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## 30. From skill mismatch to reinterpretation: challenges and solutions for manufacturing worker retention and recruitment

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The ultimate resource of an industrial economy is its people.  
(Dertouzos et al., *Made in America*, 1989: 21)

Skill builds by moving irregularly, and sometimes by taking detours.  
(Sennett, *The Craftsman*, 2008: 238)

Manufacturing jobs are coveted, and for good reason. On average they provide significantly better wages and benefits compared with most service sector jobs that share a similar labor pool. Yet changes to educational requirements for new and incumbent workers potentially threaten job access for moderately educated workers that have long enjoyed a middle class existence as result of their employment in manufacturing. This emergent labor market challenge motivates a more critical examination of the way that skill, and more specifically changing perceptions of skill, might affect manufacturing worker recruitment, retention and mobility. While this shifting educational requirement is especially pronounced in the United States, related pressures have emerged in labor markets in Europe and Asia, and thus indicate an opportunity for international comparison and policy reflection.

An educational uptick in the U.S. manufacturing workforce obviously represents an opportunity to enhance job quality and worker status. Still, it is also emblematic of a profound and prolonged institutional transformation that has the potential to produce the opposite effect for many workers in this sector. The post-World War II employment model supported quasi-lifetime employment and created pathways for upward mobility for moderately educated workers that were supported by company-specific training systems (Doeringer and Piore 1971; Hall 1984; Osterman 2000;). Job mobility in U.S. manufacturing is less certain today and often reflects the adoption of a truncated employment model which divides the workforce along educational and professional lines and results in “deskilling” and job churning at lower occupational levels with more minimal educational requirements (Davidson 2012a; Fligstein and Shin 2004; Kalleberg 2011).

The conventional policy response is to push more job seekers to secure academic degrees from colleges or universities. But is this the best policy option and how realistic is it to expect incumbent workers, especially older workers, in manufacturing to invest time and resources in higher education? As an alternative, is there maneuvering room to shape employment practices in ways that reestablish earlier norms of company-supported pathways for career development and occupational mobility? And, if so, what might this look like and how might this be achieved?

This chapter explores these questions by looking at sector-based experiments in workforce development in manufacturing that seek to promote job access for less educated workers and job seekers by influencing hiring and training practices of U.S.-based manufacturers. Common to these sector initiatives is a recognition that skill, as a concept, is inherently ambiguous and as such can be subject to reinterpretation. Treating skill in this way opens up the possibility for mediated interventions that encourage manufacturing companies to recognize greater degrees of freedom when it comes to accessing and assessing skill. External educational and training institutions, including community colleges and vocational training centers, support mediated practices of skill interpretation by creating an institutional scaffolding or exoskeleton that sector initiatives draw on to reinforce skill development practices and priorities internal to firms – a support role especially valued by resource-constrained and smaller-sized manufacturers that face greater constraints when it comes to internalizing worker training. But skill reinterpretation is fundamentally about getting employers to look beyond these supports to accept greater responsibility for upskilling through on-going investments in their incumbent workforce and the development of internal pathways for career advancement. Recasting the labor market challenge from skills mismatch to skills reinterpretation has implications for sustained job access in manufacturing, especially for moderately educated workers. It also creates a framework for labor market interventions that are potentially more enduring and certainly more inclusionary than the more standard educational-fix approach.

Still, the labor market reach of this sectoral approach is uneven and lacks consistency. Most sectoral interventions are limited to a select group of cities and industries. As a consequence, this labor market reproduction system is ad hoc and geographically continent. Renewed Federal policy interest in U.S. manufacturing creates an opportunity to extend mediated interventions capable of dynamically certifying skill content and that encourage more predictable hiring and compensation decisions based on skill.

## SKILL AMBIGUITY AS INSTITUTIONAL RESOURCE

Standard recommendations to boost the educational attainment of manufacturing workers rest on a widely held belief that a more formally educated workforce will encourage job creation in manufacturing and better use of enhanced worker knowledge for introducing new and better manufactured products. Accordingly, without an educational uptick, it is presumed manufacturing job growth will stall, reflecting what is commonly described as an intensifying “skills mismatch” or skills gap.

