

**The lean labour process:  
Global diffusion, societal effects, contradictory implementation**  
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## Introduction

In the 1930s, engineers at Toyota began to work on adapting Fordist mass production to the conditions in Japan at the time: a small market that could not justify huge volumes with dedicated machinery, coupled with severe resource constraints. Their goal was to develop a production system based on lower volumes with low inventories. Toyota didn’t implement its first compete just-in-time system until 1958, and was not able to fully debug its *kanban* (continuous flow) system until 1962, after which it was adopted companywide (Tolliday 1998). Core elements of what became the Toyota Production System were widely adopted across Japanese industry, although companies such as Nissan, Honda, NEC and others adopted the practices selectively and integrated them into their own systems (Boyer 1998; Freyssenet et al. 1998; Kenney and Florida 1993).

By the 1980s, the Toyota Production System had been codified into a production standard that had diffused far beyond Japan, divorced from Japanese HRM practices such as lifetime employment. This model was dubbed “lean production” by MIT researchers because it uses less inventory, labor and space than traditional Fordist manufacturing (Krafcik 1988). The core production model includes just-in-time production (demand-driven, flow production with low inventories), waste elimination, teamwork with employee involvement, and continuous improvement. By the end of the 1990s, lean had become the predominant model for manufacturing across the globe (Elger and Smith 1994a; Kochan et al. 1997; Oliver and Wilkinson 1992) and subsequently has spread into services, including healthcare and education.

Now, there are a range of specific lean practices that are variably emphasized across sectors, such as takt time (common in auto assembly, uncommon in metal fabrication shops), cellular layouts (common in metal fab shops, uncommon in auto assembly), *heijunka*, quick changeover and others. But the core model of just-in-time production, waste elimination, teamwork and continuous improvement has diffused broadly, including specific practices such as value stream mapping, *kanban* pull systems, 5-S standardization, and *kaizen* problem solving.<sup>1</sup>

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<sup>1</sup> Takt time is the rate at which products need to be produced to fulfil customer demand, and is defined as total demand divided by available production time. Work flow under lean is, when not using an assembly line, organised into product-focused layouts which contain all the operations needed to finish a product in the same location, to achieve continuous flow. These layouts are variously called cells (US and UK), U-shaped lines (Japan), flow groups (Scandinavia) or production islands (Germany). *Heijunka* refers to level scheduling to smooth production flow. *Kanban* is a form of production control linking upstream operations to downstream ones via a signal card or container. *Kaizen* means continuous incremental innovation, and often takes place in offline problem-solving groups or quality circles.

In this chapter we discuss the global yet uneven diffusion of lean production, the effects of national institutions in shaping the diffusion process, and the contradictory pressures facing managers that lead to further variation in how the lean model gets implemented across organizations.

We suggest that there are three accounts of diffusion. First, there is what can be called a prescriptive and universalist approach, which takes lean as the one best way, akin to earlier management methodologies, such as Taylorism and Fordism. This view assumes an inherent and plain advantage to lean such that firms will be forced, out of competitive survival, to adopt this model (Kochan et al. 1997; 2004; Liker et al. 1999; MacDuffie and Pil 1997; Oliver and Wilkinson 1992; Womack et al. 1990). Scholars in this group have shown that a core lean production model can be widely transferred across national institutional contexts, independently of Japanese HRM practices, without a negative impact on performance. Critically, this view sees best practice as requiring a complementary package of lean practices, and thus it predicts broad convergence in work organization as the world-class production model diffuses across countries and sectors.

The strength of this view is that lean has in fact been adopted across the globe in manufacturing and other sectors, with leading corporations, industry associations and consultants all pushing a nearly identical model of lean consisting of complementary practices intended to be implemented as a package.<sup>2</sup> Problems arise, however, in assuming that the broad agreement on this complementary package of lean practices will necessarily translate into its universal adoption. Such a view discounts both the role of institutions (both formal and cultural) and labor process dynamics. This view fails to provide much purchase on the reality of institutional and organizational diversity.

Second, and in direct conflict with the above approach, there is what can be called an open and contingent method, which considers diffusion not as a standardising force, producing the same effects everywhere, but as a force that fits into pre-existing divergences between industries and countries, and as such reproduces continued divergence through adaptation and hybridization (Boyer 1998; Freyssenet et al. 1998; Mishina 1998; Tolliday et al. 1998). Such hybridization is seen as (a) a source of innovation and (b) inevitable, given the need for a production model to fit into distinct institutional contexts. It assumes country (and sector) institutional factors are deeply embedded, robust, diverse and not vulnerable to a radical conversion into a standard model. Hence lean, like all production models, is an open, promiscuous concept.

The advantage of this approach is that it takes seriously the power of institutions across sectors and societies to continue to produce meaningful differences, not just in HR and social outcomes, but also in the evolution of models as they are adapted to fit local contexts. But it overestimates the innovative element of diffusion and fails to appreciate the extent of imitation within organizations. It cannot easily explain the global diffusion of a universal model of lean.

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<sup>2</sup> On the institutionalization of a single, detailed model of lean production as widely agreed best practice in the US, see Vidal (2017).

