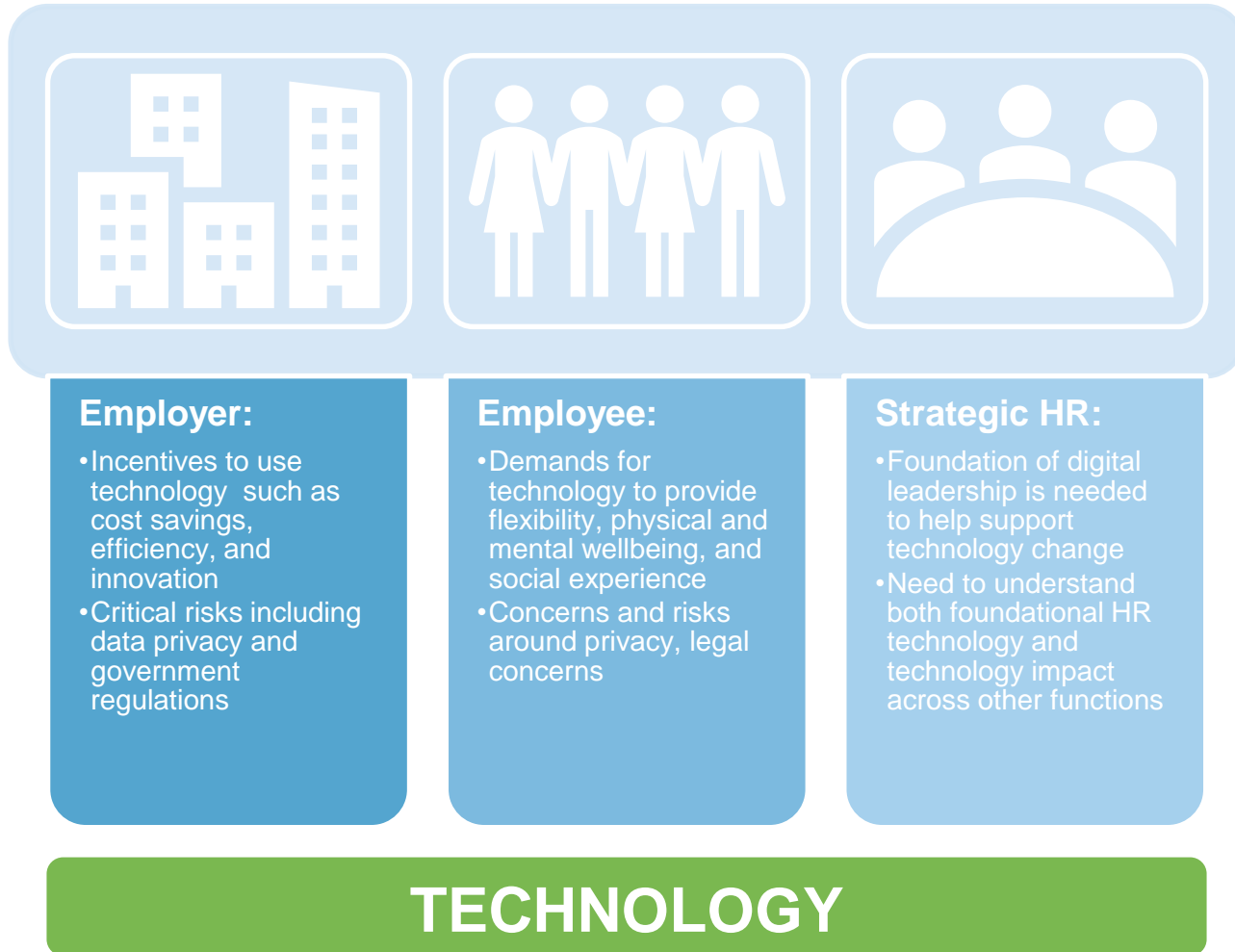
In this report, we have analyzed the impact of technology along four dimensions:

- **Sustained Need:** The existing and new needs of organizations and employees
- **Drivers:** The factors driving technology adoption.
- **Populations Impacted:** Employers, employees, and strategic HR
- **Business Impact:** Costs, benefits, and risks of technology adoption

# Technology in the Workplace

## Populations Impacted

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## Evolution of Technology

**“ Technology has and continues to play a pivotal role in enabling HR organizations to move from personnel management to business execution. ”**

*- Steven Hunt, Senior Vice President,  
Success Factors*

# Evolution of HR Technologies (1/2)

## Moving from administration to strategy

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### **Pre 1990: “Personnel Management”**

- Focused on personnel administration with basic technology
- Intended to reduce time spent on administrative HR processes
- Main focus of HR was to efficiently process employee paperwork



### **1990 - 2000: “Human Resources”**

- ERP technologies significantly reduced the time needed to perform administrative HR tasks
- HR began to focus more on workforce productivity
- HR began to utilize sophisticated talent management techniques to support key talent decisions, evaluate employees, and assess candidates

# Evolution of HR Technologies (2/2)

## Moving from administration to strategy

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### 2001 - 2010: “Talent Management”

- » Widespread adoption of internet-based HR systems
- » Allowed HR to be more efficient in sharing and analyzing data
- » Access to data enabled HR to shift focus from employee-specific decisions to aligning talent management processes that ensured a steady supply of high performing talent for critical job roles

