"We stand on the brink of a technological revolution that will fundamentally alter the way we live, work and relate to one another."

Klaus Schwab, Executive Chairman of the WEF

**THE 4TH INDUSTRIAL REVOLUTION DEMANDS NEW & MORE COMPLEX SKILLS**

<table>
<thead>
<tr>
<th>Year</th>
<th>Revolution</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1765</td>
<td>1st</td>
<td>MECHANICAL</td>
</tr>
<tr>
<td>1879</td>
<td>2nd</td>
<td>ELECTRICAL</td>
</tr>
<tr>
<td>1969</td>
<td>3rd</td>
<td>AUTOMATED</td>
</tr>
<tr>
<td>2000</td>
<td>4th</td>
<td>CONNECTED</td>
</tr>
</tbody>
</table>

1800's

1st Industrial Revolution
MECHANICAL
Steam & water powering the 1st factories

1900's

2nd Industrial Revolution
ELECTRICAL
Division of labour & mass production with electricity

1970's

3rd Industrial Revolution
AUTOMATED
IT enabled programmable work

TODAY

4th Industrial Revolution
CONNECTED
Cyber-physical systems, powered by IoT and fuelled by data, creating a fully interconnected society

---

"-------- 114 years -------

--- 90 years ---

--- 50 years ---"
In the future workplace, a combination of adaptive, technology and technical skills will help Worker 4.0 be Ready for new jobs, Relevant with new skills and Resilient to new ways of working. Combined, these traits will help Worker 4.0 achieve better skills, and ultimately better Wages, better Welfare and better Work prospects.
AN EXAMPLE: ARCHETYPE OF PORT ENGINEERING PROFESSIONAL 4.0

**Port Engineering Professional (Current)**

- **SEA TRANSPORT**
  - CURRENT JOB REQUIREMENTS
    - Develop and oversee maintenance regimes for port equipment

**Port Engineering Professional 4.0**

- **EMERGING JOB REQUIREMENTS**
  - Design and manage complex and integrated systems in automated mega ports
  - Tap on analytics to monitor and optimise port equipment performance and maintenance

**FOUNDATIONAL TECHNICAL SKILLS**

- Mechanical Engineering
- Electrical Engineering
- Civil Engineering

**ADAPTIVE SKILLS**

- Embracing Technology
- Mindset Change

**TECHNICAL SKILLS**

- Energy Optimisation and Sustainability
- Equipment Automation
- System Engineering
- Maritime Automation Systems

**TECHNOLOGY SKILLS**

- Smart Engineering
- Smart Infrastructure
- Data Analytics
- Cyber Security
- Integrated Platforms

**UPSKILLING OPPORTUNITIES**

- Examples include:
  - SkillsFuture for Digital Workplace
  - Maritime Automation Systems
  - Data Analytics
  - Energy Management & Optimisation
  - Cybersecurity by Design
  - Professional Development
To support Transformation of workers into Worker 4.0

NTUC TRAINING COUNCIL NETWORK

Labour Movement
NTUC Training Council is the nexus and will harness our network to pull and pool resources to make Worker 4.0 a reality.

By growing this ecosystem through NTUC and tripartite partners (WSG, SSG, TACs), we are turning ITMs into real outcomes for companies and workers; and transforming our workers into Worker 4.0.

Training Council
- Provides direction (Chaired by SG)

Training Executive Committee
- Centralise and coordinate efforts across Training Committees; synergise with tripartite partners (Led by DSG KPK, will include tripartite partners)

Training Committees
- Coordinate ground feedback from workers and companies, mobilise and execute plans (Chaired by Union Leaders)

Outreach, feedback and follow through
- Companies
- Workers
- Companies
- Workers
- Companies
- Workers

Supported by Training Partners Network
- Anchor Learning Partner
  - NTUC LearningHub
- NTUC’s e2i
- Workforce Singapore
- SkillsFuture Singapore
- Institutes of Higher Learning and CET Centres

Government

Future Economy Council
Looks into issues such as:
- the development of a vibrant and connected city
- strengthening our innovation ecosystem
- deepening and diversifying our international connections, among others.
A systematic process (nerve centre) to look into Future Jobs, Skills and Training required so as to prepare the workforce for the future.
OPERATIONALISING & TRANSLATING ITM TO HELP BOOKKEEPERS

Roundtable with CFOs to sense the ground and understand their hiring and training needs – Apr 2018
Launch of IBF Careers Connect on 1 Aug 2018

FINANCIAL SERVICES TRIPARTITE COMMITTEE (FSTC) HELPING WORKERS

1. SENSING
2. SYNTHESISING
3. COMMS & SHOOTING

READY FOR THE CHANGES?
FINANCIAL SERVICES INDUSTRY

FINANCIAL TECHNOLOGY (FINTECH) AFFECTING YOUR JOB

- Robotic Process Automation (RPA)
- Chatbots
- Mobile Banking
- Blockchain
- Data Analytics

ARE YOU INVOLVED IN THESE JOB FUNCTIONS?