Third, there is the approach we adopt here: a system, society and dominance framework, which breaks down the sources of adoption and resistance to production models by separating three forces (Delbridge 2003; Elger and Smith 1994b; Smith and Meiksins 1995; Vidal and Hauptmeier 2014). System effects are those that are common to all capitalist societies, most importantly competitive pressures to extract surplus labor, increase efficiency and realize profit. These are forces for convergence. Societal effects refer to the national institutional differences – both formal and cultural institutions – that make societies unique and shape the diffusion process. These are forces for divergence. Finally, dominance effects emerge as leading firms and societies develop production methods that are perceived as best practice and as such widely imitated. Dominance effects direct our attention to the active agencies of diffusion (leading firms, associations, consultants) and to institutional sources of convergence (reputation effects, imitation due to uncertainty) that complement system effects.

Applying this framework, lean contains the three elements. The dominance effects of Toyota, Japan and a universalized model of lean production emerged in opposition to other dominant models (e.g. the sociotechnical systems/Volvo model of self-directed teams, the German model), challenged them and became crowned as global best practice. The system effect of capitalist accumulation, valorization and profit pressures highlight continuity with Fordism and Taylorism and help explain the durability of lean as global best practice despite the protestations of contingency theorists that there is no one best way. Society effects highlight the continuing imprint of national institutions on how the universal model of lean gets adapted. For example, in countries with powerful unions and robust vocational training systems, lean tends to be implemented with more highly skilled workers and/or substantive forms of worker participation than at Toyota or in Japan more generally.

Critically, despite the wide diffusion of a universal model of core lean production practices, there remains extensive variation within countries and sectors. This variation is produced by labour process dynamics, including managerial orientations, workforce orientations and organization, and resulting forms of negotiation and accommodation (Smith 2015; Thompson and Smith 2009; Thompson and van den Broek 2010).

Here we emphasize the contradictory pressures managers face regarding whether to empower their workers to engage in decision making and problem solving (Adler 1993; Elger and Smith 2005; Jürgens 2004; Lowe et al. 1997; Oliver and Wilkinson 1992; Stanton et al. 2014; Vidal 2007b) or emphasize deskilling and work intensification (Carter et al. 2013b; Danford 1999; Graham 1995; Parker and Slaughter 1995; Rinehart et al. 1997; Rothstein 2016; Stewart et al. 2009). Workers also experience a contradiction regarding whether to embrace their partial empowerment when the labour process remains alienating and management retains veto power, one-way channels of communication, and the power to withdraw participation rights unilaterally. As a result of such contradictory pressures, worker responses to lean range from enthusiastic to reticent to resistant, and managers often satisfy by adopting some basic lean practices while foregoing substantive worker empowerment or truly continuous flow systems (Vidal 2018).

### **SSD effects in the diffusion of lean**

The SSD framework is useful for explaining the nature and diffusion of lean. Lean production may be absorbed into system imperatives that make it standard practice. The agency and influence of leading firms, associations and countries reinforce standardizing system effects. Yet, national institutions can embed lean in divergent ways.

The value of the SSD framework for discussing the diffusion of lean is that it helps both with the history and the future development of lean practices. In looking to the past to explain why lean developed in Japanese society we are confronted with the dependent position of the society post-war, the inherent shortages and restrictions that meant a simple imitation of Fordist practices was not possible, and the autonomy and character of large companies within the Japanese political economy that allowed for sustained experimentation. The closed nature of the economy, but the learning from the US through military occupation, created specific conditions for the development of the particular recipe of lean.

The nature of Japanese employment relations in large firms meant that management cadres built their careers within the firm and as such Japanese production expertise relied on tacit knowledge displayed in the day-to-day practices which kept knowledge within the firm. In stressing the importance of waste reduction, Toyota engineers were dealing with real pressures in the company and society, and hence innovating in a specific context. The lean model has its roots primarily in Ohno's programme for the rationalization of production developed in the 1940s designed to cope with shortages of capital and materials, including the specification of standard tasks and times, deskilling, multi-machine manning and experiments in JIT assembly. It also involved a growing role for individualized merit assessments in determining pay and promotion.

In the 1960s, a period of rapid expansion and considerable labour turnover, all these initiatives were pushed further and combined with a belated preoccupation with systematic quality control (QC). This resulted in a supervisor-orchestrated pattern of intense flexible labour, and a dynamic of productivity gains driven through the management hierarchy to the work group level by payments for continuing above-norm improvements (Cusumano 1985; Ishida 1986; Okayama 1986). By the early 1970s these features had been formalized into what became known as the Toyota Production System. This was, as noted by Elger and Smith (2005: 21) "...very much management dominated, but with a more subtle integration of workers through the institutionalization of merit pay and the extension of QC activities, as the proportion of temporary and seasonal workers among final assemblers fell rapidly (Gronning 1997; Ishida 1986; Shimizu 1998; Tolliday 1998; Udagawa 1995)."

The TPS was again reformed in the 1990s in the context of trying to attract workers into the factories in a period of full employment, and reforms included "abolishing the traditional pay system...with its tight link to hard productivity indicators...and the introduction of career paths based on competency appraisals..." (Jürgens and Krzywdzinski 2016:11). Diffusion of the TPS within Japan was aided by agencies external to the firm, such as the Japanese Union of Scientists and Engineers, which encouraged the discussion and dissemination of best practice across different firms and sectors making Toyota innovations more widely available in Japanese society (Cole 1989; Tsutsui 1998).