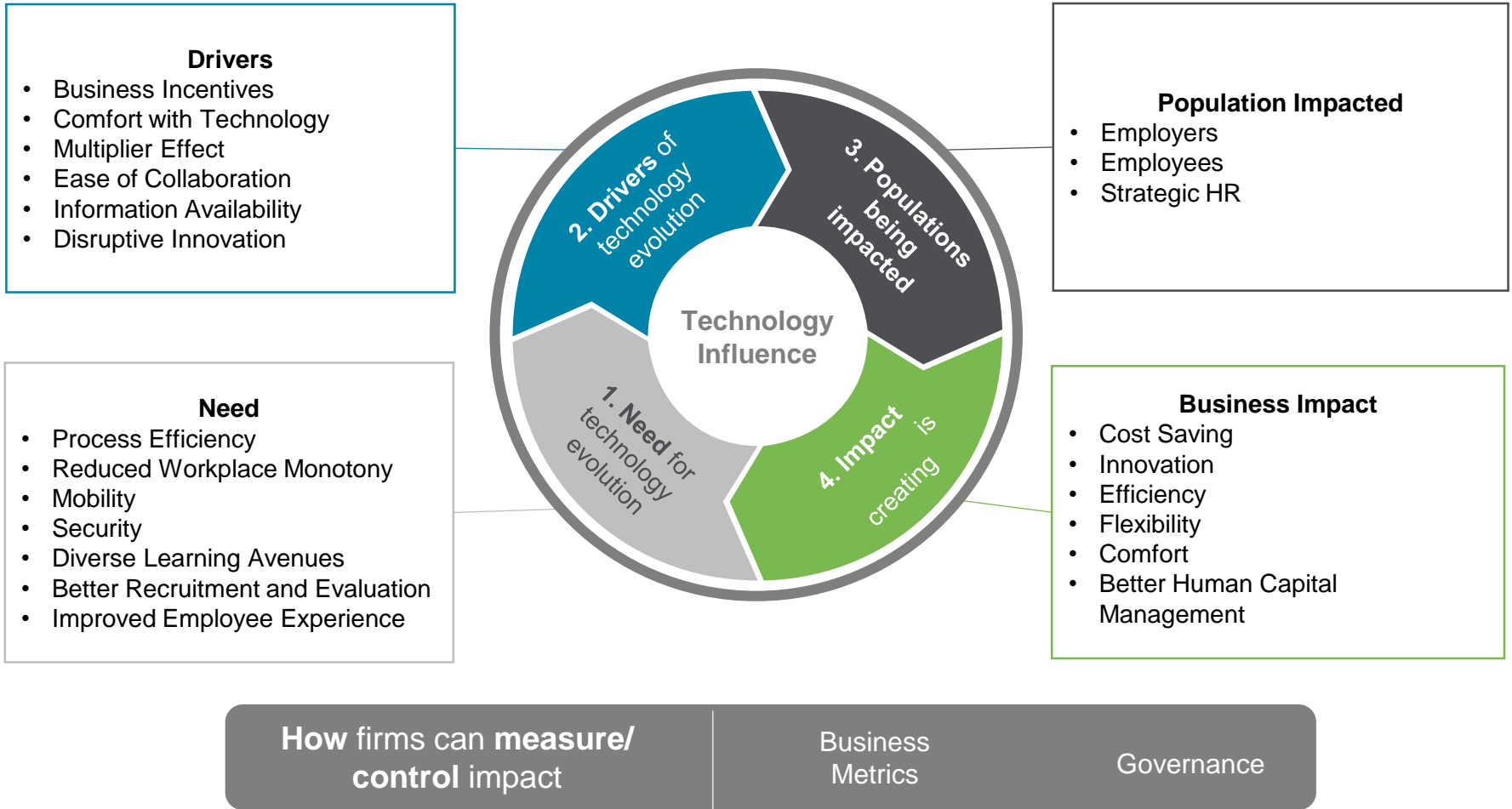


### 2011 to Present: “Business Execution”

- » Cloud-based applications enable HR to spend less time maintaining software and more time on using tools effectively
- » Evolution of highly scalable, user-friendly and cost-effective solutions incorporating sophisticated decision-support technologies
- » Focus on ensuring optimum employee utilization to support the company’s short and long-term business strategies



# Our Framework



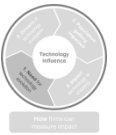
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## Need for Technology

*The need for technology adoption is primarily driven by strategic imperatives and operational efficiencies*

**“ Information technology is at the core of how you do your business and how your business model itself evolves.”**

- Satya Nadella, CEO, Microsoft



## Contemporary Need For Technology (1/3)

“ *If HR wants to continue to play a critical role in helping businesses anticipate and manage organizational change, it must have technology at its core.* ”

- Meghan M. Biro, CEO, TalentCulture

### Process Efficiency

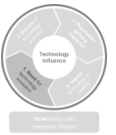


- Need for unified solutions which allow employee information to be **archived** in one secure location
- HR needs to make use of **new HR portals and platforms** that **digitize** much of the **information** they use

### Explore New Avenues



- Need to unravel **current trends**, market to **new audiences**, and **communicate** with existing and prospective employees
- **New partnerships** with business partners that possess technology competencies your organization does not have or cannot create



# Contemporary Need For Technology (2/3)

## Workplace Monotony



- Repetitive tasks hamper **job autonomy** and **decrease engagement**
- Data analytics can bring **new insights** and expand the horizons of HR

## Mobility

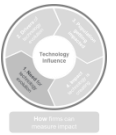


- Increased demand for **flexibility and mobility** to manage employees
- **Online portals** and **mobile HR apps** make it easy for employees to access information **anywhere and anytime**

## Security Spiral



- Using technology requires establishment of further technology to control access to information and systems.
- This requires technological measures for **cybersecurity and encryption**, thereby creating a spiral for more technology.



# Contemporary Need For Technology (3/3)

## Learning Possibilities



- **Globalized, technology-driven** business requires **continuous and lifelong learning**
- Need for **effective ways** to **administer** and **manage e-learning** resulted in evolution of learning resources like **Learning Management Systems and Learning Content Systems.**

## Operational Efficacy



- There is need for tools that are **integrated** with the company's information services to help HR hire high-quality candidates, keep them engaged, develop them, retain them, reward them, and increase efficiency and efficacy of the organization

## Employee Experience



- Besides flexibility, **changing workforce demographics** demand HR policies that focus on revamping the **holistic employee experience**
- **Bots, AI, and virtual reality** offer new ways to enhance candidate and employee experience

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## Drivers of Technology

*To drive higher adoption of technology, firms need to build leadership, manage change and empower employees*

**“ The only constant in the technology industry is change. ”**

*- Marc Benioff, CEO, Salesforce.com*

# Drivers of Technology (1/2)



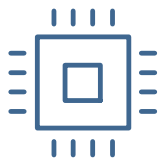
## Business Incentives

- Competitive and customer pressure to reduce costs and improve efficiency
- Make improvements in services and products
- Re-think strategy / business model (based on technology)



## Comfort with Technology

- Convenience is now a fundamental user expectation which requires leveraging new technologies



## Multiplier Effect

- As systems grow larger and more complex, additional technology is needed to use and manage them.

