Confluence of TECH INNOVATIONS and People for Indian Livestock Sector

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What if you could design, build, and move into a house in under 24 hours? That's now becoming a reality, thanks to 3D-printed houses produced by startup Icon.

Source: https://www.livescience.com

Sensing City, Quayside high-tech project, Toronto.
Source: https://www.theglobeandmail.com
Tech trends that will be dominating the news

• Artificial Intelligence
  • Smarter software

• Sensor Technology
  • More sensors collecting real-time information
  • More data processing technology

• Vision and Positioning System
  • Workflow Analysis and Digitization
  • Processes, from enterprise to manufacturing will be analyzed to check for redundancy and overlaps -> Optimization

• More CPU power at the ‘edge’
  • Cameras that can not only see, they can understand the image
  • Microphones which can listen
  • Only useful data & non-private data is passed back to the cloud

• Industrial Robotics
  • Speed / Capability / Size
  • Multi-purpose robot

• Augmented reality (AR)
  • Help humans in skilled and manual tasks.
  • Access to information for specific things at the right point in time. Smart documentation

• Virtual reality (VR)
  • Design optimization
  • Line and/or process optimization

• Autonomous Vehicles
  • Material Receiving, Warehouse management, Finished Goods Loading, Line Loading

• Machine Interconnectivity
  • More and more devices will become connected and capable of speaking to each other
4th Industrial Revolution – Industry 4.0

Integrates Cyber-Physical Production Systems

TODAY
INDUSTRY
4.0

End of 18th century
STEAM ENGINES

Start of 19th century
MASS PRODUCTION

Start of 20th century
IT, PCs, PLCs

Start of 1970s
3rd Industrial Revolution

The connected enterprise leads to the 4th industrial revolution. Connecting production facilities with the internet of things.

Mass production fuels the 2nd industrial revolution with the help of electrical power.

Combining IT and electronics allows for further automation of the production process.

Big Data
Distributed Intelligence

Automation of Knowledge
Intelligent Manufacturing

LIGHTS OUT
PRODUCTION

SMART FARMING

SMART MANUFACTURING

COMPLEXITY

Startups Powering the Future of Farming and Agribusiness

Image is not meant to be endorsing, supporting, advertising or be exhaustive of companies in the space

Source: https://www.cbinsights.com

Slide 5
One cyber-physical system based on IIoT

Source: www.tracks360.com

Image is not meant to be endorsing, supporting, advertising or be exhaustive of companies in the space

Source: www.cema-agri.org
How we make feeds is also changing

1970s - 1990s
MANUAL OPERATIONS

1990s - today
SEMI AUTOMATION

Today onwards
SMART FEED MILLS

Source: Progressus AgriSchools (2018), www.progressus.asia
Image courtesy of Agentis Innovations. Mill+.

Source: Agentis Innovations. Smart Logistics.

Image is not meant to be endorsing, supporting, advertising or be exhaustive of companies in the space.
How we farm animals is also changing

Source: http://www.rotem.com

Source: http://www.pnas.org/

Source: Fancom

https://www.afimilk.com

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How we process the end product is also changing

From washing, inspecting, grading and packing. Already products can make it from the farm to the carton without being touched by a human.
How the industry interacts with the consumer is also changing

**HAPIfork**
Monitors How Fast People Eat and Helps Them Slow Down

**Smart fork**
(Georgia Tech, Dr. John Pierson)
fork that includes sensors to detect food temperatures

**Quirky Egg Minder**
push notifications when you're on the verge of being eggless & which eggs nearing their expiration date

**Biosensors**
Detect pathogen counts
- On-farm sensors
- At the washing – grading
- At further processing
- During transportation

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Key to Competitiveness and Differentiation

- Asset Utilization (OEE)
- Cost of Unit Produced
- Local Production
- On Demand Production
- Personalized Production

QUALITY
- Ultra-Precision
- Maximum Reproducibility
- Improving Standards
- Track & Trace

RECOUP
- Employee
- Consumer
- Environment
- Saftey

From ‘isolated automation’ to Integrated Cyber-Physical Production Systems
Considerations & Challenges

1. Timing
2. Funding
3. Market dynamics
4. Social Responsibility
5. …….
Considerations & Challenges related to technology

- Technology availability and adaptability
- Available infrastructure
- Predictions of future course of technology’s
- Technology maturity
- The pace of technology change
- Technology compatibility and collaboration
- System design
- System integration
- Manufacture and supplier quality and longevity
- Technology certification
- Information security
Considerations & Challenges related to People