The global hegemony of the US and Fordism, moreover, ensured that there was no widespread interest in Japanese practices in these early years as it was assumed that Japanese manufacturing industry was bound to follow the dominant US model, leaving Japan (especially Toyota) to innovate over a long period of time and hence build a robust alternative to classical Fordism behind the back of the US. But of course, when the Toyota Production System became recognised as genuinely different from and innovative to Fordism, it was a time when Japanese society was in a different place, as the second largest economy in the world, and the US was also in a different place, with their manufacturing challenged from Europe, rising BRICs and Japan. The societal jig-saw was different, and the economic or system effects were different, as the US pressed tariffs on Japanese goods encouraging internationalisation of the Japanese firm and as transplants or reproduction plants the MNCs acted as an agency of diffusion. Japanese firms established overseas subsidiaries and selectively transferred work and employment practices (Elger and Smith 2005).

Retrospectively we can identify a distinctive Japanese production regime, but this history and must be set in the context, as it is not a closed system. Furthermore, internationalization processes are also formed historically, and the operations of subsidiaries must be situated in their own evolving contexts (Elger and Smith 2005: 22). Selective transfer of Japanese practices was partly driven by cost considerations (Dedoussis and Littler 1994) - with expensive practices left at home - but also host society considerations, assessing how the wider social, institutional, and economic contexts relate to the practices that are being transferred.

Toyota replaced Ford and GM as the biggest auto producer, forcing them and others to seek to learn from them and embrace 'Japanese' methods or Toyotatism, throughout the 1980s. Elger and Smith (2005: 67) note that the learning from Japan was closely linked to the economic power of the country which was often simply reduced to superior Japanese ideas on production and employment relations. Through processes of borrowing some Japanese terms were kept (*kaizan*, *kanban*) while others were neutralized by more generic or technical terms, such as 'lean production' or 'TQM' or 'continuous improvement', which were created by academics and consultants for their own interests and to aid the spread of the message through a more neutral language.

We can see that dominance effects (the strength of the Japanese economy as well as the distinctiveness of Toyotatism) helped disseminate these new manufacturing standards as a distillation of the societal and systemic elements through the process of diffusion. This is clear in the debate about Japanese production innovations, but it was also evident in earlier debates on Taylorism, where an initial resistance in the UK was framed by the American origins of the practices which were deemed inappropriate in the British context where labour, employment and business practices were different, in particular, wedded to smaller markets and craft labour (Merkle 1980; Vidal 2015). But with diffusion though management consultants (Littler 1982), this American model was transformed it into a 'best practice' which was seen as a 'system' requirement in other economies, who associated it (and Fordism) as explaining the rise and dominance of the US economy. Analytically separating the three elements of Taylorism and Fordism – those specific to the US, those with wider system reach and those linked to a dominant economy, only becomes clear when other

dominant models arise – as in the Toyota system - that begin to make clear what to take and what to reject from American production models (Smith and Meiksins 1995: 263–4).

Fordism spread across the OECD countries, producing both cheap durable goods and – based on coordinated wage bargaining with powerful unions – effective demand in the form of high wages. As new forms of more flexible production emerged in the 1960s – driving rather than responding to fragmenting markets – rigid Fordist production went into crisis. Over the 1970s and early '80s there were competing models of flexible production: the Swedish (Volvo) model, the German model and the Japanese (Toyota) model. By the end of the 1980s, Japanese lean production emerged as the victor, becoming the universal model of best practice in postfordist manufacturing and increasingly spreading into services.

Lean became packaged by leading multinational corporations and consultants into a template of best practice. Although lean is often rebranded in proprietary terms – such as GM's Global Manufacturing System – a template of core practices has spread across the globe. This template includes demand-driven, flow production, emphasizing process standardization, economies of flexibility and continuous improvement, using multiskilled workers empowered to engage in decision making and problem solving. Yet, this model may be adapted within particular institutional contexts or otherwise selectively adopted.

National institutions and traditions can impact how the lean model is implemented. For example, the German codetermination and vocational training systems have led a higher percentage of highly skilled workers in many companies that have adopted lean (Jürgens 2004). And a tradition of teamwork (*Gruppenarbeit*) associated with humanization of work programs has resulted in teams with high levels of autonomy, although there is great variation across firms (Benders and Van Bijsterveld 2000). Similarly, in Norway

Early adoptions of Lean bear the imprint of the Scandinavian working life model (Gustavsen 2007) reflecting strong traditions of worker participation and cooperative industrial relations. ... From the onset then, Lean was enacted in a worker-friendly fashion and framed as an instance of how management and unions could cooperatively develop productive and humanly rewarding organizations (Benders et al. 2018: 9).

But deep traditions of autonomous teamwork and strong codetermination institutions do not guarantee cooperative outcomes or happy workers. Oudhuis and Tengblad's (2013) study of three mechanical engineering plants in Sweden documented the frustration of workers as the implementation of lean resulted in reduced autonomy and narrowing of skills used. However, they note that due to institutionalized sources of worker power, these workers retained a level of participation higher than is common in Japan, the UK and US and did not experience such extreme work intensification as in the latter countries.

