



Digital Technology, Skill Transformation, Work Design and Social Dialogue in the Port Industry: A Contextual Review and Research Direction.

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Abstract

This paper provides conceptual and methodological explorations on the imperatives and the need for researchers conducting workplace study to focus on how to develop and profile innovative workplace practices for effective management at the ports. It also aims to identify the imperatives of conceptual and empirical analysis to support workplace work-design, even in the context of emerging technology and automation in the port industry. The paper which is analytical review and scope study of sea ports in Australia and Nigeria provides insights to understanding the theoretical and conceptual remits of work-design and social dialogue as institutional framework for effective leadership management and innovative work practices at the waterfronts, and how these can enhance productivity and workers well-being at the ports. Institutional framework of Social Dialogue, combined with effective leadership at the port, is expected to provide Management and other stakeholders with opportunities to expand the benefits of port reforms, and the potentials of innovation; even as ports operations are continuously automated with challenges of skills transformation, and how these can ensure decent work at the seaports. Further, the contextual review described in this paper explores the broad understanding of global governance and management of ports reforms, and how to integrate this with the concept of work-design for innovative work practices. In particular, the paper engages with the epistemic understanding of work-design, and how this could further be advanced through Social Dialogue in the port industry.

Keywords: Digital-Technology, Automation, Work-Design, Social Dialogue, Port Industry

Introduction

The analytical insights for this paper resonates with ILO's theoretical and conceptual assumptions behind "Decent Work" Agenda in contemporary workplace, which focuses on the "promotion of full and productive employment and enterprise development; social protection for all, through various ways; including enhancing social protection coverage, and promoting better, safer, and healthier working conditions; improving governance in the world of work and the labour market through promoting effective tripartism and social dialogue to promote

decent work" (ILO's Decent Work 2002, and SDG's #8). This therefore provides the analytical threshold for this paper; to further engage with critical theoretical analysis and conceptual evaluations of "decent work, work-design and social dialogue", (Oladeinde, 2022). This is more so in the context of evolving port automation and containerization, broadly. The research work provides the understanding and analysis of global dynamics of world of work, as the world of work remains fluid, heterogeneous and problematic; even as emerging concepts of work-design and workplace practices of innovation task, activities, relationship and

responsibilities,(Parker, 2014)

Context of the Research: Analytical Background.

Worldwide, the Port Industry has been identified to have the potential to continue to contribute significantly to the economic development of various countries. Improved terminal operations, increased private sector partnership (PSP), as well as efficient cargo handling techniques have been identified to contribute towards substantial improvement in ports' operations all over the world (Turnbull 1996). However, just like other "public-sector" of a national economy, reforms in the operations of the port industry continue apace in the context of "globalization of the transport sector" (Turnbull 1996). Globalization of the port industry has prompted continual and far reaching changes in the ports' operations, generally. Reforms in the industry remain a continuous process, influenced and driven by different circumstances of various countries (Turnbull 1996; Oladeinde, 2022).

Even though the issue of reform in the ports is a world-wide phenomenon, countries adopt different approaches and strategies for the reform. Within the context of the reform generally, "international shipping lines and private operating companies, continue to display a more commercial approach to ports administration, management and operations" (Turnbull 1996). Evidence from ports all over the world continue to show private partnership with the public port authorities, in "developing and managing port facilities, and in the integration of various transport modes that converge at the port i.e sea, road and railway" (Turnbull 1996). These range of port operations defined the commercial orientation and activities of port industry. Commercialization has thus signified a more decisive role for ports operation in both developed and developing economies (Turnbull 1996; Adeleye 2005). The global dimensions of restructuring and reform in the port industry have therefore involved the following roles for the stakeholders; Public-Private roles and partnership, and 'landlords' management of ports. However, these are not without implications for innovative work

practices, employment relations, dock-labour process, and effective leadership and management, and indeed for the future of work, at the waterfront.

Faced with this development, the employability of the workers in terms of protecting what remains of their jobs within the context of on-going reforms have come to represent important workplace practices and employment relations issue for the social partners. The emerging reform processes have raised questions on, for example, the issues of equal access to available work opportunities in the ports, (Oladeinde, 2022). In other words, do workers at the container terminal enjoy similar or more equal secure and better paid work? Do job opportunities shrink? And how are severance and other entitlements being managed at the ports? Indeed, in the context of layers of managerial regimes, occasioned by evolving automation practices that characterized ports operation, innovative work practices issues have also become problematic; tasking the capacity and strengths of the social partners. It is in this understanding that Turnbull (1996) had noted that under the current arrangements of Public-Private Partnership, and landlord administration, new forms of interests' representation and mediation are required in coping with the challenges. As he noted, under the landlord-model of port administration, public port authorities typically lease terminals and other port facilities to private companies. And the implications are there in terms of workplace practices, employment relations and leadership management.

Typically, at the ports, employment relations are segmented into two levels; first, a permanent core of highly skilled operators who are expected to be 'functionally flexible', and also work on shift basis. This form of employment is supplemented by "casuals" or temporary workers who are employed to cover specific, but typically, less skilled tasks (Turnbull 1996). Consequently, differential form of employment relations exists at the ports. Expectedly, these are bound to generate tensions and palpable perceptions of job insecurity amongst the 'casualised' dockworkers in the industry. Employment categorisation into these two levels

could be expected to continuously be a source of workplace tension and confrontation amongst the social partners. While labour reforms may have been acknowledged as significant aspect of port reforms (UNCTAD 1999), the implications remain for the dockworkers. Indeed, an important index for assessing how ports adjust to the reform policies is the quality of labour-management relations, innovative-work practices, and work-life balance, at the ports.