**47%** of firms expect **digitization** of their existing products/services to contribute to **more than 10%** of their **future revenue** over the next 5 years<sup>[5]</sup>

**6 Bn** people have mobile phones while **4.5 Bn** have access to a toilet<sup>[6]</sup>

**Digitization and integration** expected to more than double (from 2015 to 2020), globally, from **33% to 72%**<sup>[7]</sup>



# Drivers of Technology (2/2)



## Ease of Collaboration

- In pursuit of wider partnerships and interoperability, firms are increasingly demanding technological platforms to foster newer business opportunities



## Information Availability

- Reach, depth, and widespread impact of technology gives access to massive amounts of diverse information
- This drives new opportunities to utilize, analyze, learn from and act on newly available data.



## Disruptive Innovation

- Improved products and services disrupt industry and change business models.

**78%** of Millennials say that access to the technology they like to use makes them more effective at work.<sup>[64]</sup>

Over **11 Bn** devices are connected to the Internet, and that number is expected to increase to over **20 Bn** by 2020<sup>[8]</sup>

**45%** of companies are still focused on basic process automation <sup>[109]</sup>



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## Technology in the Workplace

- **Employers**
- **Employees**
- **Strategic HR**

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## Technology in the Workplace - Employers

- **Employers**
- Employees
- Strategic HR

# Technology in the Workplace – Employers: Cost Saving (1/4)

## Automation can provide fundamental process improvement and workforce uncertainty



### Automation and Robotics

#### What is the technology:

- Machines with enhanced sensing, control, and intelligence used to automate, augment, or assist human activities
- Create an augmented and collaborative working model / the “blended workforce”

#### Where is the impact:

- **Manufacturing:** Speed, strength, resilience, and lower error rate make them ideal for working in dangerous surroundings or round-the-clock
- **Customer Service:** Formulaic and repetitive tasks such as cash machines in banking, self-service check-outs in retail, and airport check-ins
- **Retail:** Automation & robotics utilized in e-commerce to deliver products with high accuracy

#### Impact examples:

- A business process outsourcing provider achieved 30% cost savings per process, while improving service quality and accuracy by applying RPA to 14 core processes<sup>[10]</sup>
- 58% CEOs said they intend to reduce headcount by adopting automation over the next 5 years<sup>[11]</sup>
- 94% of those who’ve adopted robotics say that it has increased productivity in their business<sup>[12]</sup>
- Some robots cost roughly half of a human worker’s salary in the US, or about three times that of a manufacturing worker’s salary in China<sup>[13]</sup>

#### What are the risks involved:

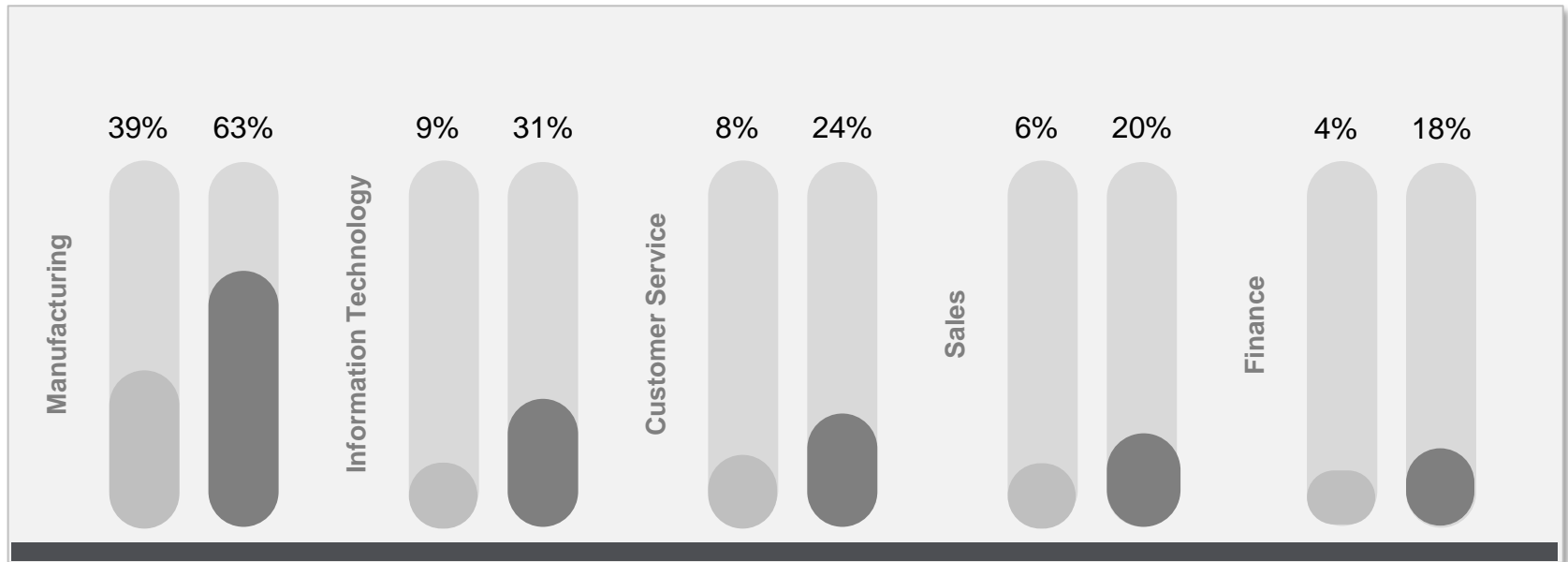
- Oversight/Governance required:
  - Software bugs or performance issues can create widespread production issues
  - Monitor interdependence with other automatic processes
- Uneasiness/ impact on current workers/ managing change in a new blended workforce

# Technology in the Workplace – Employers: Cost Saving (2/4)

Financial services is expected to witness highest % increase in automation adoption



## Role of automation in IT, Customer Service, and Sales is going to increase significantly



Source: PWC, CEO Pulse

■ Adoption in 2015  
■ Adoption by 2020

# Technology in the Workplace – Employers: Cost Saving (3/4)

## Cloud-based solutions provide innovative solutions with minimal capex



### Cloud-Based Solutions

#### What is the technology:

- The delivery of on-demand computing resources; everything from applications to data centers, over the internet on a pay-for-use basis

#### Where is the impact:

- 43% of companies said reduced cost of operations and/or maximizing IT investment drives their adoption of cloud systems/architecture<sup>[21]</sup>
- Cloud provides agility, decreased time to market, accelerated innovation, better and richer user experience
- Economies of scale and without need for in-house expertise

