

The link between job quality and innovation: Virtuous or vicious circles?

Karen Jährling (Duisburg-Essen);

Maarten Keune (Amsterdam);

Chris Mathieu (Lund)

ETUI/ETUC *The world(s) of work in transition*

June 2018

Outputs [all available on website: quinne.eu]

• Working papers

- Makó, C. & Illéssy, M. (2015) *Innovation policy review: National and European Experiences*
- Makó, C., Illéssy, M. & Warhurst, C. (2016) *The Evolution of EU Innovation Policy Relevant to Job Quality and Employment*
- Erhel, C. & Guergoat-Larivière, M. (2016) *Innovation and Job Quality Regimes: A Joint Typology for the EU*
- Muñoz-de-Bustillo, R., Grande, R. & Fernández-Macías, E. (2016) *Innovation and Job Quality. An Initial Exploration*
- Muñoz-de-Bustillo, R., Grande, R. & Fernández-Macías, E. (2017) *An approximation of job quality and innovation using the 3rd European Company Survey.*
- Duhautois, R., et al. (2018) *The employment and job quality effects of innovation in France, Germany and Spain: evidence from firm-level data*
- Gallie, D. (2018) *Quality of Work and Innovative Capacity: Implications for Social Equality*
- Jaehrling, K. (ed.) (2018) *Virtuous circles between innovations, job quality and employment in Europe? Case study evidence from the manufacturing sector, private and public service sector*