Reforms in the Nigerian Seaports: historical and Institutional Context

As global reforms processes in the port industry remain a worldwide phenomenon, the differences are less obvious, in terms of its neo-liberal logic for commercialization and privatization of ports both in the developing countries and in industrialized nations. Indeed, as noted by Juhel (1999), the same operational challenges confront all ports worldwide. Thus, the institutional context and managerial framework for dealing with neo-liberal imperatives of port reforms are characterised by; reconfiguration of national/institutional port system and development strategies; need for a reform in the legislative, institutional and procedural provisions for port system planning and regulations; re-organization of port management and operational system (Juhel, 1999). The above reform imperatives are global; even in the context of developing countries, and are increasingly driven by the imperatives of innovative-workplace practices at the ports.

Port operations in Nigeria started in 1909s, with the opening of Lagos Lagoon facilities for ocean going vessels. In 1921, the Apapa Port in the South West of Nigeria began with construction of the first four deep water berths (Nigeria Port Authority (NPA), www.nigerianports.gov.ng accessed 12 May 2024). On discovery of coal in Enugu, South East of Nigeria, the Port of Port Harcourt was conceptualized and later opened for port operations in 1913. Thus, port development started in Nigeria to support the economic activities in the exploration and exportation of minerals and crops such as coal in the Eastern part of Nigeria, and Cocoa and Kola from the West, and to support importations

of goods into the country (NPA, 2024).

The Nigerian Port Authority was established as a continuous Public Corporation by the Ports Act of 1954, to address “institutional weakness” identified to have characterized port operations, and to further develop more coherent policy framework for port operations (NPA 2024).

However, in response to neo-liberal prescriptions of commercialization, the Federal Government in 2003 started the process of Public-Private Partnership (PPP) arrangement in the ports management and operations. Accordingly, the Landlord Model was adopted for all the Nigerian Ports (NPA 2023). In line with this policy regulations, 25 Port Terminals were conceded to private Terminal Operators with “lease agreement ranging from 10-25 years” (NPA 2023). Included in the “concession-agreement” was the concept of Build Operate and Transfer (BOT).

Under this new policy arrangement, the Authority ceded some of its functions and responsibilities to Terminal Operators at the Ports. Also, as part of institutional reforms, the former eight (8) ports were reduced to six (6) major ports, with two in Lagos South West Nigeria; Lagos Port Complex and Tin-Can Island Port Complex; and four (4) in Niger-Delta South-South Nigeria; Calabar Port, Rivers Ports, Onne Ports Complex and Delta Ports Complex (NPA, 2023).

Port Reforms in Nigeria and Implications for Dock Labour, Work-Design, and Innovative Management

Within the context and rhythms of work processes and operational activities of the ports in Nigeria, there have been considerable impacts and implications on employment relations and dock-labour processes, especially at the terminals, where the influences of reforms on dock-labour are more immanent. Dock-labour implications of the emerging managerial practices and “containerization” of ports are the scholarly concerns of this research work. In particular the study is concerned with

conceptual framework to understand the lived-work experiences of port workers and their explanations of the innovative work practices regarding the accompanying managerial practices, given the peculiarities of the NPA as State Owned Enterprise within the Nigerian peripheral capitalist mode of production. As a State Owned Enterprise, the NPA contributes significantly to the Nigerian socio-economic development. The analytical remit is thus specifically inspired by the realization that NPA as a “state-capital” does sustain the collective socioeconomic interest of the citizens of Nigeria. This is illustrated in the understanding that NPA remains one of the “cash-cow” of Nigeria “fiscus”. The lived-work experience of port workers in this context; their interpretations, and indeed their orientation as “Dock Labour” remain the analytical focus of this review, and for further research work (Oladeinde, 2022).

It is therefore instructive to further understand the empirical exploration of the dynamics of port reforms and dock labour processes and the managerial practices on work practices and employment relations. In teasing out the implicated dimensions of managerial discourses that surround dock-labour process, the imperatives of emerging technology of port operations and its embedded management dimensions, and implications on dock-labour, employment relations, and workers’ own experiences are analytical focus. Their perceptions and lived-work situations remain instructive for future research work.

The research contexts that provide scope exploration for this research work are the Nigerian Port Authority, (NPA) in Nigeria, and Ports in Australia. The choice of NPA, and indeed our focus on ports in the two countries, as foci of analysis are influenced by several factors: First, for example, in Nigeria, NPA remains one of the most significant and largest State-Owned Enterprises in the economy; contributing significantly to the “fiscus”; and there is a curious duality to this. Reform in the industry, as influenced by regulatory and institutional frameworks reverberates in the port operations generally, and its managerial practices. This has implications on employment

relations and work processes, both at the level of individual workers and the “collective” (Oladeinde, 2022). Secondly, such reforms in port operations influence the future of work at the ports.