More broadly, in Sweden, the implementation of lean has been accompanied by “wider work content, cooperation and influence, as well as more participation in problem-solving activities among the workers,” although there has also been work intensification (Johansson et al. 2013: 454). In 2008, the largest union, IF Metall, launched a “sustainable work” program intended to increase labor-management cooperation, skill development and

worker participation while limiting job rotation so that no more than 75% of work consists of repetitive tasks.

In the US, although there is robust evidence of work intensification from studies of US auto assemblers, there is also evidence of substantive forms of participation within limited work intensification in supplier factories (Vidal 2017). This substantive participation within lean also has an institutional basis: a long history of worker participation programs and joint labor-management committees in US industry (Appelbaum and Batt 1994). But, as we will discuss in the following section, particular managerial orientations and managerial satisficing provide a source of variation at the establishment level. Lean practices are often implemented selectively, with some – perhaps most – managements opting for work intensification over worker empowerment.

In the most comprehensive recent study of the implementation of lean in BRIC auto industry, which used Toyota, VW and local plants to examine convergence and divergence forces, it was noted that while VW is now the biggest car company, it was Toyota that was the model for innovation in the sector and beyond:

“Toyota is an icon of the branch and its production system represents a model whose influence radiates out across the entire industry. It has generated a vast literature. While the first wave of research into the Toyota system focused on technical and organisational aspects (such as the classic studies by Shingo (1981); Monden (1993); and Ohno (1988)), a second wave, which began in the early 2000s and was promoted by the introduction of the ‘Toyota Way’ in 2001 and the experience of Toyota’s North American transplants, paid much greater attention to aspects of Toyota’s personnel system (see in particular Liker (2004); Liker and Meier (2007); Liker and Hoseus (2008)). In contrast to the mainstream literature on the Toyota model, there is a smaller body of critical work that reflects the experiences of Toyota employees and highlights negative aspects of the Toyota Production System (Ilhara 2007; Kamata 1982 [1973]; Kato and Steven 1995)” (Jürgens and Krzywdzinski 2016: 10).

Car plants around the world emulate TPS. In Germany, VW “expressly modelled its production system on TPS” (Jürgens and Krzywdzinski 2016: 11) both at home and in its overseas plants around the world. The same can be said for Ford and GM (Elger and Smith 1994c). The spread of the TPS was produced through global car companies, management consultants and engineers. *The Machine that Changed the World* (Womack et al. 1990) sold in huge numbers for a social science book and was influential on the academic, consultancy and business community. It provided many international consultancy companies with the tools to spread lean, and later variants of this package, to companies around the world. Their message was simple, lean was inexorable:

‘Lean production will supplant both mass production and the remaining outposts of craft production in all areas of industrial endeavour to become the standard global production system of the twenty-first century. That world will be a very different, and a much better, place’ (Womack et al. 1990: 278).

Standardisation is central to lean and was the norm in its diffusion: “...in the case of production...due to the influence of the Toyota Production System, which all our manufacturers sought to align themselves with in various ways’ [where this involved change to existing practices]...the organizational changes have often been carried out in cooperation with international HR consultancies” (Jürgens and Krzywdzinski 2016: 314). But they also stress that human resource management practices and work culture varied within countries, reflecting national and company diversity.

Diffusion of lean has moved away from autos and indeed manufacturing. It is possible to find papers on a range of sectors including *civil service* (Carter et al. 2013a; Carter et al. 2011; Carter et al. 2013b; Procter and Radnor 2014), *baggage handling* (Alsyouf et al. 2018); *higher education* (Thirkell and Ashman, 2014; Sunder and Antony, 2018); *road building* (Tezel et al. 2018); *retail* (Kroes et al. 2018); *pharmaceuticals* (Garza-Reyes et al. 2018); *trucking* (Liker and Karlin 2018); *information technology* (Bell and Orzen 2016); *logistics* (Klug 2018); and even *cities* (Herscovici 2018).

### **Contradictory and contested implementation of lean**

In addition to the effects of national and sectoral institutions, there remains widespread diversity in how lean is implemented even within the same sector in the same country. To explain this variation we emphasize management satisficing in the face of contradictory pressures. Vidal (2018) has distinguished a set of competing pressures facing managers from a set of competing pressures facing workers, referred to, respectively, as the management contradiction and the workforce contradiction.

On the management contradiction, even in the era of Fordism, when the basis of efficiency was economies of scale and automation, and Taylorism was the primary labor management model, deskilling was always necessarily incomplete. Managers experienced a tension because production always depends to a certain extent on the tacit skills and cooperation of labour (Edwards 1979; Friedman 1977). In the postfordist age, where the basis of efficiency is economies of scope and flexibility, this tension becomes acute. With lean production there is high interdependence across operations and hence sensitivity to disruptions, which requires ongoing problem-solving processes involving the knowledge and experience of all shop floor actors. Some suggest that “participation in continuous improvement activities is thus a *functional* requirement and not a concession to labor” (Butollo et al. 2018: 9). In this competitive context, there can be a real efficiency advantage to empowering workers, via both multiskilling and employee involvement in problem solving and decision making.