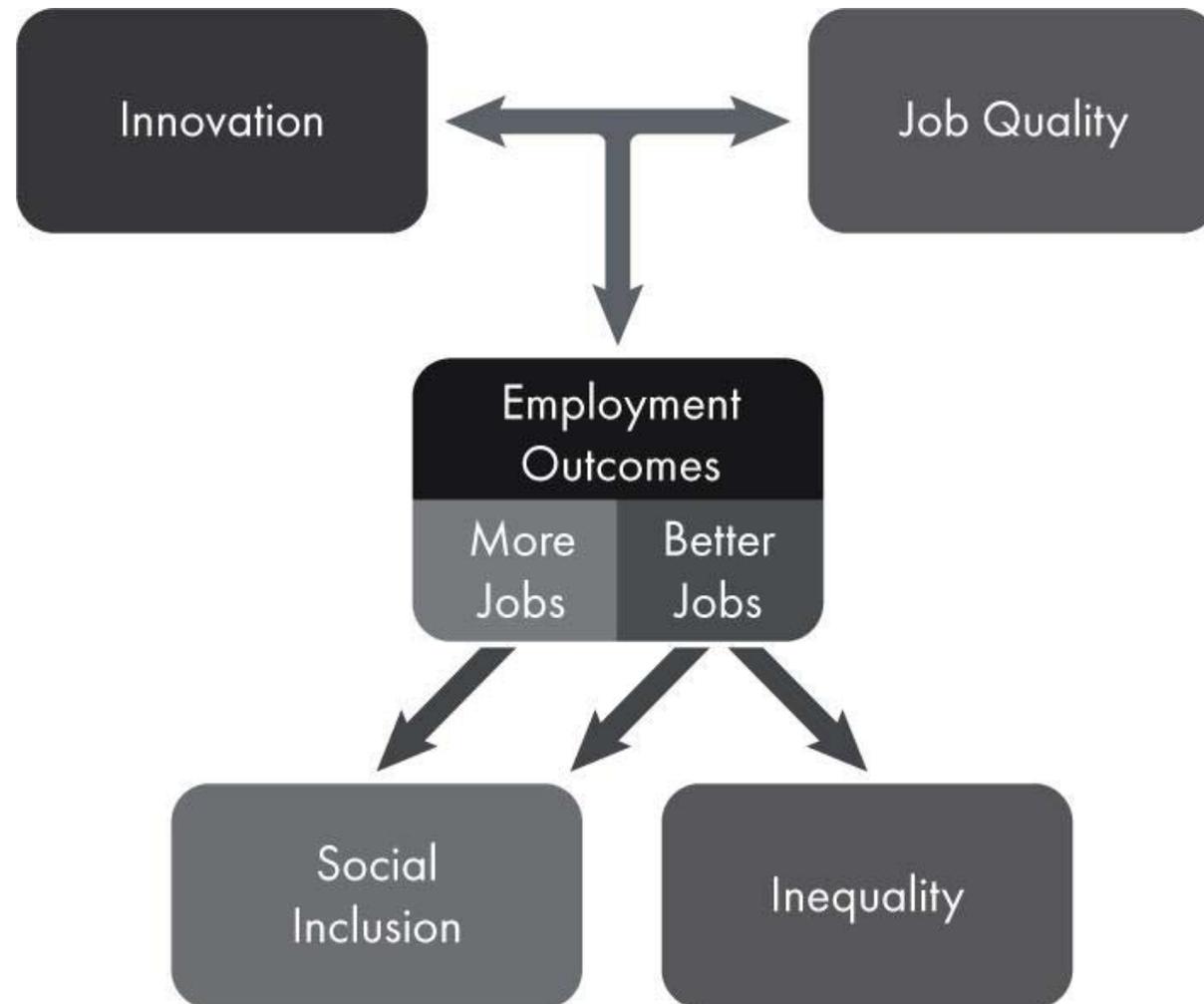
• Tools

- Quinnemap [Diagnostic tool]
<http://tools.quinne.eu/quinnemap/>
- Developmental tool:
<http://178.62.198.40/>

QuInnE investigates mutual relationships

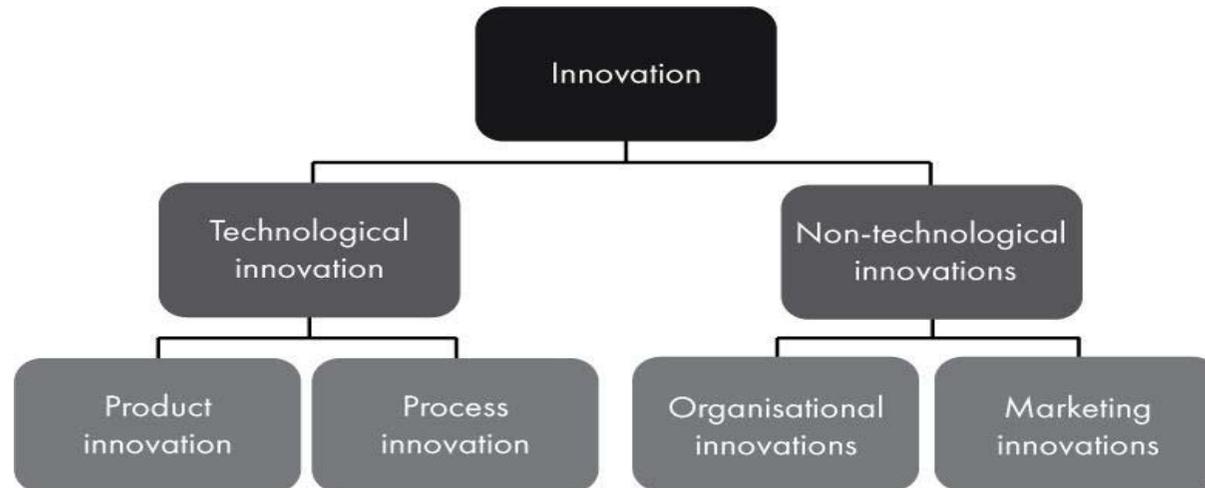
Analytical approaches:

- Qualitative
- Quantitative
- Policy



Innovation

Oslo Manual (OECD & Eurostat, 2005)



- **Product innovation** is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses.
- **Process innovation** is the implementation of a new or significantly improved production or delivery method.
- **Organisational innovation** is the implementation of a new organisational method in the firm's business practices, workplace organisation or external relations.
- **Marketing innovation** is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.