Australian Port Governance and Management: towards understanding the regime of Port Reform

As noted elsewhere in this paper, in the last two decades, there have been waves of port reforms across sea ports around the world. Even though reforms could be ‘eclectic’ in terms of their objectives and the forms they took, they indeed shared a common trajectory in terms of influence of “dynamic world economy, characterised by a new wave of globalization of production, transportation of goods and services, and consumption” (Brooks, and Athanasios, 2017). In the wave of globalization, there has been world-wide challenge of improved policy-frame work to support activities at the seaports. Scholars within the International Port Performance Research Network (PPRN) have also identified the need for a ‘precise’ understanding of the dynamics, and the ‘emerging devolution of responsibilities within the port sector, with diverse implications on port governance, management and performance, (Brooks and Athanasios, 2017). Other researchers have now focused on analysing context-specific changes in national port policies; pointing out the regulatory reforms and new waves of governance and models that continue to exert significance influence on the specific nature and dynamics of ports’ management (Gekara 2020).

However, as observed by Brooks and Cullinane (2016), while public authorities, generally, may have had the best intentions in establishing a more commercialized footing for their port operations, the outcomes in many countries had not yet brought the full benefits. Port reforms are complex processes that continuously unfold and adjust, in context-specific dynamics of national reconfiguration of port operations. Port reform processes, port governance decisions in terms of institutional strategies and structures are the

‘inputs’, aiming to produce the best outcomes as embodied in the regulatory framework that govern each port (Brooks and Pallis 2017). However as evidence continue to show, (Brooks and Pallis 2017), there have been noticeable ‘flaws’ in many of the seaports reform processes and outcomes. Authors have noted these flaws in terms of conceptualization and implementation of specific institutional frameworks, which “might possibly produce performance deficits” (Brooks and Pallis 2017).

Given broad and diverse contexts of port reforms at various national policy levels, there are differences in port governance and national institutional frameworks that are contextual and specific to each national environment, strategy, structure and regulatory framework. Australian port reforms and the historical trajectories provide the case study for our review of literature.

In Australia, the latest port reform which started in 2010 (Brooks and Pallas 2017) allowed long-term leasing of port infrastructure to private sector holding companies that have responsibility as the ‘landlord’ for the port. As observed by Brooks and Pallas (2017), the main motivation for Australian Port Reform of 2010 was to raise capital for investment in general land-based infrastructure at the ports. Other researchers (e.g Chen et al. 2017) have also argued that some measures of success may have been achieved through the policy-reform, broadly; that, for example, the privatization of ports may have had improvement in the States’ ‘fiscus’. Others have also alluded to the earlier reform of 1990s to have heralded labour reforms at the ports, improved productivity and efficiency, (see for example, Productivity Commission, 1998; Tull and Reveley 2001; Reveley and Tull, 2008). However, there are still divergent views, as maintained by other researchers, as per the success or otherwise of Australian port reform programs. It is therefore instructive to conduct more evidence-based study of the reforms, with the embedded implications on several thematic dimensions of the reform governance.

Countries adopt specific goals and policy-positions to influence and shape the trajectories of their specific port reform regimes. Broadly,

the underlying policy-guides that influence ports commercialization, and privatization in Australia, for example, are that “any entity that provides port services should operate in commercial environment with market mechanisms” (Chen, Paterman and Sakalayan 2017). Such market principles would entail transfer of full or partial ownership and operations of port terminal operations from public authorities to private sector. It may also entail utilization of private capital to fund port facilities, equipment and systems (ibid).

By way of comparative illustrations; while UK port reforms had demonstrated the experience of port privatization in the 1980s-1990s into a positive direction through the sale of port assets, (Chen et al 2017), most other countries such as Australia have recently started to implement their specific-context and environment-determined port reforms. Policy-directions of port liberalization, commercialization, corporatization, concessions, lease and Build Operate Transfer (BOT), through joint ventures and ‘contracting-out’, characterised the policy-guides of many countries port reforms, after the UK’s experience (Chen et al. 2017). Australian experience has also followed this ‘path-dependence’ since 2010. However, a striking feature in the case of Australian model is long-term leaseholds of port assets to private sector, over a period of 99-100 years (ibid).

The evolutionary processes of Australian port reforms have always been driven by underlying focus of ‘alternative’ approach to full privatization, (as against what obtained in the UK). Thus, a nuanced context-specific analysis illustrates the roles and policy-participations of the three levels of government in Australia i.e the Federal, State and Local Governments; influencing port reform processes and implementations. Before 1980 many of the seaports in Australia were owned by the State Governments. However, there were those owned by private entities (Infrastructure Australia, 2013). Those that were privately owned were bulk-ports. Just as NPA in Nigeria, public port authorities managed port assets, while the private sector ‘mainly’ operates cargo handling and other business activities within the ports.

However since 1980, the ‘path-dependence’ institutional approach adopted by the Australian ports has been characterised by common models, including commercialization and corporatization (Chen 2009). As institutional model and policy direction, commercialization obliged public port authority to apply public sector commercial management practices with a high degree of autonomy (World Bank 2007). On the other hand, corporatization obliged the public ports to transform their business operations to independent, but government-owned entity under the relevant Corporation Acts or similar statutory state legislations (Chen et al. 2017).