This perspective is especially prevalent in the United States. Concern about a looming “skills gap” is visible in numerous, recently published media and scholarly accounts about the future prospects of U.S. manufacturing. Business consulting reports give additional strength to this argument. An oft-cited 2011 survey of U.S. manufacturers conducted by the Manufacturing Institute in partnership with Deloitte Consulting estimated that close to 70 percent of firms faced “moderate to severe shortage” of qualified labor. The results of this survey are often used to explain why, despite a high national unemployment rate, 600,000 U.S. manufacturing jobs remain unfilled. The survey also notes that over 50 percent of U.S.-based manufacturing employers anticipate facing an intensifying skills shortage in coming years.

Fear of a manufacturing skills gap is certainly not unique to the 2010–2012 post-recession recovery. In fact, this has been a recurrent theme in recent decades, with intensified pressure to upskill coinciding with periods of economic downturn and when U.S. policy and economic analysts are most concerned with the problem of higher than normal rates of unemployment (Katz and Autor 1999; Levy and Murnane 1992). But as national discourse around industry skill requirements heats up, so have counterclaims that challenge fears of anticipated skill shortages.

In the 1980s and throughout the 1990s, U.S. labor economists called into question the widely held assumption that the introduction of computer technologies significantly altered industry skill requirements and with it undermined job and wage security for incumbent manufacturing workers (Howell 1994; Osterman 2000). This phenomenon – commonly referred to as skill-biased technical change – was believed to be a major contributor to rising income inequality in the 1980s, reflecting a seemingly commonsense argument that those lacking computer knowledge would experience wage stagnation in relation to those with more experience with personal and micro-computing. But this claim was soon refuted by labor market data that demonstrated widespread wage stagnation, even in industries that experienced a significant increase in educational attainment and during periods with little technological upgrading (Card and DiNardo 2002).

In response to evidence of a “skills myth,” labor market analysts searched for alternative explanations for rising income inequality that were less dependent on technological transformation and focused instead on changes to the institutional structure of the labor market that undermined job tenure, income security and occupational mobility (Fligstein and Shin 2004; Levy and Temin 2007; Osterman 2000; Osterman et al. 2007). While institutionalists often incorporated a discussion of skill development, it was folded into a larger statement about a weakening of internal structures for supporting on-the-job training and upskilling and what this might imply for worker displacement and disenfranchisement.

Today’s renewed interest in the role of upskilling in economic recovery has led to similarly powerful counterclaims that unfilled jobs in manufacturing are not the result of a skills mismatch, but rather reflect below market wages that make it difficult for companies to attract and retain qualified candidates (Boston Consulting Group 2012; Cappelli 2011, 2012). As one analyst put it, “trying to hire high-skilled workers at rock-bottom rates is not a skills gap” (Davidson 2012b). The logical conclusion, then, is for companies to increase the wages they offer successful job applicants.

But what this recurring debate around skill obscures is the notion that skill, as a concept, is inherently slippery and ambiguous (Attewell 1990; Handel 2003, 2005). Proposing to simply end this debate by pushing companies to raise wages may not be sufficient, for it too fails to get at a deeper set of issues that affect how and whether worker skill gets recognized and valued in the first place.

To some extent, obscurity around skill has been attributed to research design and specifically to differences in how analysts represent skill that they turn to for its assessment (Sandberg 2000). As one example, surveys of employers – a common data source for assessing industry skill requirements – rarely generate consistent lists for which types of skill are most valued within an industry and, related to this, which may be in short supply (Handel 2005). Michael Handel, in his in-depth review of employer surveys, found strong evidence for this. While some surveys emphasize the need for cognitive

skills, especially in the areas of basic math and reading comprehension, others stress instead a set of work habits and interpersonal and communication skills. This inconsistency supports recommendations for improved survey design (Handel 2005).