- Search Data
- Operations Support
- Services Support
- Transaction Validation
- Settlements
- Risk Management & Governance

Skills that will help you stay in the game
- Deep Domain Knowledge
- Digital Awareness & Literacy
- Data-Driven Decision Making
- Human-Centered Design
- Agile / Empathetic Thinking
- Communication & Customer Engagement

Possible expanded / adjacent roles
- Sales / Relationship Management
- Data Analytics
- Fraud Risk
- Process Redesign
- Product Design
- Data Analysis
- Digital Marketing
- Team Leader

Financial practitioners need to be more aware of training opportunities in sector: NTUC

New career centre in CBD launched to help finance workers with training, job matching

New centre will offer career guidance to finance professionals

THE STRAITS TIMES

WHAT YOU CAN DO

First Guidance from a Career Coach

IBF Financial Services Industry Digital Skills and Competencies Framework

IBF Financial Services Industry Digital Skills and Competencies Framework

IBF Leadership and Change Management Leadership and Change Management Framework

IBF Leadership and Change Management Leadership and Change Management Framework
HEADING: HELPING HIGH TOUCH HEALTHCARE IN THE HIGH-TECH WORKPLACE

Page 1:

- **Engagement with Union members (July 2018)**
- **NEW HEALTHCARE ACADEMY LAUNCH (Aug 2018)**

Page 2:

- **HEALTHCARE INDUSTRY**
- **READY FOR THE CHANGES?**
- **IS INDUSTRY TRANSFORMATION AFFECTING YOUR JOB?**
  - Digitalisation
  - Emphasis on Community Care (Job Redesigned)
  - Proactive Health and Mental Wellness
  - Shifts in Model of Care

Page 3:

- **1. SENSING**
- **2. SYNTHESISING**
- **3. COMMS & SHOOTING**

Page 4:

- **Labourbeat**
  - K. Thanaelchini: Caring for Healthcare Workers
  - This is How Patient Service Associates are Getting Ready for the Future
Engagement with ICT Association Exco members (Sep 2018)

Joint-report with TTAB

Tech Talent Assembly (TTAB) Launch (Oct 2018)

Supported by TTAB, jointly produced a series of infographics to create awareness of emerging tech
TRANSFORMING WHOLESALE TRADE JOBS & SKILLS

Supported and participated in a series of industry validation sessions with ESG & EY

1. SENSING
2. SYNTHESISING
3. COMMS & SHOOTING

Key Trends & Emerging Technologies Affecting Your Job

- Digitisation: e-Commerce, EDI, ERP, CRM, e-Invoicing
- Sustainability: Green Logistics, Renewable Energy
- Internationalisation: Cross-Border Trade, Free Trade Agreements
- Data Analytics: Business Intelligence, Predictive Analytics

Skills to Help You Stay in the Game

- Technical Skills: Data Analysis, Digital Marketing, International Trade
- Generic Skills: Communication, Management, Problem Solving

Skills Framework for Wholesale Trade

A Guide to Occupations and Skills

Helping you prepare for the future, today
TRIPARTISM IN SINGAPORE – SYNERGISTIC PARTNERSHIP

1. WORK

TRIPARTITE ALLIANCE FOR FAIR & PROGRESSIVE EMPLOYMENT PRACTICES

The entire Civil Service
- Anchored on Trust & Understanding
- Tripartite Committees, Workgroups, Taskforces, Strategy teams, Review teams, Alliances
- Guidelines and Advisories

3. WORKFORCE

The entire Labour Movement

Singapore National Employers Federation
- Adapt and Grow
- Transform and Grow

2. WORKPLACE

Tripartite Alliance
For Fair & Progressive Employment Practices

INDUSTRY TRANSFORMATION MAPS

- A strategy to promote growth and competitiveness for 23 industries, backed by Industry Transformation Maps (ITMs) incorporating productivity transformation, skills development, innovations and internationalisation. To be developed and implemented in partnership with industry partners, they will help us achieve our vision for the sector and create good jobs for Singaporeans.

SkillsFuture Work-Learn Programme

- 7.6 million learner records in SkillsFuture
- 52,000 government-subsidised courses
- 431,000 Singaporeans

FUNDING AND SUPPORT

- S$455 million in 2016
- 12,000 enterprises

SAFETY AND HEALTH TRAINING AND SURVEY

- Professional workforce
- National safety and health framework
- Excellence Awards
- Industry-based safety and health training and survey

NTUC

- National Trades Union Congress
- For Fair & Progressive Employment Practices

2018 YEAR-IN-REVIEW
It is aimed to chart Singapore’s growth for the next 10 years
ITMs have resulted in new initiatives to help sectors retain their edge and in turn help workers gain.