In the attempt to improve efficiency in Australian seaports, commercialization policy was further promoted in the 1990s as part of port governance and management structure. This was also in the attempt to ensure reform of corporate governance and ownership of the ports are in line with Corporation Acts (Chen and Everett, 2014). In the emerging context and processes, Corporatization model has been generally accepted by the various State Governments in the reform of their respective ports. Everett, (2009) had earlier identified two types of ‘Corporatization Model’ that existed in Australian port reform processes: one is the Government Owned Company (GOC), registered to the Australian Services and Investment Commission (ASIC); here, the State Minister, just as NPA, Nigeria represents the ownership of the port, and remains liable to the Corporation Act, thereby being accountable to ASIC.

As per the specific governance and management processes adopted by each State, there had been ‘amalgamation’ of individual port with other ports authorities within the State. For example, in 2014, the Government of Western Australia “consolidated eight WA port Authorities into five, to ensure better safety, planning, port development, coordination and economics of scale” (Chen et al. 2017:7). The ‘consolidation’ exercise was to be a ‘pre-cursor’ to full scale corporatization that the ports followed later (ibid); enacting ports as Government Owned

Corporation (GOC) for effective privatization. Even though port privatization had been on for long in Australia, for example, from 2001, the South Australian Port Corporation was managing the ports of Adelaide and others, it was only recently that the model spread phenomenally across other ports and States through the sale of long-term leases of port land and other assets by the State Governments (Australian Competition and Consumer Commission (ACCC, 2024). The Western Australia Government also announced intention to privatize Fremantle port, only to be put on-hold by the Parliament (Chen et al. 2017). Infrastructure Australia (2013); one of the regulatory bodies continue to provide advice both to State and National Governments on the desirability of port privatizations. Generally, port governance structure and processes through privatization continue apace, to further divest port management and governance from public authorities in Australia.

In this review of literature on historical development of port governance and management in Australia, it has been demonstrated that the “unbundling exercises” were of three stages; from commercialization; moving through corporatization into current dynamics of privatization of port assets (Chen, Paterman and Sakalayan, 2016). Major ports in Australia have been privatized.

As noted by Chen et al. (2016), similar transactions model of privatization was adopted by the various tiers of government in Australia in implementing the reform exercise, as exemplified in the policy of long-term leasehold contract with the various private entities. As in the pattern elsewhere, where ‘unbundling exercise’ was implemented, the government transferred major port assets including the port corporation, except land to respective states’ owned holding companies, who then sell to private sector.

Thus, the governance structure in the context of Australian port reforms has been characterised by what is referred to as ‘private/public’, whereby private port companies, being the port authorities and landlords have the right to

manage the ports (ibid). However, the regulatory functions and responsibilities, following the privatization lie with the public sector of governments. The private stevedores are saddled with port operations. Accordingly, Australian port reforms and the privatization model are also in tandem with international trends and practices of reducing government/public authorities' involvement not only in port operations, generally, but also in infrastructure management. The logic, or justification has being to augment 'States-fiscus', to reduce debts, and be able to fund investments in other sector of the economies (ibid).

For comparative understanding, while partial port privatization in Australia has been interpreted as 'alternative' to full privatization of the UK approach, for example; the objective remains the same i.e. to reduce government financial burden on port management and operations (Chen et al. 2016). Thomas, (1994) had noted that the UK government was able to transfer ports 'property rights' to private ownership for commercial business operations, with a 'positive business culture'. However, the Australian experience has not followed the outright sales of ports; private ports did not assume the 'absolute monopoly' over the privatized ports. The State Governments of privatized ports still maintain 'prerogative power' over the ports, through regulatory frameworks and legislative oversights on port policies, via Public Company Acts (ibid).

Privatization of Ports in Australia

In the context of evolving dynamics of Australian port reforms, the privatization processes have been identified to be "complex" as State Governments and other stakeholders embark on it with the specificities and nuances of their respective strategic environment and positions. However, this is under the same national regulatory framework. This section of the paper therefore reviews, with case-study illustrations of commercialization and privatization policies of some selected ports in Australia.

Queensland State: Port Brisbane

Under Queensland State regulatory agency, privatization model started with Port of Brisbane Corporation (POBC), and this commenced with "a sale of a 99-year lease over the port to the private sector" (Chen et al. 2016). The process had entailed the transfer of all port facilities, equipment, and machinery, all employees and operating rights to the newly created State's Government Operating Company; the Port of Brisbane Pty Ltd (PBL) (Port of Brisbane 2016). This arrangement has involved granting a 99-year lease over the port to PBPL, for management. However, the shares regarding this arrangement were later in 2010, sold to Queensland Port Holding (QPH) (ibid). The Port of Brisbane was thus, the first Australian port to be managed by a private equity consortium.

New South Wales: Port Botany, Port Kembla and Port of Newcastle

Prior to 2013, most of the ports in New South Wales were State's Governments-owned, while the port of Newcastle and Port Kembla were regional ports, (Everett, 2009). On the other hand, Ports of Sydney (Sydney Harbour and Port Botany), which are capital city ports, are managed by Sydney Ports Corporation. (ibid). Newcastle Port Corporation and Port Kembla Port Corporation were both under the Port and Maritime Administration Act, 1995, (Everett, 2009). Generally, under the privatization arrangement, these ports leased terminal to private stevedores for cargo handling operations (Chen et al 2017). Thus, in 2012, NSW Government passed Ports Assets (Authorised Transactions) Bill 2012 to "authorise and facilitate the transfer of the State's ports assets of Port Botany, Port Kembla and the Port of Newcastle to the private sector (Chen et al. 2017). These initiatives tagged 'recycling of infrastructure assets' aimed at raising funds through Public-Private Partnership (PPP). After this exercise and arrangements, NSW Government, later in 2014, reviewed the exercise, and subsequently merged the Port of Sydney, Port Kembla and Newcastle Ports Corporation into a State's owned Corporation, functioning as Port Authority of New South Wales (Chen et al 2017). Under the new

arrangement, Port Authority of New South Wales has multiple roles; it is responsible for the regulatory functions of the three merged privatized ports; and performing regulatory and land-owner functions for Sydney Harbour, Ports of Eden and Yamba (ibid).