But sources of ambiguity are not simply the result of a misspecification. They also stem from the “interpretative” nature of skill that often makes it difficult, if not impossible, to reduce skill into an objective and quantifiable metric (Sandberg 2005; Sennett 2008). Theories of “situated knowledge” help reinforce this point, by highlighting skill as context dependent and therefore impossible to fully separate from or understand outside the social relations and work environments in which it is developed and deployed (Lave and Wenger 1991; Lave, Murtaugh and de la Rocha 1984; Rogoff and Lave 1999). As Paul Attewell points out, “the terms grounded and situated imply that features of the context in which the work is done play a very important role in how the work is done, such a large role that it is meaningless to talk of a particular skill outside of the situations and practices in which it is used” (Attewell 1990: 425). In other words, skill is not a set of fixed capabilities that workers carry with them to all work settings and environments. Rather, skill is “situated” in the work environment itself and results from a dynamic and on-going interplay between worker(s) and their work.

This line of reasoning is used to explain why, for example, individuals have been known to underperform in testing environments that differ significantly from the actual setting in which the skill sets being tested are developed or applied (Rogoff and Lave 1999). Additionally, context-dependent perspectives help to underscore sources of “tacit” skill that remain hidden or obscure, at times even to those possessing that skill (Attewell 1990; Doeringer and Piore 1971; Iskander and Lowe 2010). And this also helps us better understand sources of skill that are collectively produced, rather than individually controlled – in other words, that stem not from or through individual action but rather from combined knowledge that is created in a group setting or team-based work environment (Brown and Duguid 2002).

But equally, the idea that skill is context dependent implies that processes of skill formation can take place outside of a formal classroom setting and are likely to reflect what happens within the workplace itself and as a result of on-the-job learning opportunities and exchanges. This, in turn, underscores the need to uncouple formal, academic education from skill development in order to recognize competencies that are produced through a variety of channels and experiences, only some of which depend on a traditional educational format (Iskander and Lowe 2010; Rose 2005).

Noting this, scholars have adopted a number of innovative methodologies for trying to capture skill that is context dependent and tacit in nature. In most cases, the approach is to utilize in-depth ethnologies, including participation observation and in-depth interviewing, in order to document skill-in-action and engage workers in an interpretative research process that helps broaden understandings of skill and identify hidden sources of talent (Iskander, Lowe and Riordan 2010; Piore 2006; Sandberg 2000). Side stepping a longer discussion about the value of these methodological approaches for now, it is useful to consider what these improved methods also imply for skills identification and skill interpretation more generally. Examining skill at the worksite, and through in-depth observation and discussion with those active in skill development, deployment and assessment, suggests there is room for collective reinterpretation of skill. That is to say, for multiple actors to engage in a negotiated process over what is meant by skill, who

is presumed to possess that skill, and what structures and supports might be needed for workers to demonstrate and defend skill.

As this implies, the ambiguous and slippery nature of skill is more than just a complicating factor for skill assessment. It also represents a potential “resource” for agency, advocacy and intervention. We see evidence of the transformative power of ambiguity in recent studies of product and process innovation. As Lester and Piore note, “ambiguity is the critical resource out of which new ideas emerge” (Lester and Piore 2004: 54). And as they also note, interpretation “plays in the space of ambiguity” by establishing an interactive process that is “open-ended, and part of an ongoing conversation” (Lester and Piore 2004: 53). Lester and Piore have applied the concepts of interpretation and ambiguity to a study of industrial engineers and designers to gain insight into processes that lead to both radical and sustained forms of innovation. But given the ambiguous nature of skill across all occupations and classes of work, these concepts are also applicable to studies of skill on the shop-floor.