**Example: Logistics**

**Best in Class Facilities**

- DHL
- eComm Log Hub
- Toll City
- World Gateway @ Bulim
- Advanced Regional Centre
- Food Cold Chain Hub
- YCH Supply Chain City
- South Asia Air Hub
- Yang Kee
- LF Logistics

Highly automated facilities with 40-70% labour productivity improvements

**Supply Chain & Logistics Innovation Playground (SCLIP) established**

- To incubate startups offering technology solutions for the logistics industry.

**Centres of Excellence/Innovation –** Anchoring MNCs/LLEs to carry out innovation activities here and tapping on local talent base

- DHL Asia-Pacific Innovation Centre
- DHL Asia-Pacific CoE for Automation
- Living Lab for Port Technologies
- Technology Innovation Centre
- Global CoE for Service Logistics
- Global Shared Value CoE
- Healthcare Innovation Lab
- Global CoE for Trade Management Services
- DB Schenker Global CoE for Vendor Managed Inventory
- Asia-Pacific Business Innovation Centre

Estimated to create 2000 new professional positions in MNCs/LLEs

**Logistics Skills Framework**

- Launched in August 2017

- Identifies job roles, career pathways, and existing and emerging skills required for the logistics sector.

- Launched in September 2017
WE ARE SEEING TRACTION IN THE NEW GROWTH AREAS

Example: Advanced Manufacturing

New partnership platforms to bring together different players

- Experiential Learning Environment
- Co-Innovation Platform
- Improving Production Processes

Singapore Smart Industry Readiness Index (launched Nov 2017) to guide companies’ digital transformation journeys

“Digital champions” to lead adoption

- Chevron
- Emerson
- Oronite
- PBA
- meiban
- Arcstone
- KUKA

5-year Smart Plant Digitalization Initiative to drive efficiency, productivity, and safety

Directed research in FoM horizontal technologies

- Industrial Internet of Things & Digital Manufacturing
- Artificial Intelligence in Manufacturing
- Robotics & Automation
- Additive Manufacturing
- Advanced Materials

Global Pervasive Sensing Cx&O & Remote Analytics Hub

Joint collaborations with a group of technology providers
SECTORS ARE TRANSFORMING FOR HIGHER PRODUCTIVITY AND BETTER JOBS

Example: Food manufacturing/services and Retail sectors are collaborating on Ready Meals

**Food Manufacturing**
- Increasing trend of consumption of convenience food products represents export opportunities

**Food Services**
- Ready meals as a more manpower-lean format that serves specific meal occasions with fewer workers

**Retail**
- New products to cater to consumers who desire more convenience and increase sales

Expanding through both traditional and new platforms

1. **Traditional retailers and convenience stores**
   - Select Group launched in NTUC and Sheng Siong in March’17
   - Da Paolo Group launched in Cold Storage in June’17
   - TCGC launched in Cheers Esso, to be rolled out to 35 stores by year end

2. **E-commerce**
   - Redmart as a platform for large and smaller food companies
     - Onboarded 4 new companies – 76 new SKUs
     - Launched own signature range of ready meals
RECIPE FOR LASTING & STRONG TRIPARTISM

❖ Guide collective bargaining towards constructive rather than disruptive ends

❖ Trust: Unions work towards their goals but not at the expense of the management

❖ Communication: creates informal platform for working level staff from the tripartite partners to forge stronger bonds

❖ Fairness: during good times, unions fight for fair share of the rewards

❖ During bad times, unions willing to accept lower wages to minimize retrenchment

FUTURE READY . RELEVANT . RESILIENT

MORE FUTURE JOBS, SKILLS & TRAINING CONTENT AT

WWW.NTUC.ORG.SG/FJST
1. FINANCIAL SERVICES SECTOR
- 2017: Financial Sector’s Infographic
- 2018: Blogpost - Financial Services Sector – Disruption, Displacement & Development
- 2018: Financial Services Sector’s Infographic

2. INFOCOMM TECHNOLOGY SECTOR
- 2017: Blogpost - “Riding the wave of digital revolution”
- 2017: ICT Sector’s Infographic
- 2018: Insight Report for ICT Industry
- 2018: ICT Sector’s Infographic

3. HEALTHCARE SECTOR
- 2017: Healthcare Sector’s Infographic
- 2018: Blogpost - K.Thanaletchimi - “Caring for Healthcare Workers”
- 2018: Healthcare Sector’s Infographic