Port of Fremantle: Western Australia

Unlike the Port of Queensland and NSW Ports, described above, the Government of Western Australia had initially rejected both the privatization and corporatization models, instead opted for a strategy of commercialization (Everett and Robinson 2007). Under this model, Fremantle Port “retains statutory authority status” with major control over trade activities at the port.

Towards Integrating Innovative Dock-Work Practices with Work-Design at the Ports: Models for Analysis and Understanding

While extant literature on work, technology and automation in the workplace has largely focused on impact of technology on employment, and how employment has been disrupted by technology, scholars are increasingly focusing distinct attentions to how technology has indeed impacted and influenced workforce, with implications on several dimensions of world of work, such as safety, and well-being at work (Parker and Grote 2022; Parker, Trezise, and Thomas, 2024). Indeed it is argued that as digital technology transforms work, and work processes in modern organisation, skills required by the workers are to be re-designed and transformed, for them to be able to take on different skills, and to ‘profile’ them for future work demands, and challenges.

Increasingly, digit-technology continues to shape workplace ‘skill-ecosystem’ so much so that skills required by the workers in the port industry must be ‘reconcilable’ with the changing dynamics of port operations and technologies. For example, analysts are increasingly concerned with changing skills-ecosystem in the port industry as a result of digit-technologies and automation; with a focus on how this has transformed port operations work and what is going to be the nature and dimension of work and the imperatives of ‘new skills’ (

Geraka, and Fairbrother, 2013).

Thus, in this section of the literature review, we shall be engaging with analytical insights of ‘core relevance’ of work-design as model of analysis for work organisations to be able to cope with the impacts of digit-technologies on work; with a focus on innovation, workers safety, well-being, and job performance (Parker, and Grote, 2022). Therefore, in utilizing much of the analytical remits of ‘Work-Design’ (ibid), this section engages the model as potential ‘interventions strategies’ and options for work organisations to achieve both the ‘ethos and practices’ of innovation at workplace.

As modern organisations continue to embrace technology and automation, there are concomitant challenges regarding what is referred to as ‘varieties of job content and resources’, and these are characterised by job control and autonomy, skill-use, job-feedback and relational aspects of job (Parker, and Grote, 2022). These job characteristics have been identified to have far-reaching implications for the workers and how they thrive at work. Even as influence of technology remains critical to the success at work, with the embedded diverse implications, literature has shown the resilience of ‘intervention strategies’, driven by work-design principles to enhance the varieties of job-content for workers’ optimal performance.

As observed by Parker and Grote (2022), four intervention strategies could be demonstrated to have the potentials to aid in the understanding, and application of conceptual relevance of ‘work-design’ programs in the context of technological transformation at work. First, in making the choice about work-design in the context of the challenges, ‘actors’ (Management and workers) should be proactive in considering various options for job-optimization. Second; work-design process should be ‘human-cantered’, with considerations of the ‘agentic’ imperatives of work and workers own interest, perceptions, and expectations. According to the authors, such decisions and choices for work-redesign should be strongly aligned and influenced by macro-level policies of national institutions and framework. With profound implications of

technology on the world of work, the national institutional macro-level policies also influence the type and nature of training and development that should align with ‘specificities’ of organisation’s work- design template in ‘up-skilling’ the employees, for example.

As work intensifications continue to characterise the technology of production in the workplace, the need to redesign tasks, jobs ,and work processes in line with ‘agentic-orientations’ of the workers and tech-demands has also become imperative. ‘Work-design’ perspective, therefore, resonates here, on how tasks might best be ‘shared’ between human and machines, in the circumstance of technology and job automations (Parker, and Grote, 2022: 1173). Thus, in a more insightful illustrations and understanding of work-design model, emphasis is laid on why work should be ‘structured’ for positive outcomes in the interest of both employees and the organisation (ibid). As noted by Parker, and Grote, 2022; Parker, 2024), the ‘reality’ of contemporary work organisation is the current inevitability of technology, and technology- enabled changes that affect work processes and hence work-redesign. In other words, if workers’ competencies, skills, values, needs and expectations remain ‘normative values’ in enlisting their involvement for performance, work processes must therefore be redesigned in the light of multiple challenges of digit-technology in the workplace. As a normative factor influencing the specificities of work-design for improved performance, rapid application of technology and automation in modern workplace must equally be ‘encultured’ within the specific organizational socio-institutional context.

