The fourth industrial revolution and the employment challenge

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4th Annual Public Policy Conference 19 September 2018

FIRe in the workplace: should we be afraid?

- Fourth Industrial Revolution (FIRe): the current wave of technological advancement characterized by the interconnection via digital networks of all processes of modern production and distribution.
- Promise of greater productivity, lower costs, higher growth but also risks to employment, incomes, personal security, and inclusivity

Two FIRe-related facts

- Substitution of computer-enabled processes for labor in manufacturing and services (e.g. robotization)
- Emergence of various non-standard forms of employment (the "gig economy")



Forecasting the future of work

- Evidence does not support claim of majority of jobs being lost to automation.
- Technological change creates jobs, too, via several channels.

The task approach

- A job consists of several tasks.
- Skills are used to perform tasks that, when combined, generate output.
- Tasks can be performed by domestic labour, foreign labour (offshoring), or capital depending on cost considerations and comparative advantage.

The task approach

Technology usually changes work by changing how specific tasks are performed.

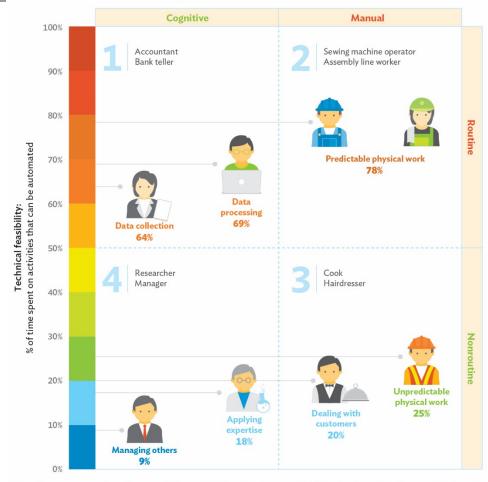
Levy and Murnane (2013)

Figure 1: Varieties of Computer Information Processing¹⁰

Increasingly Difficult to Program

	Rules-Based Logic	Pattern Recognition	Human Work
Variety	Computer Processing using Deductive Rules	Computer Processing using Inductive Rules	Rules cannot be Articulated and/or Necessary Information cannot be Obtained
Examples	Calculate Basic Income Taxes	Speech Recognition	Writing a Convincing Legal Brief
Examples	Issuing a Boarding Pass	Predicting a Mortgage Default	Moving Furniture into a Third Floor Apartment

2.1.9 Impact of automation on jobs



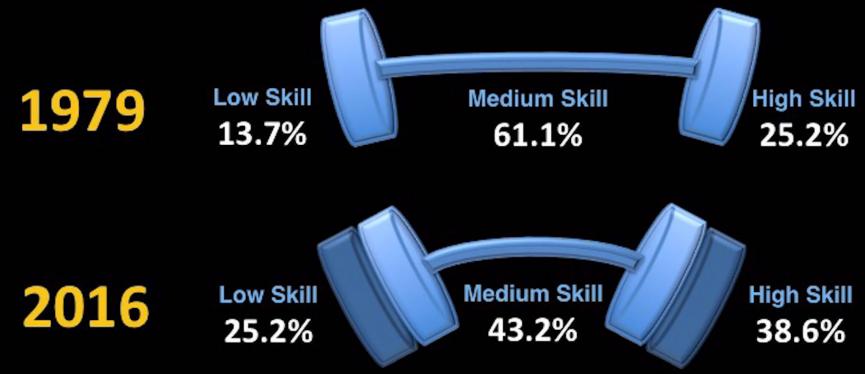
Note: Percentages are from Frey and Osborne (2017) estimates on probability of automation. Framework is based on Acemoglu and Autor (2011).

Source: ADB (2018)

The task approach

- Computerization of routine job tasks leads to job polarization where jobs that are intensive in cognitive and manual tasks – on either end of the skill spectrum – account for the majority of jobs.
- This is confirmed by a large body of US and international evidence at the level of industries, localities, and national labour markets.

Share of U.S. Workers in Low, Medium, and High Skill Occupations: 1979 and 2016



			2003	2006	2009	2012	2015	
		TOTAL EMPLOYED	80,363	76,606	73,557	79,649	82,841	
	Skill Level	% Share of Occupation						
	-	Government officials and managers	11.92	12.06	14.53	16.09	16.76	
	4	Professionals	4.05	4.33	4.42	4.93	5.17	
	3	Technicians and associate professionals	2.76	2.74	2.71	2.79	2.63	
	2	Clerks	4.13	4.91	5.30	5.72	6.71	
	2	Service workers and shop and market sales workers	9.26	9.79	10.76	12.63	13.03	
	2	Farmers, forestry workers, and fishermen	18.39	17.65	15.37	12.68	11.45	
	2	Craft and related trades workers	9.06	8.09	7.72	6.77	6.77	
	2	Plant and machine operators and assemblers	7.48	7.72	6.10	5.27	5.45	
	1	Elementary occupation: laborers and unskilled workers	32.54	32.28	32.66	32.88	31.73	
	-	Special occupations	0.42	0.43	0.43	0.25	0.29	
		TOTAL	100.0	100.0	100.0	100.0	100.0	
-		Skill Level	2003	2006	2009	2012	2015	
Ē		4	4.05	4.33	4.42	4.93	5.17	
ŀ		3	2.76	2.74	2.71	2.79	2.63	
		2	48.31	48.16	45.25	43.07	43.41	ノ
		1	32.54	32.28	32.66	32.88	31.73	
		-	12.34	12.49	14.96	16.34	17.05	

The gig economy

- An environment in which jobs are short-term, workers are predominantly independent contractors, and no employeremployee relationship exists between the contracting parties
- Attraction is in freedom, flexibility, being own boss, and higher income
- No estimate exists on the size of the gig economy in the Philippines.