#### How much is the impact:

- One casual dining restaurant in Marina del Rey, California, saw a profit increase by \$20,000 a year after using cloud-based solution to detect employee theft<sup>[18]</sup>
- Manufacturers are using cloud platforms to get up-to-the-minute information on product performance that can eventually reduce equipment downtime

#### What are the risks involved:

- Data security and privacy
- Legal and regulatory considerations



## Blockchain

### What is the technology:

- A decentralized digital ledger that allows everyone in the chain to see and verify the details of every record in the network; can dramatically increase transparency and efficiency of transactions within and between organizations

### Where is the impact:

- Reduces costs for transactions and recordkeeping, and, reduces risk of fraud
- Provides faster, cheaper, reliable and transparent processes
- Enables new ways to manage supply chains, end-to-end quality assurance, contracts, and global transactions

### Impact examples:

- Utility providers in North America and Europe are using blockchain to trade energy futures and manage billing at electric vehicle charging stations
- New blockchain-based social media aims to allow users to own and control their images and content

### What are the risks involved:

- Blockchain governance is outside organizational control
- Security /Privacy/ Control framework is limited

# Technology in the Workplace – Employers: Efficiency (1/2)

## AI and Machine Learning offer promise but carry new risks



### Artificial Intelligence (AI) and Machine Learning

#### What is the technology:

- AI provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use it to learn for themselves.

#### Where is the impact:

- **Information Process:** AI and machine learning use the vast stores of data generated by IoT and cloud-based services to derive insight and make predictions.
- **Security:** Machine learning/AI is used to identify potential frauds in human-in-the-loop decision systems. The computer learns from those insights to improve its models and decisions.
- **Object Detection:** Image recognition can be used in medical imagery to quickly and accurately detect and diagnose terminal diseases and by insurance companies to digitally recognize and assess damages

# Technology in the Workplace – Employers: Efficiency (2/2)

## AI and Machine Learning offer promise but carry new risks



### Artificial Intelligence (AI) and Machine Learning

#### Impact Examples:

- Intel uses a predictive algorithm to segment customers into groups with similar needs and buying patterns, and then prioritizes its sales efforts and promotions. It expects to generate additional \$20M in revenue<sup>[31]</sup>
- Smart security systems that can automatically detect anomalous patterns in video data and immediately alert authorities of a possible intrusion can reduce the cost of human observation needed by 20% to 50%, leading to a potential savings of more than \$6 billion in 2025<sup>[37]</sup>

#### What are the risks involved:

- **Programming Efficacy:** High-stakes applications of AI/machine learning such as controlling automobiles or surgical robots require better machine decision-making than current software can reliably produce.
- **Unintended Bias:** Machine learning captures patterns in existing data. Unintentionally biased existing processes can be unknowingly perpetuated in AI systems.
- **Talent:** Demand for AI/machine learning talent outstrips supply, making custom systems expensive to build and maintain, and more general-purpose systems difficult to evaluate



# Technology in the Workplace – Employers: Innovation (1/2)

Connected devices offer new ways to manage assets and processes



## What is the technology:

- The *Internet of Things (IoT)* is the network of devices embedded with electronics that allow those devices to connect and exchange data. This includes vehicles, home appliances, wearables, industrial machinery, etc.

## Where is the impact:

### • **Energy Conservation:**

Intelligent energy management systems can be used to automatically sense when a room is unoccupied or occupied and adjust heating or cooling and lighting as needed.

### • **Security and Asset Intelligence:**

Wearables and internet-linked devices can report their locations to allow tracking of employees and business assets.

- **Fleet Management:** Real-time visibility into driver and vehicle performance can be used to increase the safety of technicians, reduce damaged inventory, decrease insurance-related costs, and permit field service technicians to take action before problems arise.

- **Agriculture:** Agricultural applications of IoT include farm and range management systems using sensors linked to automated irrigation and cultivation systems.

### • **Inventory Management and Supply Chain Integration:**

IoT can replace barcode-tracking systems to improve inventory management and track products throughout the supply chain, enabling just-in-time fulfillment and inventory efficiency.

## Internet of Things (IoT)

# Technology in the Workplace – Employers: Innovation (2/2)

Connected devices offer new ways to manage assets and processes



## Internet of Things (IoT)

### Impact Examples:

- Use of IoT technologies to manage office spaces can have an economic impact of \$70 billion to \$150 billion per year in 2025<sup>[37]</sup>
- Discrete Manufacturing, Transportation and Logistics, and Utilities will lead all industries in IoT spending by 2020, averaging \$40B each.<sup>[110]</sup>

### What are the risks involved:

- **Data Vulnerability:** Enhanced communication and information availability through new devices creates more touchpoints that are vulnerable to hacking, security malfunctions, and privacy violations
- **Regulation:** Increased integration of IoT and exploitation of security vulnerabilities will invite increased regulation and regulatory conflict, especially across jurisdictions.
- **Complexity:** IoT provides data at unprecedented velocity and volume, creating new challenges in data security, storage, and verification, as well as in analysis.

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## Technology in the Workplace - Employees

- Employers
- **Employees**
- Strategic HR

# Technology in the Workplace – Employees: Flexibility (1/2)

Gig economies are driving a demand for greater flexibility



## Flexibility

### Why flexibility:

- Employees demand technologies that provide flexibility in workplaces and save money for employers
- Employees are routinely collaborating with people they have never met, in places they have never visited, and staying connected with the office anywhere and anytime
- One-third of employees (32%) feel that they would have stayed longer in their previous jobs if greater flexibility had been offered<sup>[41]</sup>
- 9 in 10 people, given the choice of two jobs, would take the one that offers more flexible working options<sup>[41]</sup>

### Which technologies provide flexibility:

- **Microwork:** Breaking down complex tasks into smaller tasks that anyone with internet access could complete
  - **Notable tools:** Amazon's Mechanical Turk, Fiverr
- **Remote Teams:** software and social media solutions designed for remote teams allow maximum flexibility to employees and save employers money
  - Low or no overhead costs, a strong pipeline of applicants who prefer to work from remote environments, and the ability to utilize foreign workers with specialized skills without requiring immigration.
  - **Notable tools:** Trello, Google Drive, Zoom, Slack

# Technology in the Workplace – Employees: Flexibility (2/2)

Gig economies are driving a demand for greater flexibility



## Flexibility

### Impact examples:

- 30 million employees work from a home office at least once a week in the US while 60% of office-based employees will regularly work from home by 2022 [64]
- 80% of HR professionals believe that video conferencing is helpful in achieving their goals and objectives, and for their organization [111]
- 2/3 of the most effective business leaders worldwide are unwilling to relocate, and prefer to work remotely[64]

### What are the risks involved:

- **Employment legislation:** “Online freelancing” does not clearly fit into traditional employment legislation. Therefore, online workers in most countries do not receive the benefits of unionization, collective bargaining, social benefits, or legal protection such as minimum wage laws
- **Ensuring effectiveness:** Remote teams can lead to ineffective project management, decreased employee performance, and, data and intellectual property security issues.