‘Proactivity’ should therefore be the hallmark in decision-making to redesign work in line with the challenges of digit-technology. In combining this with ‘human-centric’ approach, the organisation is potentially on the right track to stimulate the much needed organisational performance, while also fulfilling the long-term desires of the workers (ibid). As job-tasks and work processes are continuously automated, indicating intense relations between humans and technology, paying distinct attention to ‘agentic-

dimensions’ becomes instructive; an agency that is not under the ‘absolute grip’ of technology, but with multi-level skills, competencies, identities, and ‘collectivity’ in coping with challenges of technology and production, (Oladeinde, 2011). This instructive observation is important in the process of evolving context-specific work designs for the workers. Thus, the normative praxis of ‘socio-technical nexus’ between machine and humans, remains important, even as automation in the workplace equally remains profound (Clegg 2000. cited in Parker and Grote 2022). The problematic of how to ‘steer’ workplace technology with its associated challenges toward future directions of work remains a concern in the process of designing future work in contemporary organisations (Parker, Morgueson and Johns 2017a, cited in Parker and Gorte, 2022). However, as observed by Coovert and Thompson (2013), the nexus between workplace technology and how to design work should not be construed as ‘uni-linear’ or ‘deterministic’, as the contours could be shaped by other contextual attributes such as managerial choices and the type of technology adopted, the skill-levels of the workers and the prevailing organizational challenges.

Hackman and Oldham (1976), had earlier proposed ‘Job-characteristics model’ in understanding job content and task performance. Teasing this model further, Parker, Morgeson and Johns (2017a) argue that the impacts of technology on work-design can significantly combine both positive and negative attributes. For example, as noted by Parker and Gorte (2022), job enrichment through job autonomy, job-control and feedback, and role-clarity; all potentially have positive impact on work and work-design. This is more enhanced through positive social relations and workplace social context. With such model of analysis, Parker et al. (2022), argue that these attributes at work, combined; provide worker with ‘courageous initiative’ and freedom to control and manage aspects of tasks that could secure his employability and job performance. Ability of workers to be proactive at work stimulates discretion and autonomy to manage ‘variances’ and ‘potentials’ associated with work-design

processes. Arguably, when workers are motivated to exercise both 'programmatic' and 'pragmatic' involvement in the specific tasks they perform, they tend to be interested to co-design work with management.

While stressing the importance of socio-technical factor in influencing flexibility at work, Parker, Van de Broeck and Holman (2017 a), had argued that 'technology-use' alone does not always lead to 'better work-design'; noting that there are other factors which are 'context-determined', such as institutional regimes, ideologies and orientations of the management, and the 'social processes' of the workplace; as co-determinants of autonomy and better work-design. Thus, when workers, in the entire context of workplace, perceive a sense of empowerment, arising from job-autonomy and flexibility, processes of acceptable work-design are enabled.

Digital Technology and Work-Design

Evidence-based research and analysis to support work-design model, has shown that a well-designed job involves doing varied, meaningful tasks with emphasis on peoples' skills and competencies. This has long been demonstrated in the work of Hackman and Oldham (1980), for example. More contemporary analysis has also shown that work characteristics such as task variety, skill variety, job complexities, job challenges, task significance and task identity (Parker, and Gorte, 2022) profoundly drive the motivation of workers to identify with 'work-design' innovation at work. This is more so when the type of technology adopted at the workplace allows greater opportunity for workers to engage in skilled and meaningful tasks. Job enrichment through job autonomy, combined with appropriate and context-determined technology, which proactively encourages opportunity for decision-making for workers do also, potentially enhance work-design. In this understanding, it is argued, there must be role-clarity and task-identity with a job, even within the context of particular complex technology adopted in the workplace. Thus, technology on skills are not 'deterministic', but are shaped by workplace dynamics that are context-specific as influenced

by managerial choices.

'Sociocultural' dynamics at work influence workers in their 'agentic-orientation' at work, and work processes. In other words, social context, social support and interdependence do influence commitment at work and other affective outcome such as efficiency and improved work performance. Parker, Jonhson, and Nguyen (2013) had also argued that, even though the impact of technology on social processes of work might vary, technology enhances coordination and enables stronger connections among workers. The broad import of this understanding for work-design strategies is that the 'social-connective' and 'collective at-work', among workers influence positively the process of work-design. It remains instructive for researchers, therefore, to look beyond 'technology-determinism', in accounting for factors that might further influence and shape 'work-design project'.

In this conceptual framework, several 'core-connections' between the impact of technology on work-design with diverse implications on the human-agentic interface between work and technology have been drawn to illustrate the need for researchers to pay distinct attention to human-centric principles on the development, design and implementation of specific, nuanced relevance technology. Indeed, as noted by Parker and Gorte, (2022), workplace stakeholders. i.e. workers and managers should be proactive in engaging with all relevant factors in designing specific organizational-relevance work-design that meet the needs of the workers and the organization.

Future-work technology will continue to challenge workers for improved education and skill- competencies, to foster their adaptability to the imperatives of new technology in the workplace. Organizations should therefore focus on skill development and cultivation of life-long learning as imperative strategies, not only in work design, but also in building the acceptability of the entire workforce. Work-design remains a core project and process to move workplace technology forward.

Automation at the Waterfront and Implications for the management of Dock-labour

This section of the paper provides an empirical overview and illustrations of the global dynamics of dock-labour in the context of container terminal automation. It provides an understanding of how dock-labour processes have been automated in selected sea ports of the world. Empirical evaluations of impacts of automation at seaports on ports performance, safety at the ports, training and development, illustrate dock-labour dimensions. Policy issues associated with evolving dynamics of port automations also remain instructive for empirical analysis.