Dimension	Indicator
Wages	Pay level relative to national minimum pay and average for required qualifications
	Pay variability
Employment Quality	Permanent/Temporary Status
	Job Security
	Internal Progression Opportunities
	Predictability of Weekly Hours (Overtime – Zero Hours)
	Presence/Absence Involuntary Long Hour Work (40 +)
	Presence/Absence Involuntary Part-Time Work (<30)
Education & Training	Learning Opportunities on the Job
	Training Incidence
	Training Quality
	Opportunities for General vs Specific Skill Acquisition (Transferability)
Working Conditions	Individual Task Discretion/ Autonomy
	Semi-Autonomous Teamwork
	Job Variety
	Work Intensity
	Health and Safety (Physical and Psychosocial)
	Supervisory Social Support
	Peer Group Social Support
Work Life Balance	Work Time Scheduling (Unsocial Hours)
	Hours of Work (Duration)
	Working Time Flexibility – Personal Control of Work Hours
	Working Time Flexibility – Provisions for Time Off for Personal Needs
Consultative Participation & Collective Representation	Direct Participation re Organisational Decisions
	Consultative Committees-Works Councils
	Union Presence
	Union Decision-Making Involvement

Key Research Questions: General Effects

- Does innovation generally **improve or reduce employment quality** (eg. wages, job security) and the **intrinsic quality of work** (eg. skill, autonomy & working conditions) or are there distinct **effects of different types of innovation**?
- Does innovation have **different effects for different sectors of the workforce**? Does it lead to a levelling up or polarization of job quality between different categories of worker (skill, gender, age, contract status)?
- Does innovation increase **employment opportunities** for those **marginal to the labour market** or increase **barriers** through higher technical, social skill and certification demands?
- Is the relationship between innovation and job quality relatively similar **across countries** or are there **national institutional effects** that condition the outcomes?

1. Macro-level empirical results: an overview

Main results

A positive correlation between innovation and job quality

- Positive correlation is found between technological innovation and job quality at all the levels considered (country, industry, individual)
- Also true for a definition of job quality based on training and learning/task discretion and initiative/job security (Innovation conducive job quality).
- In the case of organisational innovation, the link is weaker, and the effect is non significant in several cases.
- Some other factors influence job quality: individual characteristics (gender, age, occupation/class, level of education); firms characteristics (size, employee representation) → inequalities among workers

1.2 Main results

Country heterogeneity matters

- Four innovation clusters and four job quality clusters → crossed typology (2012, quite stable across time when compared to 2000)
- Generally positive relationship between level of innovation and job quality in country regimes but not always consistent
- Considerable country differences in nature of innovation-job quality nexus that points towards significance of institutional characteristics as source of variation

		Innovation			
		--	-	+	++
Job quality	++				DK FI SE
	+			AT DE IE NL UK BE LU	
	-	ES PL	EL IT PT	FR	
	--	CZ LT LV SK HU		EE	

2. Firm-level analysis and results: the impact of innovation on job quality



Findings: job quality

Effects on job quality (in France and Germany – no data for Spain):

- Job quality effects **more mixed** across countries and vary with the type of innovation.
- In general, effects **more positive for technological** innovation than for organizational innovation; within technological innovation **product innovation** seems to be slightly more favourable to job quality than process innovation.
- In France and Germany, product innovation seems to generate **higher wages** and more **employment stability**, suggesting that firms share the benefits of product innovation with their employees.
- **Results are more mixed for process and organizational innovation:**
 - In France, process innovation impacts negatively the synthetic **index of job quality** and organizational innovation has a negative impact on **wages** and a positive impact on the number of **temporary contracts** (none on permanent jobs).
 - In Germany, process and organizational innovations increase **part-time** employment, which can be associated with labor saving encouraged through the use of short-time working during the GFC. Organizational innovation also seems to increase the number of **low-paid workers**.

Findings: employment

- **Technological** innovation (i.e. product and/or process innovation) has a clear positive impact on employment at the firm level in all three countries.
- This positive effect holds true in the case of **product** innovation in all three countries but also in the case of **process** innovation (France, Spain) and **organizational** innovation (France, Germany).
- The result about **process** innovation is less expected theoretically as this type of innovation casts as labor saving (empirical results are mixed).