Skill interpretation, in this context, might involve an on-going dialog with employers that helps to challenge deeply held assumptions and perceptions of shop-floor skill that potentially undermine or hinder job access and job security for moderately educated workers. Following from this, heightened public awareness of and interest in industry upskilling provides the basis for opening that conversation with employers. With this possibility in mind, I turn next to a brief historical overview of the role that labor market institutions have played in reinterpreting sources of shop-floor skill in manufacturing and their role in motivating emergent institutional supports.

## LABOR MARKET INSTITUTIONS AND THE DEFENSE OF SKILL

U.S. labor market institutions, most notably labor unions, have long positioned themselves as defenders of worker skill. But how they do so has differed considerably across industry lines and has also changed with time. In the U.S. construction industry, for example, the defense of worker skill was formalized through industry-sanctioned apprenticeships that labor unions have tightly controlled (Palladino 2005). While the vast majority of new worker training received through construction apprenticeship programs occurred at the jobsite and often involved informal learning processes, there was considerable specificity with regard to required hours of training and how phases of training, once completed, would be compensated and rewarded. Union-friendly construction companies supported this formalized training structure by assigning skilled journeymen to the mentoring process and allowing a specified number of apprentices to work each site.

Until quite recently, the role of U.S. labor unions in demonstrating and defending worker skill in manufacturing has been less direct. Formal apprenticeship programs in U.S. manufacturing remain rare and, when they exist, are limited to a handful of specialized occupations, such as tool-and-die maker or airplane mechanic. Reflecting this, union wages in manufacturing tend not to be associated with “mastery” of skill, as is the case with construction, but rather have reflected years of industry work (Doeringer and Piore 1971). While one could argue this temporal form of seniority has functioned as a

defacto signifier of skill, historic accounts of labor relations in manufacturing suggest a potentially different interpretation. Beyond a handful of specialized occupations that have been formally recognized as “skilled crafts,” most manufacturing jobs have been defined instead as “semi-skilled,” regardless of the seniority level of those filling these positions (Carnevale, Leila and Metzger 1988; Slichter, Healy and Livernash 1960). This perspective continues even today, most notably through descriptions of manufacturing jobs as “middle-skilled.”

The view that manufacturing requires less skill relative to other manual trades appears to be unique to the United States. In Western Europe, where labor unions have long represented manufacturing workers, there is considerably less differentiation. In Germany, for example, apprenticeships are not only commonplace in both manufacturing and construction, but even today are structured and revised according to government-sanctioned educational and skill standards (Streeck 1989; Thelen 2004). In Britain too, labor unions have long promoted manufacturing workers as highly skilled.

So why have manufacturing skill requirements been portrayed so differently in the United States? Are these jobs substantively that different from their counterparts in Europe and, therefore, require less worker intellect and skill? Some comparative accounts of manufacturing imply this might be the case (Gertler 2004). Others suggest instead a more complicated institutional story and one that is not simply about identifiable differences in the organization of production or in how U.S. workers relate to technology, but rather is an outgrowth of a long-standing struggle over the control of skill and its determinants (Thelen 2004; Weir 1993).

History is replete with examples of U.S. employers and managers treating their manufacturing workforce as less skilled than they actually are. Some accounts portray managers as woefully ignorant of the existing knowledge and skill that manufacturing workers bring to their jobs and further develop as they encounter complex problems at work (Juravich 1988). Tom Juravich’s (1988) rich ethnographic study of an electrical wire-making plant in New England not only illustrates this point, but also helps to highlight the way that managerial ignorance can manifest itself in subsequent decisions that undermine channels through which workers share knowledge and collectively solve problems.

Other accounts are less benign. Some labor scholars argue instead that U.S. managers intentionally “deskilled” tasks by applying principles of scientific management, a.k.a. Taylorism, and introducing a detailed division of labor that lowered skill requirements for most manufacturing jobs (Braverman 1974). Doing so allowed managers to retain control over the labor process by creating an easily replenished manufacturing labor pool and with it made credible their threats to replace workers that resisted this structure or attempted to collectively organize against it.