As demonstrated above, the specific specializations of different roles of ports, their geographical locations, sizes and specific policy-guides of reforms influence the extent of automation and therefore port performance. Indeed, just as capital costs are associated with port reforms and automations, dock-labour challenges are also implicated. In most specific situations of port reforms, where machines tend to replace port-labour, dock-labour issues are also nuanced and context-specific. Safety and health, training and development of dock-workers, and employability issues are more pronounced. While processes of automation at water-front may appear beneficial in terms of improved terminal operations and performance, issues of dock- worker safety and health remain for further research engagement and study, and for empirical data analysis.

Automotive innovations in handling terminal operations at the ports are bound to yield mixed evidence in terms of productivity and workplace managerial practices on dock-labour. Within the overall context of this review of literature, it is argued that port automation projects and containerizations, are often the sources of 'workplace social tensions' (OECD/ITF 2021). This is the case when 'benefits' of port automation are not well-spelt out for the understanding and full participations of all stakeholders; thus creating tensions between management and dock-labour unions, for example. Also, 'polarizations of positions'

between employers and employees in instances of automation tend to generate 'social conflicts' at the water-front (OECD/ITF 2021). Situations where unions, port authorities, and operators 'pitch positions' over the over-all projects of automation, 'constructive participations' could be undermined. On the other hand, where the stakeholders share the ethos of 'constructive participation', shared benefits are noted in terms of wage-increases, early retirement arrangements for older workers, and redundancies management (OECD/ITF 2021).

Therefore, the 'social costs' of port automations remains not just scholarly relevant in the context of evolving dynamics of globalization and containerizations of ports operations across various seaports, but also a potentially invaluable policy-uptake for stakeholders in terms of relevance of the research outputs. Social costs such as social security expenditures, in cases of redundancies, 'welfare benefits-foregone' (where machines replace port workers), are cases to illustrate potential issues of concern to stakeholders (OECD/ITF 2021).

Port Automation and Social Relations at the Port

Worldwide, projects of port automation potentially provoke significant social conflict at the ports. For example, in United States and Australia, projects of port automation have been identified (OECD/ITF 2021), to often resulted in opposition from trade unions, resulting into 'blockages' and strikes in the ports. Social conflicts are often related to 'unclear articulation' of costs and benefits of intentions and actions among actors. This could be problematic to 'social relations' at the ports. When the benefits and costs of management's initiated projects are ambiguous and unclear, unions could interpret automations as a 'ploy' by the management to undermine them (Oliveira and Varela 2017). Unions' 'pushbacks' or strikes may give opportunity for the management to act 'strongly' on automation projects without sufficient considerations to unions. On the other hand, there could be less labour conflicts if the prospects of automation projects are mutually raised and shared in principle, 'ex-ante'

(OECD/ITF 2021). Polarisation of position between employers and dockworkers may result from cases of 'forced automation', or automation projects where workers' concerns are not initially considered by employers. In cases where social costs of automations are constructively negotiated, potential social conflicts are minimized at the ports.

Indeed, when mutual trust is earned by management through 'constructive discussions' i.e. social dialogue, unions can help automation projects to advance, and therefore avoid deadlocks. This happens when unions are seen, and see themselves as 'legitimate partners' in automation projects. This is often achieved through 'tripartite governance structure'; with 'co-responsibility' for decision-making. Where such decisions are co-responsibly arrived at, benefits of automation would be shared with workers. Such benefits can take the form of wage or allowance increase, early retirement programs for elderly workers or other benefits as a form of 'package' negotiated, with the introduction of automation (OECD/ITF 2021). Automation could therefore be more attractive and well accepted by workers if they have a clear sense and understanding of the productivity gains. An empirical illustration of this was at the Container Terminal Altenwerder, in Hamburg, where worker's pay was linked to the over-all productivity gains from automation (OECD/ITF 2021).

Conclusion

In this Paper, attempts have been made to review literature; conceptual and empirics, on ports reforms, broadly, automation and skills transformation at the ports, and implications on innovative work practices and decent work. The resilience of the concepts of Work-Design and Social Dialogue is brought into analytical focus; providing imperatives for further research work on strategic management and work-innovation in the port industry. Imperatives of work-innovation and social dialogue with distinct attention to their merits as analytical relevance are engaged in understanding the dynamics of port reforms, globally. Theoretical and conceptual merits of the frameworks and their

justifications for further research are particularly instructive in the context of global challenges, dynamics of automation, skills transformation, and digitalization; with implications for future work at the ports, world-wide.

Attempts have also been made, to introduce and integrate the conceptual frameworks of social dialogue and work-innovation, as imperatives toward seaports work-innovation; to demonstrate to the Social Partners in the industry, the positive features of Social Dialogue and work-innovation, and through empirical review, enumerate enabling conditions that facilitate effective working of Social Dialogue and Work-Innovation for Decent Work at the ports.