Findings: inequalities (skills)

Decomposing by skill (defined by education/occupation as a proxy):

- **Number of higher-skilled workers increases** following technological and organizational innovation; in most cases, no effect or negative effect on lower-skilled workers. In France, intermediate skill occupations' employment does not decrease following innovation.
- **Contradicts polarization thesis** at the firm level and rather **supports the skill-biased technological change hypothesis** and the literature on learning organizations and ICT use, which claims that new technology adoption requires higher skills and is less favorable to low-skilled workers
- **Wages by occupations (in France)**: technological innovation has no significant effect on the pay of managers and professionals but a negative effect on the pay of manual workers (and of technicians and associate professionals for radical product innovation) – however, organizational innovation has a negative effect on the pay of managers and professionals (and no effect on other workers' pay)

Findings: inequalities (gender)

- Decomposing by gender:
 - **Technological** innovation increases employment **for both** men and women in France and Germany (no data for SP)
 - But in France **radical product innovation** increases **male** employment and male gross annual wage only
 - **Organizational** innovation also seems to have differentiated effects by gender: it only increases significantly **women's** employment in France and Germany and has a negative impact on men's wage in France (gender pay gap decreases)

Findings: summary

- Overall positive effect of all types of innovation on total employment
- Rather positive effects of product innovation but more heterogeneous effects of process and organizational innovations on job quality
- Technological and organizational innovations tend to be more favourable to high-skilled (and medium-skilled) workers: SBTC but no polarization
- Radical product innovations seem more favourable to men and organizational innovations to women

3. Case study results: Some key findings

(shedding some light on the results of the quantitative work concerning the « *heterogeneous effects of process and organizational innovations on job quality* »)

Qualitative case studies

	UK	FR	NL	SE	ES	HU	GER	Total number of case studies	Total number of interviews
Manufacturing sector									
Aerospace	1	3		2				6	78
Automotive						3	2	5	34
Agri-food					4	3		7	59
Private Service Sector									
Computer games	2		6	3			3	14	86
Banking		3			2			5	42
Retail Logistics		2	2				3	7	52
(quasi) Public Sector									
Elderly / Home care	3		2			3		8	56
Hospitals				4	2			6	54
TOTAL	6	8	10	9	8	9	8	58	461

The impact of new technologies at occupational level: three scenarios

- **Sc 1: *Displacement*** (occupations replaced by new technologies); some cases, but more often reallocation of tasks and changes in job contents. (Retail log – shops to warehouses [not fully auto] & delivery)
- **Sc 2: *Skill enhancement and job enrichment*** (upskilling “skill biased” T.C); many illustrations of skill enhancement (Aero, Agrifood, Bank, Care, Hospitals...) with some positive impact on JQ; but often more ambiguous:
 - “Age bias” rather than “skill-bias” when new technologies require **new rather than higher skills** => different modes of adjustment, depending also on institutional contexts (e.g. Aero : France: early retirement schemes vs. Sweden: training)
 - What is seen as upskilling may in fact cover a shift from tacit knowledge/ craft skills to codified knowledge/more formalized skills => not seen necessarily by the worker as job enrichment; e.g.: skilled operators on Computer Numerical Control (CNC) machines
 - Codification of knowledge and standardization of procedures may facilitate external flexibility and outsourcing of work activity (i.e. worse employment conditions)
 - IT/CT – communication technologies – allow two-way communication – penetration of the “design” process = better JQ / better innov opportunity (Aero)

- **Sc 3: Digital Taylorism** => de-skilling; reduction in task discretion and autonomy => negative impact on JQ:
 - Some forms of (semi-)automation when full automation not yet profitable => very similar to the Taylorist assembly line; e.g. Logistics: very repetitive tasks, mandatory job rotation (nothing to do with job enrichment) to avoid musculoskeletal disorders
 - New tools to augment human capacities (e.g. “wearables” such as smart glasses; cobots..) But some may in fact rather turn humans in simple “*appendages of machines*” (Marx) => work activity highly prescribed, with some extreme cases where human are “robotized” (waiting for being replaced by robots) e.g. Logistics with “voice picking”; but less extreme examples in other industries (Aero, Automotive..);
 - “Digital monitoring” and “Management by indicators”; widespread across all industries; may concern all occupational levels (i.e. including managers, engineers, professionals – but **resisted in hospitals**); often associated with “lean” organizational principles