Still, claims of purposeful deskilling by U.S. managers are complicated by conflicting accounts that show their equally strong desire to engage worker intellect and ingenuity, including at the shop-floor level (Lazonick 2004; Osterman 2000). Assumptions of widespread deskilling are further undermined by detailed studies of contradictory shop-floor practices that manufacturing workers themselves created and willingly reproduced.

In the 1960s, Doeringer and Piore, in their seminal book on internal labor markets, not only identified informal processes through which manufacturing workers develop skills on-the-job but, paradoxically, their simultaneous role in concealing such practices from their supervisors. “In some cases they [workers] also have a strong incentive to hide

what they do from management who might use this knowledge to extract greater output from them or to correct a loose incentive rate” (Doeringer and Piore 1971: 20). Building from this, Michael Burawoy’s book *Manufacturing consent* painted a rather troubling portrait of a complex power play between manufacturing workers and managers over skill and work responsibilities (Burawoy 1982). And while Burawoy ultimately concluded that manufacturing workers were pawns in a rigged and unfairly structured game, he nonetheless reinforced the point that skill was contested and open to interpretation.

Despite this, U.S. labor unions – at least through the late 1980s – made few attempts to alter the perception that U.S. manufacturing jobs were semi-skilled, not highly skilled. Some of this reflects their own legacy in specifying and reinforcing these differences in the early 20th century, when union jobs were initially categorized as either “craft” or “industrial,” with the former treated as highly skilled and the latter as semi-skilled (Thelen 2004). Labor unions fought among themselves over these classifications and what they implied for labor market jurisdictions and control. But long after this internal conflict subsided and craft and industrial unions united through the merger of the American Federation of Labor and Congress of Industrial Organizations, there remained little need for “industrial” unions in the United States to explicitly challenge entrenched definitions of skill as long as manufacturing job growth remained robust and wage-setting processes remained in place to reward workers for years of industry service.

This all changed in the late 1980s, when deindustrialization and intensifying threats from global competition ultimately pushed U.S. labor unions to make a stronger case that worker skill was a central contributor to productivity gains in U.S. manufacturing. Front and center in this effect by industrial unions to wrest control over and better defend the skill of manufacturing workers was a novel American experiment (though admittedly one that drew heavy inspiration from Japan) called the high performance work organization.

## SKILLS AND TRAINING IN THE HIGH PERFORMANCE EXPERIMENT

In its idealized form, the high performance work organization involved a range of company-supported human resource practices that were designed to increase the participation of rank-and-file workers in product and process innovation (Appelbaum and Batt 1994). These practices included the use of more flexible work routines which allowed workers to move more freely across traditional job categories and, in the process, engage with, learn from and combine multiple tasks. As this implies, job rotation was a key element, as were open channels for communication and collective problem solving that crossed the traditional labor–management divide.

U.S. manufacturing firms – especially those in automotive manufacturing – were early adopters of the high performance model (Osterman 1993). The United Auto Workers (UAW), the main labor union representing workers in the U.S. automotive industry, was an especially eager participant and, as such, was prepared to relax traditional systems of seniority and rules of job allocation in order to support a more fluid work environment. The UAW worked closely with General Motors to introduce high performance models at Saturn’s production facilities in Tennessee and at the New United

Motor Manufacturing, Inc. (NUMMI) plant, a joint venture with Toyota, in Fremont, California (Adler and Cole 1993; Kochan and Rubinstein 2000). They also worked with Japanese automotive manufacturers, especially Mazda, to incorporate high performance elements at U.S.-based assembly plants (Shaiken 1993).

In light of this commitment, labor scholars initially rejoiced the high performance experiment, viewing it as a new internal structure for engaging and valuing worker skill and ingenuity, and linking it to improvements in job quality (Appelbaum 2000; Kochan and Osterman 1994). Further research however revealed potential limits to high performance strategies and noted especially the tendency for partial adoption within manufacturing and in other sectors as well (Knauss 1998; Osterman 1993, 2000). While a handful of U.S. manufacturing facilities, namely GM's Saturn and NUMMI, adhered closely to the model's core principles and tenets, the vast majority of firms that classified themselves as high performance chose only select elements of the model. And the procedures that did get implemented often had the perverse effect of increasing worker stress and turnover and foreclosing channels for skill development that high performance work systems were meant to support. This led to claims by some labor market scholars that high performance firms were also adopting "low road" labor practices, in turn undermining job quality and job security.