The gig economy

- Disadvantages include unemployment risk, lack of social protection cover, absence of non-wage benefits and pension
- Issues are not new; generally true for nonregular workers

		2003			2006			2009			2012			2015	
	Permanent	Short Term	Different Employers												
TOTAL EMPLOYED	57,976	19,357	3,029	58,051	16,059	2,495	56,954	14,672	1,931	57,941	18,251	3,363	60,34	18,728	3,681
% Share of Industry															
Agriculture	33.82	41.97	54.95	33.56	36.41	50.60	31.61	34.65	53.67	28.29	32.32	58.37	24.75	29.31	53.48
Industrial															
Mining & Quarrying	0.31	0.62	0.41	0.31	0.87	0.44	0.46	0.90	0.23	0.63	0.88	0.24	0.48	0.74	0.33
Manufacturing	10.00	9.71	3.04	8.90	10.58	2.61	8.29	9.32	2.01	8.58	8.86	1.27	8.43	8.90	1.17
Electricity, Gas & Water	0.40	0.25	0.09	0.40	0.33	0.02	0.49	0.32	0.00	0.28	0.19	0.00	0.22	0.22	0.09
Waste Management	0.08	0.10	0.12	0.05	0.15	0.10	0.02	0.07	0.00	0.06	0.05	0.00	0.04	0.03	0.04
Construction	3.52	8.81	17.85	3.31	8.81	18.46	3.84	9.75	20.70	3.69	10.55	20.93	4.93	12.64	25.25
Services															
Wholesale & Retail	19.95	16.05	3.81	20.13	17.50	6.03	20.56	18.56	2.39	19.94	18.20	2.34	20.25	17.63	2.23
Transport Services	7.96	5.16	4.67	7.91	5.16	4.89	7.71	4.56	2.88	8.18	4.67	2.75	8.61	4.80	2.32
Accommodation	2.61	2.97	0.17	2.72	3.76	0.45	2.95	3.90	0.50	4.11	4.84	0.43	4.31	5.63	0.72
Information and															
Communications	0.43	0.25	0.00	0.58	0.44	0.09	0.69	0.38	0.06	1.01	0.90	0.16	1.05	0.82	0.08
Financial Intermediation	1.20	0.46	0.00	1.22	0.49	0.10	1.24	0.48	0.02	1.42	0.53	0.04	1.48	0.64	0.03
Real Estate Activities	0.31	0.13	0.13	0.54	0.26	0.28	0.58	0.23	0.07	0.69	0.33	0.03	0.68	0.20	0.00
Professional, Scientific, and															
Technical Activities	2.03	1.18	0.23	2.34	1.53	0.53	2.67	1.68	0.05	0.54	0.28	0.07	0.64	0.35	0.14
Administrative and Support															
Services	0.12	0.08	0.00	0.15	0.09	0.00	0.17	0.19	0.08	2.92	1.75	0.09	3.51	2.26	0.44
Public Administration and															
Defense	5.27	3.10	0.26	5.29	2.84	0.06	5.52	3.98		5.99	3.81	0.13		4.32	
Education	3.60	1.08	0.10	3.70	1.33	0.04	3.81	1.17	0.07	3.98	1.40	0.02	4.30	1.44	0.19
Human Health and Social															
Service Activities	1.32	0.59	0.25	1.36	0.54	0.39	1.32	0.86	0.17	1.40	0.91	0.15	1.51	0.80	0.12
Arts, Enternainment and	0.04	0.07	0.50	0.00	1 27	1 00	0.00	1 7 4	0.70	0.04	1.02	0.54	0.00	1 22	1 07
Recreation	0.84	0.97	0.58	0.88	1.37	1.00	0.99	1.34			1.63	0.54		1.22	-
Other Service Activities	6.21	6.51	13.33	6.64	7.56	13.92	7.07	7.67			7.91	12.45		8.06	-
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