But: key finding of our research: no technological determinism: organizational/managerial choices matter

- Both **Sc 2** and **Sc 3** may be found in a given country / industry /even company
- A given technological tool/device can be used quite differently with contrasted impacts on JQ in different industries – by managerial choice. Employee power (via importance to production process, not collective rep) decisive (hospitals; computer games)

Looking for the “virtuous circle”

- **QuInnE** looks for:
- **(1)** *innovation has a positive impact on JQ*
- **(2)** *JQ has a positive impact on innovation*

- “innovative conducive JQ” (Gallie) = JQ (at least some dimensions) as favorable to “innovative workplaces” (OECD, 2010) – i.e. JQ may play positively for both the emergence of innovation and the successful implementation of innovations => the “**virtuous circle**” = **(1) + (2)**

4. Conclusions and recommendations

Conclusions and recommendations

1. Product and process innovation (technological innovation) positive for JQ and employment. **However,**
2. Benefits of innovation vary, and vary by group
3. Innovations often exacerbate inequalities
 1. Technologization often has a male bias; a younger bias; a recent qualifications bias.
 2. **These tendencies need to be tackled directly as innovation does not solve inequality and inclusion - group specific efforts at recruitment, training, career ladders – strategic use of public sector**
4. "No trade-off" between JQ and job quantities : JQ -> Innovation – > jobs
5. Innovation used as an IR bargaining chip (wage moderation = innovation investment = jobs) -> concession bargaining



UNIVERSITY OF AMSTERDAM

Amsterdam Institute for Advanced labour Studies

Innovation and job quality in the games industry

Maarten Keune

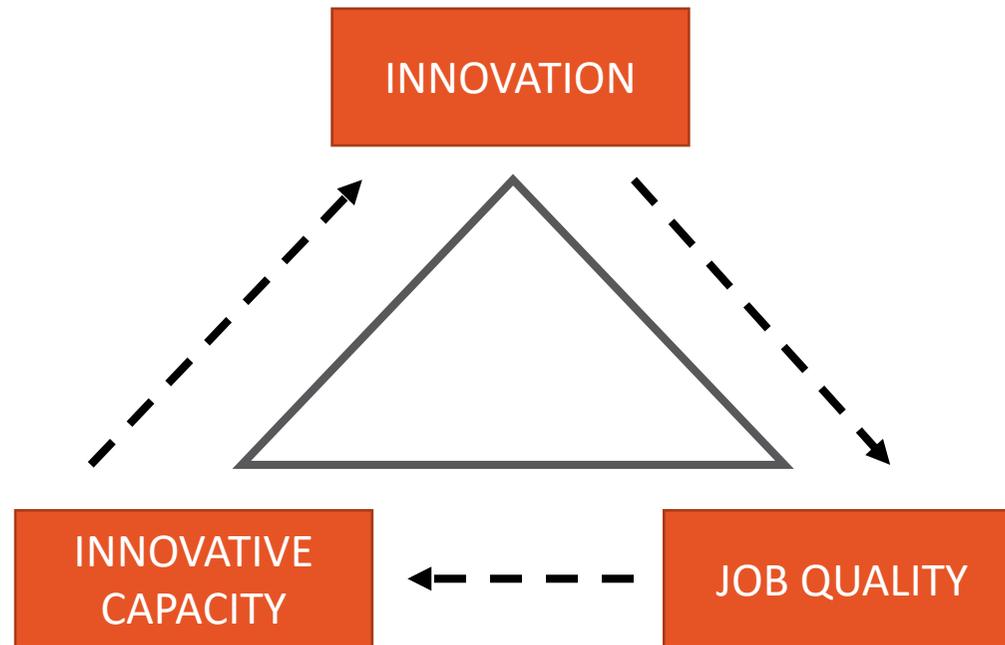


Job quality	Innovation
Wages	Technological
Employment quality (type of contracts, working time, ..)	Product
Skills & training	Process
Working conditions (autonomy, self-realisation, health and safety, ..)	Non-technological
Work-life balance	Organisational
Worker participation & representation	Marketing





A vicious or a virtuous circle?