# Technology in the Workplace – Employees: Wellbeing (1/2)

Innovations in wellness can be simple ways to improve employee experience



## Physical and Mental Wellbeing

### Why wellbeing:

- Work-related stress is a significant problem, with an estimated 40% of workers describing their job as very or extremely stressful<sup>[65]</sup>
- Sleep deprivation in the workforce is costing \$411 billion and losing 1.2 million working days per year in the U.S.<sup>[66]</sup>
- 61% employees say that lack of physical activity is an issue of large extent for them<sup>[67]</sup>

### Which technologies provide physical and mental wellbeing:

- **Smart Offices** : A well-planned office can be beneficial to employees' physical wellbeing by creating adaptive workplaces where wireless technologies allow people to move their desks according to their need; new developments in acoustic design mean even open offices can be quiet, and smart lighting can increase focus and reduce stress
- **Wearables** : Wearable devices, such as FitBits and Apple Watches, can track anomalies in body systems and suggest quick solutions, including physical activity reminders and interventions for high stress.

# Technology in the Workplace – Employees: Wellbeing (2/2)

## Innovations in wellness can be simple ways to improve employee experience



### Physical and Mental Wellbeing

#### Impact examples

- In open plan offices, 71.4% employees felt that the layout improved their productivity<sup>[70]</sup>
- 56% of people would use wearable technology offered by their employers if they knew the information would be used to improve their wellbeing at work<sup>[64]</sup>
- By 2020, 27% of employers are expected to offer mobile sleep applications that provide adequate sleep solutions to workforces<sup>[69]</sup>
- Between 2014 and 2017, venture capital firms pumped over \$16 billion into 800+ digital health companies, with \$3.5 billion being invested over the first six months of 2017 alone<sup>[68]</sup>

#### What are the risks involved:

- **Security Concerns:** Some fitness trackers provide constant geolocation data, publicly sharing employee and company locations, and potentially exposing platform vulnerabilities to third parties
- **Privacy Concerns:** Fitness trackers, health advising chatbots, and wellness analytical tools utilize confidential data such as personal health records, insurance policy details, and even physical and mental weaknesses that need to be strictly private, and are therefore perpetually at risk.

# Technology in the Workplace – Employees: Social Experience (1/2)

## Stronger social experiences offer productivity and wellness gains



### Social Experience

#### Why social experience:

- A SHRM survey highlighted that the top engagement driver for 79% of respondents was their relationship with co-workers<sup>[72]</sup>
- A team's performance has been observed to increase by 50% when its members socialize more and use email for operational purposes only
- Socializing for at least six hours each day is known to reduce stress and worry, while also enhancing the holistic wellbeing of the person<sup>[71]</sup>

#### Which technologies enhance social experience:

- **Social Media:** Social media enhances the workplace experience for employees on several fronts. Tools like Yammer and Jive allow augmented internal communications with instant messaging and group discussions. Social media tools can also be used for effective recruiting, disseminating the organization's culture and policies, and providing platforms for employee recognition.
- **Connected Environment:** Enabled with IoT and networked systems, each employee acts as a contributor to a connected experience, and collaborate on group decisions.
  - Devices like Google's Nest thermostat turn a smart office into an intelligent ecosystem, where information is gathered continuously and office managers can crowdsource decisions like optimal workplace temperature
- **Collective Intelligence:** Wearables and AI-enabled-workflow-management interfaces assist in breaking down the employee data by task types, and help understand when individuals perform certain tasks best, scheduling meetings when the group collectively is most likely to be engaged



# Technology in the Workplace – Employees: Social Experience (2/2)

## Stronger social experiences offer productivity and wellness gains



### Social Experience

#### Impact examples:

- Organizations that installed social media tools internally found a median 20% increase in employee satisfaction<sup>[73]</sup>
- Pilot programs, where companies have used badges to track activity and interactions among employees, generated 10% to 12% of productivity gains and individual performance improvements of 20%<sup>[37]</sup>
- IoT enabled process improvements for collaboration-dependent knowledge workers could generate an economic impact of between \$16 billion and \$47 billion per year globally by 2025<sup>[37]</sup>

#### What are the risks involved:

- **Malignant Exposure:** Allowing public social media in the workplace can potentially increase the risk of employees accidentally compromising system security
- **Objectionable Information:** Providing access to public social media in the workplace can damage the image of the firm or brand through negative or unprofessional posts.
- **Disengagement and Lost Productivity:** Social media exposure and interaction with colleagues can be distracting and hamper productivity. Alternatively, however, restriction and monitoring of social media can contribute to disengagement and, in worst case, attrition

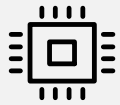
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## Technology in the Workplace - Environment

- Employers
- Employees
- **Strategic HR**

# Technology for Human Resources – Talent Acquisition (1/2)

Technology helps improve efficiency and reduce bias in talent acquisition



## Disruptive Applications

- **Artificial Intelligence:** AI-based systems which evaluate recorded interviews and identify education level, cognitive ability and potential fraud
- **Natural Language Processing:** Intelligent recruiting agents that can connect with passive candidates through social media to gauge interest, educate, and understand candidate skills and interests.
- **Augmented Reality:** Selection tests using augmented-reality simulation wherein recruiters can learn how candidates react in proxy environments, where they are required to make key decisions that recreate the daily job demands.
- **Machine Learning:** Profiles for new hires can be built by analyzing the skills and characteristics of current high-performers, and be combined with local demographic and socioeconomic data to generate highly effective sourcing plans and decision support tools.