But as extensive research has documented, managements often emphasize work intensification instead of worker empowerment, offering limited opportunities for worker participation (Carter et al. 2013b; Danford 1999; Graham 1995; Jürgens and Krzywdzinski 2016; Parker and Slaughter 1995; Rinehart et al. 1997; Rothstein 2016; Stewart et al. 2009). “In many companies, continuous improvement processes (CIP) are ritually ossified and little attention is paid to the contribution of workers” (Butollo et al. 2018: 9). In our analysis, establishment-level variation on these outcomes stems from the fact that managers face contradictory pressures between empowering their workers via multiskilling

and substantive participation versus disciplining workers via standardization, deskilling and work intensification.

On the workforce contradiction, it has been observed that workers are often hesitant to take on increased problem-solving and decision-making responsibilities. This may come from a distrust in management's motives and scepticism of management fads of the month (Delbridge 2003; Vidal 2007a; Vidal 2007b), an experience of such responsibilities as stressful (Bouville and Alis 2014), or a realization that workers' ideas are being used to speed up their work (Rinehart et al. 1997). At a more fundamental level, worker reticence to embrace increased responsibilities (or change more generally) stems from the fact that they are wage labourers subject to managerial authority, with management ready to exercise a veto or remove (partial) worker empowerment at any time – in short, that the labour process remains alienating (Friedman 1977). In such an alienating context, workers will often cling to, and even tenaciously defend, existing routines (Willmott 1990). This contradiction between (partial) empowerment and (continued) alienation drives scepticism, reticence and resistance toward the former.

In response to the management contradiction and the worker contradiction, managers often satisfice, settling for “good enough” rather than pushing ahead in pursuit of the most efficient and flexible organizational form. In the context of lean, the most efficient and flexible form is to implement true continuous flow, which is the bufferless, highly interdependent, just-in-time system touted in textbooks. Such a system is exceptionally fragile and, as such, is most effectively implemented when managed by a substantively empowered workforce.

But genuinely empowering workers to enthusiastically expend discretionary effort to engage in problem solving and decision making is difficult. It requires extensive workforce training in problem solving techniques, leadership, and so on. Yet managers face multiple competing demands on their time, including pressures to keep machines running, maximise uptime, and get products out the door. Short-term goals overwhelm long-term goals. Finding time to plan and train is hard to do. The one thing managers must do is ensure physical output to meet customer demands.

Facing such competing demands, managers often emphasize standardization, work simplification, physical labour on the line, and work intensification over training and empowerment. That is the management contradiction. And even if a particular management is able to prioritize training and empowerment, they often face the workforce contradiction: Workers reticent or resistant to increased problem-solving and decision-making responsibility. This experience also encourages managerial satisficing. Why go to all the trouble when selectively adopting lean practices focused on standardization, improved workflow, and smaller batch sizes can yield considerable performance improvements? Or when lean can be highly effective in intensifying the labour process rather than empowering workers?

Summing up so far, we have argued that a universal model of lean has emerged and diffused across the globe, which is widely perceived by practitioners as best practice for manufacturing and a range of other sectors. Yet, this has not led to anything nearing

convergence due to the resilience of national institutions and the contradictory nature of the capitalist labor process.

### **General types of lean**

Vidal (2017) developed an inductively derived typology of lean based on two key dimensions along which the implementation of lean may vary. First, lean regimes can include either substantive or consultative worker participation. Second, managements may adopt lean as a system of complementary practices or as a toolbox from which practices are selectively drawn. This produces four types of lean: high-involvement lean, autonomous lean, lean standardization and lean enough.

This typology affirms the position of mainstream advocates (e.g. MacDuffie 1995) that lean delivers the highest levels of efficiency, flexibility and organizational learning when it is adopted as a system including substantive worker participation. But it departs from the mainstream analysis by showing that there are three other ways in which lean is commonly implemented, two of which do not include substantive worker participation. Analytically, it focuses attention on managerial satisficing as a primary factor leading to lack of substantive participation (Vidal 2017) and on union power as a key factor that can prompt management toward substantive participation, which in turn facilitates the adoption of lean as a system (Vidal 2007b).

But this typology does not take into account work intensification – a common finding in the literature on lean – because the workers in the factories Vidal studied did not complain of work intensification. At a theoretical level, work intensification is a dimension that crosscuts those in the Vidal typology, being possible in all four types. While we might expect work intensification to be less likely in cases where workers are given substantive decision-making authority, this is ultimately an empirical question.

Considering work intensification and focusing on the effect of lean on labor, the empirical literature suggests three general types: high-involvement, consultative and intensified. These are not meant to constitute a formal typology of categories that are mutually exclusive and conceptually exhaustive. They are more like ideal types in the sense that they emphasize key outcomes of theoretical interest, which in empirical reality may appear in hybrid form. But we do not use the concept of ideal type in the full Weberian sense of being a "mental construct" that "cannot be found empirically anywhere in reality" (Weber 1949: 90). Rather, we see these as general types in realist terms, as types that describe a key aspect of reality but which may be combined in practice. Below, we discuss these three general types of lean along with some important subtypes that have been observed in the literature.

*High-involvement lean.* A high-involvement regime engages workers in substantive participation, meaning they are given real problem-solving and decision-making authority. It has two main subtypes, depending on whether it is implemented as part of a lean-as-system or lean-as-toolbox approach (Vidal 2017).