Characteristics game industry

- Triple A games, massive multiplayer online games, smaller PC and smartphone/tablet games
- Entertainment games and serious or applied games
- Few large companies (MNCs) and many small companies, self-employed
- With external investment and Indie games

- Small but growing industry, innovation at core
- Young white males
- Programmers, designers, artists, audio, ...
- Medium/high skilled work, not always formalized skills
- Project based industry, portfolio labour market



Main questions



- Part of the creative industry, creativity, passion key aspects of work, of innovation.
- How are innovation and creativity organized, managed? Workers have to be willing and able to innovate. But very competitive industry.
- Relationship with job quality? High job quality for high innovation? Or precarious trade-off between privilege to work and low job quality?

Research



- 4 countries: Sweden, Germany, UK, the Netherlands
- 17 company cases, 64 interviews with owners, managers, workers, freelancers
- 26 interviews with industry experts
- Document analysis

Innovation



- Continuous product innovation: new games, new features, new functions. Very competitive
- Process: from linear towards fuzzy product development
- Organizational:
 - Increased use of Agile, Scrum management methods to allow for fuzzy product development and to improve time management.
 - Increased efforts to retain workforce.

Job quality



- Hardly any collective workers' representation. Decent but relatively low wages ("30% below IT"), some exceptions
- Tradition of long working hours and/or crunch periods; low job security, limited access to pension plans, poor WLB, etc. But increasingly improvements linked to size, maturity, ideas.
- Continuous individual learning (desire) and increasing company-based self-learning (time and resources available), sometimes more formal structures.

Worker and freelancer perspective



- Hierarchy of job quality dimensions: strong intrinsic motivation, value first of all the creative aspects of work, are willing to sacrifice on other dimensions, make concessions. “Not in it for the money”
- But over time (house, kids, age), the other job quality dimension become more important for the workers. Innovation should be fostered and rewarded.
- Exceptions wages and collective worker representation?