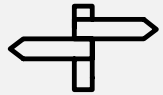


## Case Examples

- **Mya** automates tedious parts of the recruitment process such as sourcing, screening and scheduling. It is powered by machine learning and uses natural language processing (NLP) to pick up on details that come up in a conversation. Mya also creates candidate profiles and shortlists applicants.
- Recruiters at Vodafone, use **Textio** to analyze job postings for corporate jargon and words — such as “competitive” and “drive” — that research suggests may discourage female applicants from applying for positions. <sup>[112]</sup>

# Technology for Human Resources – Talent Acquisition (2/2)

## Technology helps improve efficiency and reduce bias in talent acquisition



### Tracing the Impact

- **Costs and efficiency:** Companies using AI for recruiting have seen promising results such as a 71% decrease in cost per hire and a 3x increase in recruiter efficiency.<sup>[74]</sup>
- **Reducing Time:** A SourceCon annual recruiter challenge revealed that while humans take around two days to review 3000 applications, software can deliver an equally proficient result in 30 seconds.<sup>[75]</sup>
- **Tackling Unconscious Bias:** Surveys suggest that when assessing individuals, 85% to 97% of professionals rely, to some degree, on intuition or a mental synthesis of information. <sup>[113]</sup> Using AI can help to reduce the potential for unconscious bias and expand the candidate reach, assuming software is evaluated for bias.
- **Candidate Experience:** AI-based chatbots promise to improve the candidate experience permitting immediate and continuous candidate feedback.

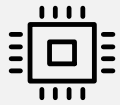


### Enablers and Derailers

- ✓ **Objectivity**  
Companies in healthcare, financial services, and technology sector use analytics to uncover reasons behind diversity challenges, understand how recruiting/interviewing creates bias, and identify drivers of bias.
- ✗ **Scrutiny**  
While AI can assist in making unbiased decisions, it fundamentally works by learning patterns underlying existing decisions. As a result, machine learning models can perpetuate existing biases. Scrutiny is required in the information that is being provided to models, accuracy of AI results, and whether AI is building the experience that is required.

# Technology for Human Resources – Engagement and Culture (1/2)

Engagement can now be monitored and improved continuously.



## Disruptive Applications

- **Engagement Monitoring:** Rapid pulse survey tools enable employees to provide anonymous or confidential feedback. Employee mood monitoring systems offer weekly or more frequent feedback in less than 30 seconds per employee.
- **Peer-to-Peer Recognition:** Recognition platforms help the workforce feel valued and respected. Teammates can cheer each other on and create strong support networks, especially if management is too busy or lacking in leadership skills.
- **Gamification:** Gamification can be used to increase employee engagement while facilitating goal attainment and training compliance.

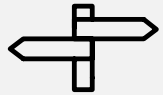


## Case Examples

- Software suites, such as **Glint** and **Culture Amp**, offer automated and customized pulse surveys which are shorter and more frequent employee surveys to help executives obtain a holistic picture of their employees' engagement levels.
- **CompanyMood** offers weekly “mood reviews” taking less than 30 seconds per employee, which may help detect and defer upcoming tensions, especially for field service teams.
- Coaching platforms, like **BetterUp**, provide technology-based personalized expert coaching, as well as tools for leadership to identify employee growth areas and measure impact.

# Technology for Human Resources – Engagement and Culture (2/2)

Engagement can now be monitored and improved continuously.



## Tracing the Impact

- **Understanding Engagement Surveys:** AI can be used to analyze employees' comments and free-form text from pulse surveys, providing rapid feedback to teams and managers.
- **Discovering New Meanings:** Using AI and advanced analytics, sentiment of employee emails can be measured and monitored. Combined with appropriate analysis, email traffic can be interpreted to monitor employees' stress levels, and to spot fraud or poor management.
- **Creating a relevant culture:** Advanced analytics can be used to Identify behaviors that contribute to employee *happiness* and performance. This data can be used to modify work, reconfigure teams, or to rearrange workspaces.

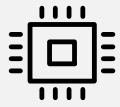


## Enablers and Derailers

- ✓ **Differentiated EVP:**  
Technology enables an organization to better understand its employees' thoughts and feelings and build a culture that supports employees motivations and needs. Tracking unique metrics such as happiness, fitness, stress, and sentiment are tools which can help build differentiation in cultures and EVPs.
- ✗ **Data Infringement:**  
As organizations collect more personal and business data about their employees, they raise growing risks and ethical questions about data security, transparency, and the need to ask for permission.

# Technology for Human Resources – Employee Development (1/2)

Innovation will change career pathing, succession planning and learning & development.



## Disruptive Applications

- **Artificial Intelligence and Machine Learning:** AI and Machine Learning will play pivotal roles in talent development and succession planning, especially for managerial roles, by enabling the identification and preparation of future leaders.
- **Internet Learning:** Content aggregation and curation platforms with learning management systems driven by AI will allow better understanding of learner behaviors and prediction of learner needs to recommend and position content based on past behavior.
- **Virtual Reality:** Virtual reality allows remote employees to meet in real-time in a 3D environment using social avatars.

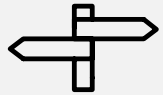


## Case Examples

- **Axonify** is an employee training platform utilizing micro-learning and gamification to teach and engage employees in retail, sales, finance, and insurance in place, on the job.
- **GE's** HR analytics team is using data that tracks the “historical movement of employees and relatedness of jobs” to help employees identify potential new opportunities across the company, regardless of business unit or geography.

# Technology for Human Resources – Employee Development (2/2)

Innovation will change career pathing, succession planning and learning & development.