*Learning lean.* This subtype of high-involvement lean approaches lean-as-a-system. What distinguishes a lean-as-system approach is the establishment of true continuous flow organization, in which all operations are linked into a highly interdependent flow via kanban and demand is truly customer driven. When workers have wide participation in problem solving with real decision-making authority, this provides the best basis for successfully implementing lean as a system because workers gain critical information from their everyday experience on the shopfloor and because a culture of substantive participation leads to worker-driven continuous improvement. We call it *learning lean* because in such a system, value stream mapping exercises and *kaizen* events are run regularly, driven by shopfloor workers, providing the best basis for true continuous improvement.

Learning lean regimes have been documented by a small number of case studies on manufacturing organizations (Adler 1993; Ingvaldsen et al. 2013; Vidal 2007b; Vidal 2017). Other evidence suggests something approximating this type has been implemented within organizations across a range of contexts (Benders and Van Bijsterveld 2000; Elger and Smith 2005; Jürgens 2004; Lowe et al. 1997; Oliver and Wilkinson 1992; Stanton et al. 2014). However, we believe it is relatively uncommon due to the devolution of authority required and the difficulty of maintaining such a fragile system. And, as we turn to discuss now, the tension between autonomy and standardization looms large.

*Autonomous lean.* Under the second subtype of high involvement lean, a high level of individual worker autonomy limits the ability to implement high levels of process standardization necessary for lean-as-system. Managers thus selectively adopt basic practices from the broader suite of practices, including reduced inventory and batch sizes, waste elimination disciplines, teamwork, and some degree of flow organization. But it is not a true continuous flow system in which all operations are tightly connected by *kanban* and driven by customer demand. This regime has been observed in manufacturing (Oudhuis and Tengblad 2013; Vidal 2017). There have also been a number of applications of lean into healthcare that suggest another source of autonomous lean (for critical reviews of the application of lean in health see McCann et al. (2015); Lindsay et al. (2014); Waring and Bishop (2010)).

The autonomy of professional workers may create real constraints and resistance to standardisation pressures. Stanton et al (2014: 2926) for example, argue that “translating lean from a manufacturing context into the politicised and professionalised context of healthcare changes the usual questions about empowerment or work intensification to questions about the influences of powerful stakeholders.” Professional workers expect to be involved in the creation and monitoring of standards, and where lean is perceived as an imposition from above, without the agency of professional workers, it is resisted. If such resistance is successful, the outcome is a form of autonomous lean, where worker autonomy limits the extent of standardization. This type may be relatively common in contexts where workers have institutionalized bases of power – such as under codetermination institutions or where the labor process involves professionals – but otherwise is likely uncommon, due to system-level pressures for standardization.

*Consultative lean.* While substantive participation requires managers to give up some authority, consultative participation simply requires asking workers for their input. Where managements use consultative participation but attempt to implement lean-as-system, this results in the *lean standardization* subtype. Management focuses on using lean tools to standardize processes throughout the plant, but due to lack of substantive participation, any continuous improvement is entirely management driven (Vidal 2017). Where managements use consultative participation within a lean-as-toolbox approach, this results in the *lean enough* subtype. This regime has been widely observed (Carter et al. 2013a; Carter et al. 2011; Delbridge 2003; Elger and Smith 2005; Procter and Radnor 2014; Rothstein 2016; Schouteten and Benders 2004; Vidal 2007b; Vidal 2017). Because it is the easiest type to implement, based on minimal changes to existing routines, we believe this type is widespread.

*Lean intensification.* The lean-intensification type places the emphasis on use of lean tools to intensify work. This includes use of value stream mapping and other tools systematically to cut non-value added steps out of the production process so that workers have less downtime and more productive time. This is epitomized by the notorious 57-second minute in automotive assembly, an industry standard that has been pushed up, under lean, from an average of 40-50 seconds of every minute in traditional North American manufacturing (Adler 1993; Fucini and Fucini 1990). It has been associated with a substantial rise in workplace injuries (Bouville and Alis 2014; Graham 1995).

The lean intensification regime has been widely documented in the auto industry (Danford 1999; Dohse et al. 1985; Fucini and Fucini 1990; Graham 1995; Kenney and Florida 1993; Parker and Slaughter 1995; Rinehart et al. 1997; Rothstein 2016; Stewart et al. 2009). As far as we can tell, the 57-second minute seems to be confined to auto assembly, which experiences among the most competitive conditions of any industry. It seems that the lean intensification approach is the norm within auto assembly. However, the lean intensification regime is more widespread.

In the public sector in the UK there has been a lot of application of lean practices, especially in health, schools and the civil service, particularly around the idea of team working and performance targets. The research team of Carter, Danford, Howcroft, Richardson, Smith, and Taylor, have produced a series of papers documenting how the implementation of lean within UK Revenue and Customs (HMRC) has resulted in widespread deskilling and work intensification (Carter et al. 2013a; Carter et al. 2011). These outcomes have are associated with increased stress, headaches, fatigue and musculoskeletal disorders (Carter et al. 2013b). They see lean as being applied ideologically as an attack on labor.