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References

- Adeleye, I.L. 2005, Contesting Globalization: Nigerian Waterfront Industrial Relations and Trade Unions Strategies after 1999, Unpub. MSc Dissertation, Cardiff University
- Baird, A.J 2002 "Privatization Trends at the World's Top-100 Ports" *Maritime Policy and Management* 29 (3)
- Beynon, H. 1972 *Perceptions of Work: Variations within a Factory System*, Great Britain: Cambridge Press.
- Blyton, P.; Turnbull, P. The Dynamics of Employees Relations, (Houndmills, Palgrave Macmillan.
- Bottalico, A Vanelander, T. Verhoera, P., 2022 Innovation and labor in the port industry: A comparison between Genoa and Antwerp WILEY Special Article
- Bottalico, A., 2017 Towards a common trajectory of port labour systems in Europe? The case of the port of Antwerp Case *Studies in Transport Policy* ELSEVIER
- Bottalico, A. 2019 Towards the mapping of

- port labour systems and conflicts across Europe: a literature review *Work Organisation, Labour & Globalisation*, Vol. 13, No. 1 (Spring 2019), pp. 130-154.
- Chen, P., Pateman, H., and Sakalayan, Q. 2016 The Latest Trend in Australian Privatization: Drivers, Processes and Impacts. *Research in Transportation Business and Management* ELSEVIER
- Evans, A.A. 1969 Technical and Social Dialogue in the Worlds Ports, Geneva, ILO Fajana, S. 2005 Industrial Relations in the Oil Industry in Nigeria, ILO Working Paper.
- Fairbrother. P., Gekara. V., MacIntosh, M., .2012. "Globalisation, Changing Port Ownership and Implications for Labour". *Global Work and Employment Relations Research Group*, School of Management, RMIT University, UK
- Gekara, V.,Nguyen, T., 2016 New technologies and the transformation of work and skills: a study of computerization and automation of Australian container Terminals *New Technology, Work and Employment* 33:3
- Gregor, G. 2000. "What About the Workers? BPR, Trade Unions and Emiseration of Labour" In David Knight Hugh Willmott (eds.) *The Re-engineering Revolution-Critical Studies of Corporate Change*, Sage Publication, London.
- Helmut Deecke and Dieter Lapple 1996. "German Seaports in a Period of Restructuring". *Tijdschrift voor Economische en Sociale Geografie* Vol 87 no 4
- ILO, 1995 Social and Labour Effects of Structural Adjustment in the Port Industry of Selected Asian and Pacific Countries, Report of the ILO Regional Seminar, Pattaya, Thailand (Geneva).
- Katsarova, I. 2013. "Liberalisation of EU port services: issues and consequences for dock workers" *Library Briefing; Library of European Parliament*.
- Knights, D. and Willmott, H. 2000 (eds) *Re-engineering Revolution: Critical Studies of Corporate Change*, Sage Publications Ltd.
- Klenner, F., & Parker, S.K., 2021 Designing SMART Team-Work: How Work Design can Boost Performance in Virtual Teams. *Organizational Dynamics* (50) 1, 100841
- Marc H. Juhel 1999 "Global Challenges for Ports and Terminals in the New Era". *Ports and Harbours*
- Muhammad, M. 2003 "Power, Subjectivity and Strategies of Resistance: The Case of Acme School". *Journal of Critical Modern Organization Sciences*, Vol. 2
- Notteboom, T., Vitellaro, F. 2019 The impact of innovation on dock labour: evidence from European ports. *Electronic Journal of Management*
- Olusegun Oladeinde 2011 Management and the Dynamics of Labour Process: Study of Workplace Relations in an Oil Refinery, Nigeria, Published PhD Thesis.
- Oladeinde, O. 2022 "Decent Work in the Port Industry-Resilience of Social Dialogue: A Scope Study with Related Analysis" Vol. 28 (4) 1-13. *Journal of Scientific Research and Reports* ISSN:2320-0227.
- OECD/ITF 2021 Container Port Automation: Impacts and Implications: Case-Specific Policy Analysis.
- Sharon .P., & Jurrisma, G., 2020 Good Work Design for all: Multiple Pathways to making a difference. *European Journal of Organizational Psychology*
- Sharon, P., Grote, G. 2022 Automation, Algorithms, and Beyond; Why Work Design Matters More Than Ever in a Digital World *Applied Psychology*
- Sharon, Parker, Grote, G. 2023 More than 'more than ever': Revisiting a work design and sociotechnical perspective on digital technologies *Applied Psychology*
- UNCTAD, 1995, Comparative Analysis of Deregulation, Commercialisation and Privatization of Ports UNCTAD Geneva
- Taylor, G., McDonald, M, 2023 In practice and in principle: 'Free market' discourses and container port reform in Australia. *Competition & Change* 2024 Vol.28 (1)
- Thompson, P. and Ackroyd, S. 1995 "All Quiet on the Workplace Front? A Critique of Recent Trends in British Industrial Sociology" *Sociology* 29 (4) London: Sage Publication
- Turnbull; Wass, V. 1995, Reforms and Structural Adjustment in the Worlds Ports: the Future

- for Labour and the Unions London (ITF).
- Turnbull, P. 1995, "Port Workers Unions Response to Structural Adjustment in the Asian/Pacific Region": The Results of ITF Survey (London, ITF).
- Turnbull, P. 1996, Port Workers and Privatization, unpub. Paper, University of Leeds
- Turnbull, P. and Barton, H. 1999. "Labour Regulation and Economic Performance in the European Port Transport Industry": Report of Research Activities and Results.
- Vaggelas, G., 2020 Port Labour Challenges and Opportunities in the Era of Port Automation and Digitalization Arab Academy for Science, Technology and Maritime Transport
- Veggelas, G., Leotta, C., 2019 Port Labour in the Era of Automation and Digitalization. What's next? Electronic Journal of Management