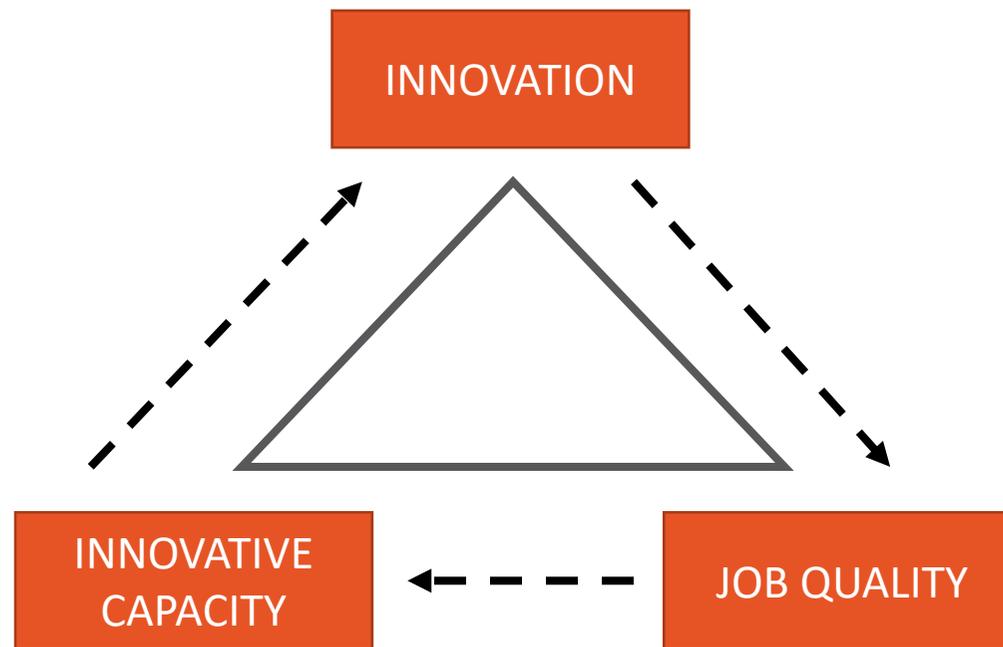
Company perspective



- Recruit creative individuals, offer opportunities to innovate and try to combine this with efficiency.
- Strong bargaining position. Hierarchy of job quality dimensions → possibility to offer low quality on most dimensions. But also strong dependency: innovation depends on workers.
- Product innovation requires organisational innovation. Transition towards more organised, professionalised work organisation to foster innovation. Offer higher job quality on some dimensions. But keep labour costs in check.
- Job quality varies substantially. Depends on size, management ideas, economic succes



Towards a virtuous circle?





‘Digital Taylorism’: What scope for collective bargaining at company level ?

ETUI / ETUC The World(s) of Work in Transition Conference
Brussels, 28 June 2018

Core questions

- How do employers/employees relations, social dialogue, collective bargaining impact on the Innovation-Job quality nexus?
 - Can they influence the innovation process itself, or just its outcomes in terms of JQ?
 - Can they be pro-active, or just passive / reactive, and limited to concession bargaining?
 - Overall, do they make a difference between companies / between countries?

- Retail logistics: Can company-level collective bargaining capitalise on logistics companies as ‚chokepoints‘ in global flow of goods?

Logistics companies: „chokepoints“ in the global value chain?

- Strong employment growth in transport sector, despite high ‚susceptibility to computerisation‘ (Frey/Osborne)
 - EU28: + 8% since 2011; subsector ‚warehousing...‘ + 28%
- Restructuring of global value chains
 - more demand driven; ‚just-in-time; ‚lean logistics‘
 - Higher interdependence of companies in the value chain
- Implications for employees + trade unions
 - Ports, warehouses occupy brokerage position in transport networks;
 - => potential ‚chokepoints‘ (Jaffee / Bensman 2016); => TU can capitalise on increased vulnerability of companies
 - Empirical evidence: „wide variations in how the powerful position occupied by logistics has actually been translated into concrete gains for the workers“ (Sowers 2017)

Warehouses in retail logistics: The context

- high competitive pressures + weak position of warehouses
 - balance of power in favour of retail chains; impose key performance indicators
 - threats from out-sourcing to third-party logistics (3PL) providers + offshoring to 'geo-optimal' locations
 - Flexibility requirements to meet consumers demand; even more with e-commerce
- Technological innovations impacting on warehousing work
 - "Smart warehouses": warehouse management systems
 - Automated processes: new picking devices in traditional warehouses, new (semi-)automated warehouses
- => Vicious Circle: 'Digital Taylorism' / 'Digital Despotism', pioneered by Amazon + Walmart Vicious Circle
 - narrow + repetitive tasks, casualised workforce, high flex requirements, tight performance control + punitive 'incentives'

Influence of collective bargaining?

➤ Research: 6 case studies on retail warehouses in Germany, Netherlands + France

- Employee reps. more involved in the NL and GER than in FR;
- Very low influence on the decision process concerning tech. innovation; more focused on trying to attenuate the negative consequences of innovations
- Different strategies of employee representatives + management, reflect different character of labour relations (adversarial vs. collaborative) + divergent views among unions about desirable outcomes

➤ Two illustrations

- **Illustration 1:** Bargaining over performance levels
- **Illustration 2:** Bargaining over working time / flexibility
- Based on 2 cases: GER-Fashion and FR-Media = Fulfilment centers delivering to shops and e-commerce customers