In a separate study on lean in the HMRC, Procter and Radnor (2014: 2987, 29990) also found that “work had become fragmented and degraded.” But they also found that some workers welcomed the increased structure provided and the standardization of processes across sites. Some workers appreciated the opportunity to engage in problem-solving, but they were frustrated that management retained final authority on whether to implement workers’ ideas. And in some sites, where middle managers were able to shape the process, “staff were able to use the diagnostic process to develop and implement their

own standards and processes.” They refer to this participation of front-line staff in problem-solving and the development of standards as indirect autonomy, a concept similar to Klein’s (1991) notion of collective autonomy.

This study provoked an intense debate over lean in HMRC (Carter et al. 2017; Procter and Radnor 2017) which we do not wish to enter, except to say that Procter and Radnor did not downplay work intensification or deskilling, and they are attempting to grapple with real variation on how lean is – and could be – implemented. And while we accept the findings of Carter and collaborators that lean in the HMRC has produced work fragmentation, deskilling and intensification, we disagree that such outcomes are inherent to lean production - this is too reductionist.

Carter et al. highlight neoliberalism, intensified competition and the rise of new public management as key contextual factors facilitating the spread of lean into the public sector (Carter et al. 2011), and criticize Procter and Radnor for failing to appreciate this context (Carter et al. 2017). In our view, these contextual factors are important less for explaining the diffusion of lean as such, and more for explaining why the lean intensification form has been adopted in this context. In a public-sector context where cost cutting is the main priority and the “customer” has no alternative choice, then a lean intensification (and deskilling) approach should be expected (Esbenshade et al. 2015). In our view, the findings of Procter and Radnor that the impacts of lean on workers can be uneven and contradictory reflect the fact that, respectively, there is variation in worker orientations (Vidal 2007a) and that managerial control within the capitalist labor process is inherently contradictory (Vidal 2018).

The lean intensification type may be combined with any of the types above. We think that the most common type of lean is likely to be lean enough with work intensification. Lean enough is the least difficult form to implement, requiring the fewest changes to existing authority structures and routines. At the same time, the lean emphasis on waste reduction and the elimination of non-value added processes lends itself to the intensification of work. Which types of lean are most common, and whether lean intensification is widespread outside of auto assembly, are key questions for future research.

Finally, recent research on lean in developing economies suggests a form of *informalized lean*, in which there is a high level of casual labor and a lack of institutionalized worker voice. Again, this type of lean may be combined with other types. Most likely is some combination of lean enough that is informalized and intensified. Because the newness and importance of this literature on lean in developing countries, we discuss it in some detail here.

This strand of lean exists in more authoritarian societies, such as China and Russia, and as such, lean practices exist in a context where labour markets are more informal, where workers have more limited or no formal institutional voice (especially in China) and where workers’ consent, participation and engagement within the workplace are constrained. In line with our emphasis on the management contradiction, researchers looking at auto industry in emerging economies note “...there is a particular tension at the

BRIC locations between efforts to implement modern lean production systems yet at the same time secure 'low cost' solutions" (Jürgens and Krzywdzinski 2016: 71-2). Yet, writers are divided about the role of lean production in these settings.

For some (Jürgens and Krzywdzinski 2016; Krzywdzinski et al. 2018) while low cost producers exist in countries like India and China, nevertheless, in the auto sector there is also an upgrading process that fits within what they see as the functional requirements of lean, which demands greater worker engagement and an strong movement towards upskilling, teamworking and more commitment and engagement from the local workforce. These writers acknowledge that there may be some initial dualism, between regular and more precarious employees, and low-cost and high cost systems coexisting. As such they "...expect that the domestic companies from emerging economies, while upgrading, will attempt to retain their cost advantages over the multinationals, for instance by preserving their labor regimes or cheap local supply chains. This can, however, easily result in a deadlock, especially if investments in new knowledge and skills are neglected" (Krzywdzinski et al. 2018: 12). Hence Krzywdzinski et al foresee an inconclusive or polarised future in BRIC economies that embrace lean in sectors like autos but in a context where the abundance of cheap labour applies a break on any management intentions to upgrade labour and labour processes.

Others suggest that lean is not a motor for upgrading or development. Zhang (2015) argues that in China there is greater informality in the labour market and tendency to have higher numbers of workers on flexible contracts, and an overall dualism between more casual and more regular workers. In this scenario, there is limited or no upgrading, without the two groups of workers working more cooperatively to resist labour market and labour process segmentation. Chen and Chan (2018) question this interpretation and their research in the auto industry in China did not find a divide between agency and more secure workers as crucial as suggested by Zhang – certainly agency workers were not more likely to resist and struggle. We would suggest that there is a Chinese element to this argument - the rural-urban divide being reinforced through the household registration system, adding a political layer to the dualism identified by Zheng (Smith and Pun 2018). However, workplace-based dualism is only partially 'Chinese' – the auto industry globally is structured between workers on core/regular and peripheral/temporary employment contracts. In other words there is systemic practice – and a general capitalist or systematic use of this form of contractual divide.