Interestingly, labor union involvement was a determining factor in whether or not a firm adopted a more worker-friendly version of high performance (Osterman 2000; Shaiken 1993). Comparative studies in manufacturing noted that high performance companies with strong union representation were also more likely than those without it to prioritize investments in worker training and take steps to ensure shop-floor workers were given sufficient time and resources to learn, master and apply newly acquired skills and knowledge. Without this institutional check, employers tended to underinvest in worker training and, by extension, undermine the ability of their labor force to leverage skills for on-going productivity gains and innovation. In this regard, unions formalized the link between worker skills, productivity and job quality, and ensured gains from high performance strategies were shared among employers and employees alike. They also helped to make visible the skills contribution of shop-floor workers and defended formal structures and training investments that would ensure manufacturers continued to value and leverage this contribution.

## EMERGENT INSTITUTIONAL APPROACHES

The U.S. manufacturing workforce has experienced a significant decline in union representation in recent decades, dropping from a high of around 40 percent of the manufacturing workforce in the early 1970s to less than 10 percent today. The declining role of U.S. labor unions threatens to undermine progress in forging a stronger connection between worker skill and productivity gains, and, subsequently, for pushing U.S.-based manufacturers to make a stronger commitment to worker training and career development. But emergent institutional actors have stepped in to help fill this void and, in the process, provide an additional vehicle for moving strategies of skill reinterpretation to the next level. One recent effort is the Digital Badges initiative sponsored by the Mozilla and MacArthur Foundations that seeks to certify skills developed in informal

and non-traditional training environments, including those acquired outside a formal classroom setting. In 2012, 30 U.S.-based organizations were awarded funds to develop digital badges, with the goal of helping job seekers, and especially youth, communicate less visible skills and qualifications to prospective employers.

The next step is convincing prospective employers to recognize non-traditional qualifications. In this regard, sector-based initiatives are proving to be an especially effective institutional actor. Defined by the National Network of Sector Partners as “regional, industry-focused approaches that improve access to good jobs and/or increase job quality in ways that strengthen an industry’s workforce,” sector initiatives emerged in response to evidence of declining job quality and, more specifically, in an effort to remove barriers to rewarding job opportunities and career advancement for less educated job seekers. In the manufacturing sector, over 200 initiatives have been cataloged thus far and represent a subset of workforce development-oriented non-profits, unions, community colleges and Workforce Investment Boards, regional labor market entities established under the U.S. Workforce Investment Act of 1998.

What differentiates these initiatives from other forms of labor market intervention is their ability to use specialized industry knowledge to mediate the relationship between job seeker and employer, and in ways that also influence industry norms and practices around hiring, wage setting and occupational mobility. Often this involves intentional actions designed to reveal and defend “hidden” or less visible sources of worker talent that may be obscured by low levels of formal education.

While a comprehensive review of all manufacturing sector initiatives is beyond the scope of this chapter, it is useful to consider how their practices contribute to skill reinterpretation. Table 30.1 provides a list of five sector-initiatives that have helped to establish an institutional standard with respect to manufacturing worker skill. All five were initially created in response to perceived skill shortages on the part of manufacturing employers in their regional economy. But each has used its labor market position to engage U.S. manufacturers in a negotiated process over skill, and more specifically with the goal of expanding employment and advancement opportunities for individuals that lack academic degrees from colleges or universities.