4. ENGINEERING (MANUFACTURING) SECTORS
- 2017: Engineering in Manufacturing Sector’s infographic
- 2017: Engineering in Aerospace Sector’s infographic
- 2017: Engineering in Precision Engineering Sector’s infographic
- 2017: Engineering in Electronics Sector’s infographic
- 2017: Engineering in Energy and Chemicals Sector’s infographic
- 2018: Manufacturing Sector’s infographic

5. WHOLESALE TRADE SECTOR
- 2017: Blogpost - “Wholesale Trade: Making Trade Great Again”
- 2017: Wholesale Trade Sector’s infographic
- 2018: Wholesale Trade – Trends, Transformation & Tools of the Trade
- 2018: Wholesale Trade Sector’s infographic

6. ACCOUNTANCY SECTOR
- 2018: Blogpost - “Disruption in the Accountancy Industry: Right Toolset, Right Skillset and Right Mindset Needed!”
- 2018: Accountancy Sector’s infographic
- 2018: Roundtable Report - Managing Disruption in the Singapore Accountancy Industry

Updated as at Jan 2019
**Changina Skills & Jobs**

**Findings: Knowledge Work**

A decision-making process about how to improve the performance of the task at hand with technology.

**Disruptions Impacting Organisations**

- Mobile communication technology
- Automation of knowledge work
- Robotics
- Artificial Intelligence (AI) and analytics
- Data scientific work

**Organisations Facing a Mounting Challenge**

Especially increasing reliance on almost all of their workers to perform knowledge work.

PMETs are first to be affected by this new heightened demand for knowledge work.

Supervising the performance of knowledge work will be a growing challenge, especially when the supervisors themselves are also challenged by the new skill requirement.

Knowledge work is the area of work which the workers are least prepared.

**How Unions Can Help**

- Mobilise workers and members to attend the SkillsFuture for Digital Workplace programme to prepare for the future economy.

**Report**


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**Retirement Adequacy**

**Of Mature Workers in Singapore**

Union members fared better compared to non-Union members on the following:

1. More likely to be working full-time
2. Less likely to lose their jobs within a given time period
3. Found employment sooner when unemployed
4. Slightly higher household income, expenditure and wealth
5. Higher household savings rates & continued saving up to a later age
6. Reach retirement adequacy sooner

**Employment**

- Employed Union members were 14% more likely to be working in the past month.
- Among respondents who would like to be working.
- Union members were 3% more likely to be in full-time work than employed non-Union members.

**Finances**

- Union members were 14% more likely to be working in the past month.
- Among respondents who would like to be working.
- Union members were 3% more likely to be in full-time work than employed non-Union members.

**How Unions Can Help**

1. Encourage employers to retain mature workers.
2. Support management partners to adopt Workpro for job redesign and implement age-friendly workplaces.
3. Facilitate placement and intervention for workers who are unemployed for more than 6 months.

**Report**

UNDEREMPLOYMENT in Singapore

How do we identify underemployment? As underemployment is too complex to measure with a single indicator, the research study considered multiple indicators:

FINDINGS

1. Unique characteristics that are mutually exclusive. Female, no children, employed at businesses that serve mainly the domestic market.

2. The underemployed expressed that there is an inadequate recognition of skills at the workplace.

3. Employers recognised educational qualifications more than skills.

4. Underemployment is NOT by choice, it is by circumstances triggered by physical disability and pain that affected work.

KEY CHALLENGES

- Underpayment: Pay is less than other people with the same qualifications.
- Status discrepancy: Status is lower than desire.
- Insufficient earnings for daily expenses.
- Lower income security.
- Lower job security.

Underemployment is seen in these sectors:

TOP SECTORS: 18% Health & Social Services, 12% Financial Services, 7% Transport, 7% Education

HOW UNIONS CAN HELP

1. Support for stronger recognition of skills by employers and greater awareness on the areas to upskill.


NEW TYPES of EMPLOYMENT

Traditional businesses face major disruptions by new business models with an emerging group of FREELANCERS.

FINDINGS

DEMOGRAPHICS

- 55% Female
- 72% Married
- 67% With Children
- 70% Living in HDB Flats
- 85% Home Owners
- Older
- Earn Lesser
- Telecommute More

Top industries with freelancers:

- 15% Education
- 12% Transport
- 7% Real Estate
- 7% Professional Service

NEW WAYS of WORKING

- 46% Work in Co-working spaces
- 8% Participate in Hackathons

Platforms to market skills

- 66% Word of mouth
- 49% Direct liaison

THE KEY MOTIVATORS

- 83% Flexible work schedule
- 73% Passion
- 49% To create a greater social impact

CONCERNS

- Skills recognition is lacking
- Job security
- Income security
- Inadequate retirement savings
- Inadequate savings for medical expenses
- Payment issues
- Loss of income during training

FUTURE PLANS

- 78% intend to carry on their current full-time freelancing work arrangements
- 43% of freelancers reported having a career plan compared to 38% of non-freelancers