	2003			2006		2009				2012		2015			
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TOTAL EMPLOYED	57,976	19,357	3,029	58,051	16,059	2,495	56,954	14,672	1,931	58,016	18,270	3,363	60,417	18,743	3,681
% Share of Occupation															
Government officials and managers	14.70	4.93	1.08	14.34	5.55	1.97	17.20	6.31	0.12	19.90	7.28	0.14	20.68	7.77	0.24
Professionals	5.11	1.29	0.45	5.29	1.57	0.35	5.29	1.66	0.46	6.02	2.45	0.17	6.46	2.12	0.29
Technicians and associate professionals	3.05	2.10	1.12	2.95	2.10	2.05	2.89	2.28	0.83	3.11	2.19	0.61	2.84	2.33	0.63
Clerks	4.56	3.34	0.51	5.17	4.63	0.77	5.55	4.94	0.28	6.14	5.33	0.57	7.29	5.98	0.68
Service workers and shop and market sales workers	9.04	10.85	3.14	9.35	12.18	4.04	10.24	13.69	2.27	11.94	16.39	2.58	12.44	16.70	2.40
Farmers, forestry workers, and fishermen	21.50	11.20	1.82	20.24	10.61	4.10	17.87	7.76	0.90	15.37	6.69	0.03	13.73	6.52	0.04
Craft and related trades workers	8.27	10.42	16.21	7.12	10.21	16.46	6.97	9.42	17.04	5.77	8.59	13.82	5.93	7.94	14.70
Plant and machine operators and assemblers	8.26	5.64	3.45	8.46	5.73	3.72	6.51	5.05	2.11	5.54	5.01	1.96	5.83	4.88	2.14
Elementary occupation: laborers and unskilled workers	24.98	50.06	72.22	26.60	47.12	66.48	27.02	48.55	75.94	25.91	45.97	80.09	24.44	45.64	78.75
Special occupations	0.52	0.19	0.00	0.48	0.31	0.06	0.46	0.33	0.05	0.30	0.11	0.04	0.36	0.12	0.11
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Skill Level															
4	5.11	1.29	0.45	5.29	1.57	0.35	5.29	1.66	0.46	6.02	2.45	0.17	6.46	2.12	0.29
3	3.05	2.10	1.12	2.95	2.10	2.05	2.89	2.28	0.83	3.11	2.19	0.61	2.84	2.33	0.63
2	51.63	41.45	25.14	50.34	43.36	29.08	47.14	40.86	22.60	44.76	42.00	18.96	45.22	42.02	
1	24.98	50.06	72.22		47.12	66.48	27.02	48.55		25.91	45.97	80.09		45.64	
-	15.22	5.11	1.08	14.82	5.86		17.66	6.64	0.17	20.20	7.39	0.17	21.04	7.88	
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Number of Agency-Hired Workers							
Year	Agency-Hired Workers						
2003	316,423						
2008	364,210						
2010	341,703						
2012	518,101						
2014	621,905						

What industries employ agency-hired workers?							
Major Industry Groups	Agency-Hired Workers						
Agriculture, Forestry and Fishing	43,955						
Industry	285,491						
Services	292,459						
Total	621,905						

What industries employ agency-hired workers?

Industry/Sector	Agency-Hired Workers	
Industry	285,491	
Mining and Quarrying	9,073	
Manufacturing	244,538	
Electricity, Gas, Steam and Airconditioning Supply	22,260	
Water Supply; Sewerage, Waste Management and Remediation Activities	3,119	
Construction	6,500	

What industries employ agency-hired workers?							
Industry/Sector	Agency-Hired Workers						
Services	292,459						
Wholesale and Retail Trade; Repair of Vehicles and Motorcycles	90,763						
Transportation and Storage	19,944						
Accommodation and Food Service Activities	43,354						
Information and Communication	18,153						
Financial and Insurance Activities	33,781						
Real Estate Activities	13,551						
Professional, Scientific and Technical Activities	7,971						
Administrative and Support Services Activities	17,060						
Education except Public Education	26,906						
Human Health and Social Work Activities except Public Health Activities	12,009						
Arts, Entertainment and Recreation	7,364						
Repair of Computers and Personal and Household Goods; Other Personal Service Activities	1,602						

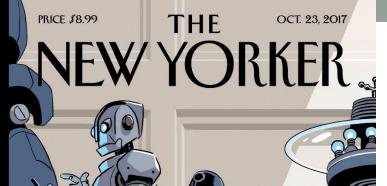
Establishments engaging agency-hired workers?						
Major Industry Groups	Work Done Inside Premises	Work Done Outside Premises				
Agriculture	662	319				
Industry	5,669	1,293				
Services	15,321	3,364				
Total	21,650	4,978				

What services are usually contracted out?

Services	Agency-Hired Workers	Services	Agency-Hired Workers
Security Services	162,453	IT Services	5,544
Production/ Assembly	160,355	Messengerial	5,313
Janitorial Services	66,433	Finance/ Accounting	5,258
Repair/ Maintenance/ Construction	33,134	Data Processing/ Encoding	3,189
Food Service/ Catering	27,600	Medical and Health Services	2,650
Marketing Sales	25,554	Human resource	2,236
Packaging	23,246	Billing/Payment	1,702
Warehousing	17,475	Research and Development	1,510
General Administrative	16,362	Learning/ Training	422
Logistics/ Transport	9,918	Others	42,073
Cashier	9,482		

Conclusion

- Risk of unemployment and income loss for workers has increased with technological change and globalization.
- Technological and organizational changes brought about by FIRe call for a re-thinking of labour policies and laws.



THANK YOU!