First and foremost, these initiatives work closely with manufacturing employers to influence which skills and qualifications are recognized during the hiring process. Key here is their ability to help match job seekers with employers through pre-employment screening and assessment services. In that capacity, however, they do not simply act as agents of employers, as a private staffing agency might. Rather, they mediate the hiring process to support less educated job seekers that might otherwise be excluded from quality employment opportunities.

As part of this effort, they encourage employers to stop making hiring and compensation decisions on the basis of how an applicant looks “on paper.” Why? Because standard application formats, including the ever-popular single-page resume, tend to reinforce an educational bias and can obscure sources of tacit knowledge which may be hard to demonstrate and defend in writing. Sector initiatives instead work with manufacturers to create evidence-based skill assessments, which they often develop in close partnership with incumbent workers within the company. As subject area experts, these technical workers provide detailed information on skill requirements for specific tasks and at multiple occupational levels. This knowledge, which is not always in reach for human

Table 30.1 Examples of manufacturing sector initiatives in the United States

	Date Started	Location	Type	Manufacturing Focus
Wisconsin Regional Training Partnership	1992	Milwaukee	Jointly union- and industry-driven, grant funded	Manufacturing, various
Lancaster County Workforce Investment Board (WIB)	1999	Lancaster County, PA (west of Philadelphia)	Workforce Investment Board	Food processing, metals
BioNetwork	2004	North Carolina statewide	Community-college driven non-profit	Biomanufacturing, biofuels, food processing
ManufacturingWorks	2005	Chicago	Workforce Investment Act (1998) community affiliate, driven by mayor's office	Food processing, metals & machinery
Partners for a Competitive Workforce	2011	Greater Cincinnati (including Indiana & Kentucky)	Umbrella organization for regional workforce programs; non-profit with some grants, some WIB funds	Auto suppliers, aviation, metal fabrication

resource managers, is helpful in clarifying skill requirements. But more importantly, it is also used to expand job access by encouraging employers to conceptualize bundles of attributes that can reflect a variety of work experiences and backgrounds.

But even with this broader understanding of skill, there is the possibility that specific skill gaps will emerge for some job applicants. Sector initiatives are mindful of this and are quick to point out their desire to provide employers with quality candidates that will contribute value to the company. As one manufacturing sector-initiative director described it, our goal is to help employers “figure out who is a good candidate to invest in who will work for a long time.” As such, they differentiate themselves from more traditional social service providers that provide job placement support to a pre-selected group of candidates. In contrast, sector initiatives focus on establishing a long term match between a job seeker and employer, which can make it more difficult for them to place all prospective applicants. This is why partnerships with community organizations and other support agencies prove crucial to the work of sector initiatives, as they provide a social safety net for those not placed and also help identify and address more persistent barriers to employment.

Still, by bundling worker attributes, sector initiatives are in a powerful position to advocate on behalf of job seekers that have most, but not all, preferred qualifications. Sometimes this involves convincing employers to rank order attributes, thereby creating

greater maneuvering room for applicants with some gaps lower down that weighted list. In other cases, sector initiatives step in to provide pre-employment training to address more prevalent skills gaps within an applicant pool. Typically this is done in partnership with external training specialists, such as community colleges or non-profit vocational training programs.

In addition to shaping hiring decisions, manufacturing sector initiatives also seek to influence how employers engage with and treat their incumbent workforce. Important here are interventions that encourage manufacturers to better harness worker knowledge when introducing improved production practices and techniques – in other words, turning to incumbent workers when introducing and developing process innovations. According to one sector initiative director,

the most valuable asset that any of these manufacturing firms have is the workers who are handling the product . . . so we start off with that premise that investing in workers and involving workers in some of the decision-making process is the wisest thing to do . . . and sometimes with a little bit of help they [the employers] listen to not only what their workers need but also take value in what their workers can offer from a floor perspective.