Bargaining over performance levels

GER-Fashion	FR-Media
Type of performance management / pay scheme	
<p><i>Individual</i> PM scheme bonus for performance exceeding predefined targets (number of items to be picked, packed etc)</p>	<p><i>Collective</i> PM scheme bonus conditioned on profits and collective performance indicators (incl. rate of absenteeism, ...)</p>
Institutional resources for collective bargaining	
<ul style="list-style-type: none"> • Veto-rights on Performance pay • Co-Determination rights on parameters + value of bonus • Colloborative method (REFA) for time-and-motion studies 	<ul style="list-style-type: none"> • Veto-rights on Performance pay • Co-Determination rights on parameters + value • -/

Bargaining over performance levels

GER-Fashion

FR-Media

The REFA Standard performance level is modelled on

- *“..the average worker, that is 1m75 tall, is of prime*
- *“A few supervisors had to learn that if they exert too much pressure, then employees go to the works council, fill in an application that they opt out of the incentive plan, and from the next day onwards they will not be*
- *addressed any more. Then it’s only the employment contract. A few supervisors had to learn that if I want an employee to achieve higher levels than he normally does,*
- *then I have to motivate and not oppress him.” (chairman of work council (DC1), GER-FASHION).*

Bargaining over working time / flexibility

GER-Fashion	FR-Media
Issues of conflict + negotiation	
<ul style="list-style-type: none"> • Hourly volume of part-time contracts (TU: <i>longer</i> part-time) • Way how annualised working time accounts are used (TU: ‚Work on demand‘) • Extension of operating hours (night) 	<ul style="list-style-type: none"> • Introduction of part-time contracts • Annualisation of working hours • Extension of operating hours (night, Sunday)
Institutional resources for collective bargaining	
<ul style="list-style-type: none"> • Legal restrictions on Sunday work • Co-determination rights on operation hours, overtime hours and use of temp agency work 	<ul style="list-style-type: none"> • Legal restrictions on Sunday work • Veto-rights on night work, Sunday work, annualisation of working hours....but more exit / bypassing options introduced

Bargaining over working time / flexibility

GER-Fashion

FR-Media

Strategies and outcomes

- *“..so obviously with the investment in W1, mechanization, they came to see us and said that with everything we invested we could not only work from 8 am to 5pm! So, shift-work. It went very badly: strike movements, refusal to enter the schedules by the employees – no compensation, zero, for adopting the new schedules: 6:00 - 20:00 in two teams” (local trade union delegate, CGT)*

- **Overtime/Flexibility:** management strategies = bypassing co-determination rights by asking employees to ‘voluntarily’ stay home / do overtime hours ;

bypassing option

- **Overtime/flexibility:** Management substitutes overtime hours of own employees by TAW → externalisation of flex requirements
- Staff repres. so far successfully vetoed annualisation

ers

Conclusions (1)

- Divergent views on desirability of outcomes: Part-time work; individual performance pay = **no one best goal!?**
- Different strategies of employee representatives
 - Negotiating (GER-Fashion) vs. Vetoing (FR-Media) = mirror management strategies and longstanding high/low trust regimes...
 - ...but does not result in clear-cut differences in terms of outcomes
 - Individual, yet voluntary and less arbitrary PM scheme in GER-Fashion
 - Less working time flex in FR-Media, due to use of veto power
- → neither collaborative nor veto attitude per se unsuccessful → **no one best strategy**

Conclusions (2)

- Overall: weak position of warehouses also translates into vulnerability of employees
 - Threat of outsourcing, offshoring, redundancies allow employers to bypass + weaken collective bargaining
- Importance of institutional resources to attenuate ‚Digital Taylorism‘ or ‚Despotism‘
 - most improvements require pressure from collective actors
 - ... who are empowered by veto + co-determination rights
 - ... and who vice-versa partly ‚activate‘ latent institutional resources (e.g. individual opt-out of PM schemes)
- Institutional framework may support innovative solutions
 - Laws forcing firms to pro-actively develop improvements
 - pre-fabricated institutional solutions (e.g. employee sharing, FR-Media)
- Problem of exit / bypassing options → different kind of institutional flexibility AND rigidity needed
 - that forces companies to negotiate and at the same time sets limits to concession bargaining