## Tracing the Impact

- **Knowledge on-the-go:** Ubiquitous computing allows access to instantly available knowledge and on-demand development of skills through boundaryless delivery of instructional materials, including VR simulations, self-paced training, educational games, chat rooms, and e-reference materials.
- **Effective Dissemination:** E-Learning initiatives record information retention rates of 25% to 60%, as compared to just 8% to 10% for in-person trainings, and employees learn nearly five times more material over the same duration in e-learning than traditional training delivery.<sup>[48]</sup>



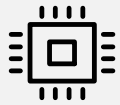
## Enablers and Derailers

- ✓ **Two-pronged benefits:**  
Augmented information retention and flexibility allow organizations to tap the untapped potential in employee learning. Technology also makes possible new kinds of cross-training and simulation-based training to prepare managers for future roles in ways that have not previously been available.
- ✗ **Increased threat of Obsolescence:**  
Since nearly 42% of Fortune 500 companies already use some form of technology in learning, and E-learning industry has expanded over 900% since 2000, not keeping up with this change is a critical threat for organizations, lest they face attrition and disengaged employees.<sup>[48]</sup>



# Technology for Human Resources – Performance (1/2)

Performance management is supported by new sources of data on employee behavior



## Disruptive Applications

- **Cloud Computing:** Cloud-hosted human capital management software enables easier and more flexible performance tracking and tools to simplify performance management of remote employees.
- **Virtual Reality Simulation:** Employee performance can be assessed using sensor-enabled VR simulations which track and record all aspects of observable employee behavior. This data can be combined with AI/machine learning algorithms to evaluate performance and suggest interventions to improve performance.
- **Artificial Intelligence:** Machine learning/AI-based systems can track online employee actions and sensor data to ensure regulatory and policy compliance, and to identify process bottlenecks and resource constraints.

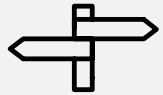


## Case Examples

- **Tobii** has developed a system which uses eye tracking technology and wearables to see work through the eyes of employees. Combined with machine learning, this can provide insight into cognitive workload, situational awareness, visual skills, and the environment and processes they work in, to support identification and transfer of tacit knowledge and gaps in quality assurance, safety, and ergonomics.
- **Florida Hospital Celebration Health** used badges embedded with sensor technology track exactly where nurses go during their shifts. The real-time location system was used to give overworked nurses a break, improve hospital operations, and to improve management processes.

# Technology for Human Resources – Performance (2/2)

Performance management is supported by new sources of data on employee behavior



## Tracing the Impact

- **Widespread Acceptance:** 70% of organizations are in the midst of major projects to analyze and integrate people analytics data into their decision making.<sup>[76]</sup>
- **Facilitating a Dispersed Workforce:** Technological tools can be particularly helpful to complete the performance management process when manager and employee do not work out of the same location.

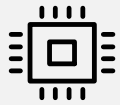


## Enablers and Derailers

- ✓ **Customizability:**  
These types of performance measurement tools can be customized to ensure that relevant aspects of employee performance are monitored, including the importance of environmental factors. This allows the construction of performance management systems that focus on the unique core requirements of jobs and organizations.
- ✗ **Organizational data overload:**  
Highly-instrumented performance monitoring systems can generate too much data that cannot easily be tied to effective performance. Additionally, employee engagement may be diminished by an overly aggressive performance monitoring program.

# Technology for Human Resources – Workforce and Org Design (1/2)

## Contingent and remote workers can be integrated into the workforce with technology



### Disruptive Applications

- **Predictive Analytics:** can be used to assist strategic workforce planning. It enables HR professionals to predict talent shortages and growth that requires new skills and/or larger workforces. AI-based job matching tools can simplify the hiring of short-term or contingent workers, as well as traditional employees.
- **Augmented Reality:** enables remote workers to “bring a company’s physical locations or workspaces to life”
- **Cloud-based** collaboration tools enable agile and remote working and the management of a workforce which may include outside vendors, contract labor, temporary and permanent staff.

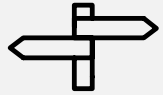


### Case Examples

- Organizations are using online talent platforms (70%), mobile talent engagement apps (23%), and gamification modules (21%) as part of workforce management systems.<sup>[114]</sup>
- Web-based customer support platforms like **Zendesk** let employers utilize both remote and on-site workers in a single integrated customer experience platform that includes self-service, live chat, messaging and telephone support.
- **Upwork** is contingent workforce brokerage which connects quality freelance programmers, designers, writers, and more with employers, using AI to match talent, and online skills tests and social feedback features to help employers evaluate contingent workers.

# Technology for Human Resources – Workforce and Org Design (2/2)

## Contingent and remote workers can be integrated into the workforce with technology



### Tracing the Impact

- **Better talent, better outcomes:** Productivity and innovation can be improved using short-term or need-based hiring to reduce time to fill roles and cost of hiring, and, can improve quality of available talent and fit between workers and roles.
- **Remote working reduces overhead costs** and can also improve employee productivity
- **Redefining Org Design:** Only 15% of global executives say they are prepared to manage a workforce with people, robots, and AI working side by side<sup>[82]</sup>. Employers may need to focus on cultural fit and adaptability as employees need to evolve along with the implementation of technology.



### Enablers and Derailers

- ✓ **Business Incentives:**  
In a gig economy, companies directly source talent and find the right person, for the right project, at the right time, which is a quicker and more effective hiring process. Some contingent workers are able to enjoy varied work in multiple environments under their preferred work schedules.
- ✗ **Compliance and Tracking:**  
Short-term, remote, or contract workers may require more and different performance tracking and management. Outcomes and daily work must be measured closely to ensure these new processes are indeed productive. Companies must take proper care to ensure short-term hiring is done according to local regulations.

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## Measuring Impact

*Firms need to measure and control the impact of technology to make it more sustainable and outcome focused*

**“ The advancement of technology is based on making it fit in so that you don't really even notice it, so it's part of everyday life.”**

*- Bill Gates, Principal Founder,  
Microsoft Corporation*



# Measuring and Controlling the Impact of Technology

Measuring and controlling the impact of technology in the workplace is no different than measuring and controlling the impact of any other business activities; the same pragmatism and controls are used even for implementing innovative technologies.

Some of the new and different considerations that must be made specifically for technology are data privacy, security, and regulating vendor support/reliance.

Measuring and controlling the impact of technology therefore boils down to:

- Control Metrics
- Business Metrics

**Control Metrics:** are comprised of state and federal regulations, and corporate policies that restrict things like dissemination and usage of data.

**Business Metrics:** are comprised of the strategies and systems used to make any other type of business decision, including financial models such as return on investment (ROI).

# Fundamental Questions for Technology Implementation

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- » Business Strategies
  - What are our long and short term business goals?
  - Will we be able to sustain expected growth rates in the future?
- » Current State
  - What are the inadequacies of current system?
  - What are the risks involved and cost incurred?
  - Will we be able match the employee expectations based on the current state of technology?
- » Benefits
  - What would be the added benefits of technology?
  - Do these benefits facilitate our ability to reach our intended goals?
- » Costs & Risks
  - What's the financial cost of adopting technology?
  - What are the business risks of adopting technology?
- » Level of Confidence
  - Are we in the position to manage the associated risks and costs?
  - Do we have sufficient talent pipeline to manage the technology?
  - Have we trained our leaders enough to manage the change?