Sector initiatives first show evidence of underutilization of worker knowledge, including structural barriers that limit involvement by shop-floor workers in decision-making processes. They then intervene to remove these barriers, but also take steps to formalize processes for augmenting and defending shop-floor knowledge. For more established manufacturing firms, sector initiatives have created interim apprenticeships that essentially act as skills equalizers for incumbent workers by codifying and augmenting skills learned earlier in their careers. But they also intervene to establish linkages to external institutions, including community colleges, that can support upskilling and related certification. As this suggests, sector initiatives do find ways to incorporate formal educational programs and credentials. In doing so, however, they avoid blindly pushing a college or university degree. Rather, they use their labor market position to create a flexible training and credentialing resource that helps to prepare industry newcomers, but equally ensures the hidden talents of the incumbent workforce become more visible and valued.

What enables these sector initiatives to influence employment practices is their ability to embed themselves within the local business community and establish on-going relationships with business owners and managers. Admittedly, this has not been the case for all sector initiatives, and directors of some initiatives, including those in manufacturing, admit difficulty in establishing and maintaining strong employer relationships. In this regard, the five initiatives reviewed here – and numerous others modeled after them – stand apart for their ability to maintain deep connections with industry that enable them to keep open a conversation around skill, and during times when definitions and perception of skill may shift and evolve.

## A POLICY CROSS-ROADS

The United States is at a policy cross-roads with respect to manufacturing. Federal and state industrial policy, while not quite set in the United States, has the potential

to influence manufacturing job creation, including where those jobs are located and how accessible they are to less educated job seekers. But it could also undermine job access as well. Key Federal agencies that influence U.S. manufacturing policy direction and discourse seem all too willing to take employer statements about their skills gaps at face value. In response, these agencies narrowly focus on bolstering external educational supports and getting more individuals through these systems – the popular policy mantra being “college for all.” In the process, less attention is given to interventions that might influence internal human resource strategies and have the goal of expanding options for workplace learning and related structures for occupational mobility.

If we start instead with the assumption that employers are inclined to overstate their skill requirements and in ways that unnecessarily conflate skill with academic degrees, we may find ourselves in a position to push for a more comprehensive institutional solution. Efforts that are designed to shape and reshape employer perceptions of and practices around skill may result in more encompassing strategies for skills identification and development. But equally, they could prove more effective in stabilizing manufacturing employment and protecting established pathways into the middle class.

Sector initiatives provide one institutional model for influencing manufacturing employer thinking and decision making, even down to the shop-floor level. Their interventions extend earlier efforts by labor unions to mediate the relationship between worker and supervisor in an attempt to forge a stronger connection between productivity gains and the application and augmentation of worker skill. But more can be done to extend practices of skill reinterpretation and widen their labor market reach.

Several options exist for bolstering sector initiatives, including securing additional and more stable funding sources that can replace those recently eliminated through a budget appropriation bill affecting the Federal Workforce Investment Act. Beyond this, there is the possibility to strengthen partnerships between sector initiatives and Federal agencies. Especially relevant is the federally funded Manufacturing Extension Partnership (MEP), a 25 year old initiative housed under the National Institute of Standards and Technology. As part of its recent strategy overhaul, MEP has committed to extending workforce development services to small and medium-size manufacturing firms through its vast network of state and local technical assistance centers and a new platform called SmartTalent. Traditionally the MEP network has concentrated its resources on helping firms introduce new technologies and coupling that investment with lean manufacturing principles. The decision to add workforce to the mix reflects its desire to have greater influence on manufacturing employment growth. But equally, it reflects MEP’s recognition that worker skill is an essential resource for industry innovation and upgrading – something labor unions recognized much earlier with their support of the high performance experiment in manufacturing.

Still, for a partnership between sector initiatives and the MEP to flourish, it is also important to recognize inherent differences in orientation across these networks, with the former approaching workforce development from a worker-centered perspective and the latter as part of an integrated business solution. At first glance, these differences could create intractable sources of conflict that could undermine opportunities for cooperation. Under a closer light and given evidence of some initial partnering

within specific localities, we instead see an opportunity where ambiguity can again function as resource for change – in this case, a resource for institutional innovation and reinterpretation.

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