Researching the case of Indian autos, Barnes (2017; 2018) considers that the industry remains tied to underdevelopment and suggests that more globally, the spread of 'informalised lean', which is pioneered in emerging economies, is now leaking into developed economies as the growth of agency working and dual labour contracting becomes more broadly embedded (Moody 2017: 14-19). But the work of Jürgens and Krzywdzinski (2016) and Krzywdzinski (2018) suggest more dynamism in the BRICs. Overall their work, covering car plants in Brazil, India, China and Russia, indicates a direction of upgrading of employment contracts and investment in training, because the technical and production demands of lean require a trained and more stable workforce. Barnes (2017) notes that local norms, which are regionally diverse within India, inhibit any production-driven standardisation from global carmakers' governance practices. Barnes (2018: 8)

argues that for India “the imposition of global best practice ‘lean manufacturing’ principles and techniques has transformed commercial relations between firms and work organisation and employment relations within firms, laying the foundations for industrial conflict.” Rather than expected upgrading of employment, driven by the need for stable and trained workers, his evidence suggests continued bi-furcation of the workforce and continued conflict based on status or employment inequalities between workers.

The differences between these authors may be due to different empirical research cases. Barnes acknowledges that the Jürgens and Krzywdzinski research evidence is from VW (although in fact they look at Toyota and local producers as well) which has different employment relations, while Barnes’ main evidence is from suppliers (he has very few interviews with OEMs) and the OEMs he investigates are mainly Maruti-Suzuki and Honda - both of which are rather anti-union companies with strongly embedded conflicts between organised labour and management (typically around the different treatment of directly and indirectly hired workers) – including the killing of a human resource manager in July 2012 (Barnes 2018: 2). Hence, divergence in their argument could also be based in whom they talked to, rather theoretical differences. Barnes has fewer management interviews; his empirical basis are mainly interviews with workers. While in this way he surely captures more of the workers' perceptions, he may have limited engagement of the companies' aims and practices.

## **Conclusion**

Lean has spread across the globe and across sectors from its origins at Toyota. Its diffusion, however, has been uneven, contested and contradictory. Because the critique of lean as a system of deskilling and work intensification is widely associated with labor process theory, we focus our concluding thoughts on these issues.

Deskilling and work intensification under lean is widespread, resulting in work that is not only monotonous and exhausting, but physically deleterious to the health of workers (Bouville and Alis 2014; Carter et al. 2013b). It is important for researchers to continue to document this. But the literature also shows that lean can be implemented with true multiskilling and substantive worker participation, and without intensifying work. In our analysis, the sources of work intensification are not particular management models, Taylorism, lean or otherwise. Rather, we see work intensification as a structural tendency inherent to the capitalist labour process (Marx, [1867] 1990), a tendency which is moderated by broad institutional forces, power relations between capital and labor, and the orientations of local managers.

At the broadest level, the Fordist accumulation regime that obtained in North America and Western Europe from the Second World War through the early 1970s (Aglietta [1976] 2000; Jessop 1989; Vidal 2015) institutionalized a form of oligopolistic competition in the private sector and traditional public administration in the public sector, which combined with high profits, powerful unions and Fordist just-in-case production to greatly diminish intensification pressures in major sectors. In the post-Fordist period, globalization and intensified competition, financialization and neoliberalism, and union decline have all combined to unleash pressures for work intensification (Thompson 2003; Vidal 2013). In the

1990s, work intensification rose in all of the EU countries except Austria, Denmark and Finland – countries with high union density and strong institutional forms of codetermination (Green 2006). In the US, intensification has occurred across all occupations (Crowley et al. 2010; Smith 1997).

If there has been a general rise in work intensification in the era of postfordism and neoliberalism, there are other factors that shape the extent of intensification along with the skill profile and nature of worker participation within the lean labor process. As we have seen, national industrial relations institutions and power balances between capital and labor matter. Thus, the powerful labor movements and institutions of codetermination in Germany and Norway are facilitating the adoption of lean with multiskilled labor and substantive forms of participation. However, certain sectors seem prone to work intensification. In particular, the auto industry is under extreme competitive pressure and has developed a normative goal of having workers work 57 seconds of every minute, while lean in the public sector has generally been adopted to cut costs with limited concern for service quality.

Finally, managers are not personifications of capital or passive conduits of a universal imperative to deskill labor. Rather, managers vary in their orientations and aspiration levels. While some managers satisfice with a lean-enough approach – a “limited, low-level application of lean” (Procter and Radnor 2014: 2981) that may prioritize deskilling and/or work intensification – other managers seek to implement a high-involvement, lean-as-system approach. Because such an approach is difficult to implement and maintain, and managers face contradictory pressures, it is likely to remain uncommon, particularly in places with weak unions and no institutions for codetermination.

In our view, criticisms of lean should not focus on labelling it as a system that inherently produces deskilling and work intensification, but rather should emphasize that these outcomes are – in addition to being degrading and damaging to workers – inefficient applications of lean. Implementing lean as a system including substantive worker participation and true multiskilling results in more efficient and flexible organizations that are better able to engage in continuous improvement. If capitalist management is systematically satisficing in response to the contradictions of the postfordist labor process and the difficulties of implementing high-involvement lean, this provides a basis for a critique of capitalism that goes beyond its impact on the degradation of labor. Efficiency is a language that capitalists understand. At a policy level, unions, works councils, labor-management partnerships and other forms of institutionalized worker power could help increase efficiency by ensuring multiskilling and substantive participation. At the local establishment level, workers and their unions should use the rhetoric of efficiency, service quality, and empowerment against managers who fail to adopt multiskilling and substantive employee involvement.

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