# Measuring the Impact of Technology – Regulatory Control (1/2)

## The European Union: GDPR (The General Data Protection Regulation)

- Controlling data regulation for **all EU (and later EEA) nations**
- Provides **enhanced data rights** for all EU citizens and imposes obligations on data controllers and processors
- Requires users be **notified** of data breaches within 72 hours, provides rights to **transparency** (users know whether data is being collected and what data has been collected) and users' **right to be forgotten**
- Applies to businesses **processing data of EU citizens no matter where the business is located**
- **Steep fines** for most serious infringements of up 4% of annual global turnover or €20 Million (whichever is greater)

### DERAILERS

- Some companies may have less interest in doing business in the EU, and thus they will move out of the target zone for many companies, leading to reduced rate of innovation.
- Companies that are built on their ability to capture, sell, or leverage data to target individuals have to rethink their data practices.

### ENABLERS

- Much less complicated regulatory environment for data controllers and processors than the U.S., where federal, state and local regulations are overlapping, vary by industry sector, and can be contradictory.





# Measuring the Impact of Technology – Regulatory Control (1/2)

## The United States:

- The US lacks a single, comprehensive federal law that regulates the collection, use, and protection of personal information. The federal government regulates only certain sectors and types of sensitive information (e.g., health and financial), and state and local regulations may lead to overlapping and contradictory protections.
- Some key federal regulations include:
  - **Federal Risk and Authorization Management Program (FedRAMP):** Standardizes the security assessment, authorization, and continuous monitoring requirements for cloud products and services
  - **Health Insurance Portability and Accountability Act (HIPAA):** Establishes national standards for electronic health care transactions
  - **United States Privacy Act:** Establishes fair information practices that govern the collection, maintenance, use, and dissemination of information about individuals in systems of federal agency records

### DERAILERS

- Data protection and privacy relies on a combination of legislation, regulation, and self-regulation.
- It can be difficult to determine which regulations may apply to a proposed technology.
- Organizations operating in multiple states and/or municipalities may be subject to multiple sets of regulations.

### ENABLERS

- Allows the private sector to lead the way in data protection, making it compulsory for them to implement their own policies and develop their own technology. Individuals should self-regulate to prevent the dissemination of their private data.

# Measuring the Impact of Technology – Business Metrics (1/2)

## Return on Investment (ROI) Approach:

### Definition

In simple terms,  $ROI = \frac{\text{net gain}}{\text{cost}}$

- Since calculating the 'Net Gain' of technology in well defined units is difficult, firms can instead use an index based on proxy variables such as time saved, eliminated process redundancies, and working within project budgets and timelines.
- Similarly, the Cost 'index' for a technology's implementation should include all aspects of the cost, including both direct monetary measures, as well as things like time lost as a result of changing systems.

### Applications

- The calculated values of variables can be modeled into comparative statistics, or into direct ROI targets.

### Limitations

- While the approach is fundamental, complexities arise because it is so difficult to measure precise costs and gains of technology implementation.
- Proxy variables, if poorly chosen, can result in incorrect estimates and failed implementations.

# Measuring the Impact of Technology – Business Metrics (2/2)

## Uptake Analysis Approach

### Definition

- Many technology projects are implemented but not accepted by users.
- Uptake analysis uses both quantitative and qualitative analysis methods to identify who is using a technology solution and how they are using it.
- Scoring systems must be developed for evaluating qualitative data.

### Applications

- Quantitative measures of uptake (e.g., number of users, frequency of use, duration of use) and coded qualitative usage measures (e.g., Likert-scaled satisfaction or ease-of-use questions, scaled user observation) can be correlated with and modeled to predict business outcomes (e.g. productivity, time spent, resources consumed).

### Limitations

- Uptake and usage measures must be carefully designed and tested to ensure that they actually measure important features of technology use. Predictive models must include all variables which are significant determinant of the outcome variables.

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## Approaching Technology Sustainably

**“ If you want to be ahead of the game, you need to master how you can utilize the tools of the future.”**

*- Dr. Aisha bin Bishr*

# The Future of Technology Decisions: A Sustainable Approach (1/2)

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## Energy Consumption



- Office buildings account for 19% of all commercial energy consumption and consume the most energy out of all properties in the commercial building sector, although they consume the second most square footage. [98]
- Commercial electricity use has risen consistently since the 1980's although commercial heating fuel use has declined with the implementation of energy-saving technologies. New approaches are needed to make technology more sustainable.

## Automation Insecurity



- 72% of Americans are very or somewhat worried about a future where robots and computers are capable of performing many human jobs.[99]
- People's careers are a significant source of identity and self-worth. Technology implementations may encounter significant obstacles due to worker fears of being made redundant. Knowledge workers are no longer exempt from technological obsolescence.
- The need for talent is likely to increase even as these jobs transform, so HR must help those displaced by technology transition into other roles.

# The Future of Technology Decisions: A Sustainable Approach (2/2)

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## E-Waste Management



- E-waste is the fastest growing municipal waste stream in America<sup>[116]</sup>, according to the EPA, while only about 12.5% of total E-waste is actually recycled.<sup>[115]</sup>
- Remote working environments create increasing touchpoints in handheld devices, laptops and memory instruments. By the year 2020, the number of objects connected through IoT will rise by 50%.<sup>[8]</sup>
- The business and social costs of e-waste management will therefore have to be considered in future technology decisions.

## The Trust Issue



- Many contemporary applications of technology make use of information that humans dislike sharing (e.g. health data, private correspondence).
- Individuals' comfort with and trust in technology has not kept pace with the accelerating pace of change in technology. Newer technologies are more complex and more difficult for ordinary people to understand, leading to greater degrees of distrust.
- Organizations need to plan technology acceptance into new technology initiatives, making clear that that they see technology as a partner to, not a replacement for, essential human abilities and activities.

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# Authors

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**Ayush Gulati,**

Consultant – Insights and Innovation,  
ayush.gulati@aon.com

**Shobhit Johri,**

Associate Consultant – Aon Knowledge Center,  
shobhit.johri@aon.com

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