SOCIAL
• It transforms the way we work and LIVE
• It raises important societal challenges and creates new opportunities

LEADERSHIP
• Awareness/Knowledge by the Top Management
  ▪ Vision and Leadership ▪ Requires a proactive business strategy
• Willingness for change and adaptation
• Requires change! Define a new way for doing things

WORKFORCE
• Qualification and Skill Set
• Job security and Job Displacement
• Redeployment of the displaced workers
Displacement of jobs by technology is an old fear

• Many people around the globe approach technological change with caution rather than excitement. No doubt, over the past two centuries waves of technological change have eliminated jobs and rendered some occupations obsolete. *i.e. Early in the 19th century, English textile workers who destroyed new weaving machines*

• The transition will be very challenging. We are on the tip of a technology revolution, especially when it comes to the boundaries between ‘artificial intelligence’ and ‘biology’ which are blurring
Not to be forgotten—technology also will create new jobs and income possibilities

- Technologies are creating new work in industries that most of us cannot even imagine, a new ways to generate income;
  - 1/3 of new jobs created in the US in the past 25 years were types that did not exist, such as software development, hardware manufacturing, app creation, and IT systems management
  - Here in India;
    - Google is rolling out the Internet Saathi (Friends of the Internet) program in which rural women are trained to use the Internet, and then become local agents who provide services in their villages through Internet-enabled devices.
    - UBER – allowed income and the possibility to purchase a vehicle to hundreds
The TYPE of Jobs will shift

Total hours by activity type, Germany example,

<table>
<thead>
<tr>
<th>Activity Type</th>
<th>Million FTE hours</th>
<th>Displaced hours</th>
<th>Added hours</th>
<th>Net change in hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applying expertise</td>
<td></td>
<td>569</td>
<td>2,293</td>
<td>1,724</td>
</tr>
<tr>
<td>Interacting with stakeholders</td>
<td></td>
<td>756</td>
<td>1,658</td>
<td>902</td>
</tr>
<tr>
<td>Managing and developing people</td>
<td></td>
<td>152</td>
<td>977</td>
<td>824</td>
</tr>
<tr>
<td>Unpredictable physical activities</td>
<td></td>
<td>1,054</td>
<td>1,198</td>
<td>144</td>
</tr>
<tr>
<td>Processing data</td>
<td></td>
<td>2,678</td>
<td>1,411</td>
<td>1,267</td>
</tr>
<tr>
<td>Collecting data</td>
<td></td>
<td>3,413</td>
<td>1,906</td>
<td>1,507</td>
</tr>
<tr>
<td>Predictable physical activities</td>
<td></td>
<td>3,097</td>
<td>1,521</td>
<td>1,576</td>
</tr>
</tbody>
</table>


Up to 375M workers globally may need to transition to new occupational categories by 2030
The SKILLS needs to perform work activities within all occupations will shift

• New work will lie in non-routine 'thinking' jobs that involve more application of expertise, interaction, and management “soft skills”

• More work activities will require social and emotional skills and advanced cognitive capabilities, such as high-level logical reasoning—capabilities that are required today for only a relatively limited number of jobs.

• This will be a challenge for education, training, and skill assessment models, which for now do not always emphasize “soft skills” such as social and emotional reasoning and sensing
Distribution of workforce across economic sectors

India: from 454 million employees, 235 million are potentially automatable

India: 114M (49%) in Agriculture, forestry, fishing has the potential to be automated

Source: https://www.statista.com/

Source: International Labor Organization, ILOSTAT.
What should keep CEOs awake at night

- How would we retrain our workforce?
- What are the new skill sets we need?
- Will we be able to produce what is needed to meet demand?
- Are we embracing and adopting technology as we should?
- Are we equipped sufficiently to capitalize on the new trends and remain relevant?
- What new leadership skills do I need?

Source: Perkin & Abraham (2017), Building the agile business through digital transformation
In Summary

• Very difficult to predict how the future of technology looks like

• The sure thing, the work place and the way we do things today will be fundamentally transformed

• Machines are making decisions and accomplishing things by there own. We will need to learn to truest the machines and work along side them

• Build a system that allows to be responsive to technology changes

Source: Deloitte. Smart Livestock Farming
Trends and Consideration: Food for thought

“*The consumer will be talking to the hen and the hen to the consumer*”
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