

7. Closing the Skills Gap

As described in the previous chapter, pathway clusters offer displaced workers a way to identify target occupations that are generally similar to their former occupations. This chapter addresses the questions of how long and how difficult the transition will be from an originating occupation to a destination occupation. Like the selected occupations from the production cluster presented in **Figure 7**, there is a distance between them. One cannot simply jump from one job to another. So what will it take to get from one occupation to another?

This chapter will layout three new concepts to help workers in their search for new occupations. The first major element in the process is defining the relative distance between occupations, that is, defining the skills gap. The skills gap is the education, training or apprenticeship time required to transition from one occupation to another. Second, as an example of the skills gap analysis, the leading destination occupation trip times are presented for auto sector jobs with the largest losses. Third, these trip-time reports can be a powerful resource for workers plotting their transition to an alternative occupation.

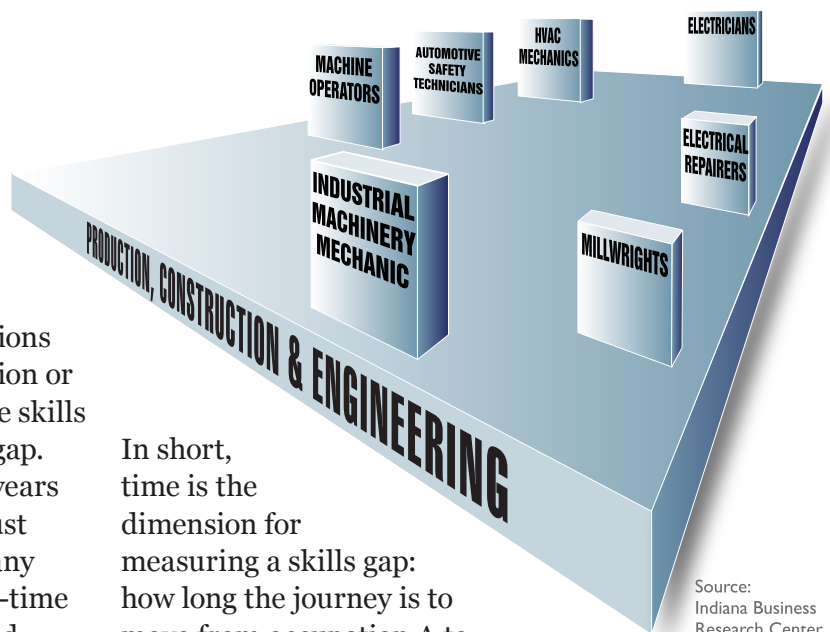
The trip-time method is “a first” because it compresses all the differences between occupations into a common numéraire, namely the preparation or retraining time it would take to change jobs. The skills gap is primarily a knowledge or human capital gap. Closing the knowledge gap can take months or years in the classroom earning credits and degrees, just as closing many types of skills gaps requires many months or even years as an apprentice. The trip-time method measures the distance of a skills gap and the relative ease of moving from one occupation to another. Because up-skilling entails increasing the level, or mix, of a worker’s human capital, the chapter closes with a mention of an online resource to match training and education programs with green and growing occupations.

“The skills gap is primarily a knowledge or human capital gap.”

7.1 Measuring Skills Gaps

The goal of the research team was to boil down the complex components of skills, knowledge and experience that an occupation needs into one dimension. That dimension is time. The time-to-transition measure—trip time—is a simple measure to inform a decision about which career pathway to follow.

Figure 7: Selected Occupations in the Same Cluster as an Industrial Machinery Mechanic



In short, time is the dimension for measuring a skills gap: how long the journey is to move from occupation A to occupation B. There are many other considerations, of course. A path that means paying large sums for tuition would not be feasible for many. Many would rule out a path requiring in-residence course work far away from home. But trip time can represent the difference between working in one occupation and migrating to another.

Source:
Indiana Business
Research Center

The research team enhanced other methods that use time as the primary gap closing measure. O*NET, for example, surveys incumbent workers to determine, among many things, the level of proficiency necessary for a wide range of worker and job characteristics and the educational and training time it would take for an individual to become proficient at a particular job.

The research team used the O*NET job zone framework as the foundation to calculating trip time from one occupation to another, and as a rough test of how well the trip-time calculation reflects the required levels of formal education, experience and on-the-job training for occupations within clusters.

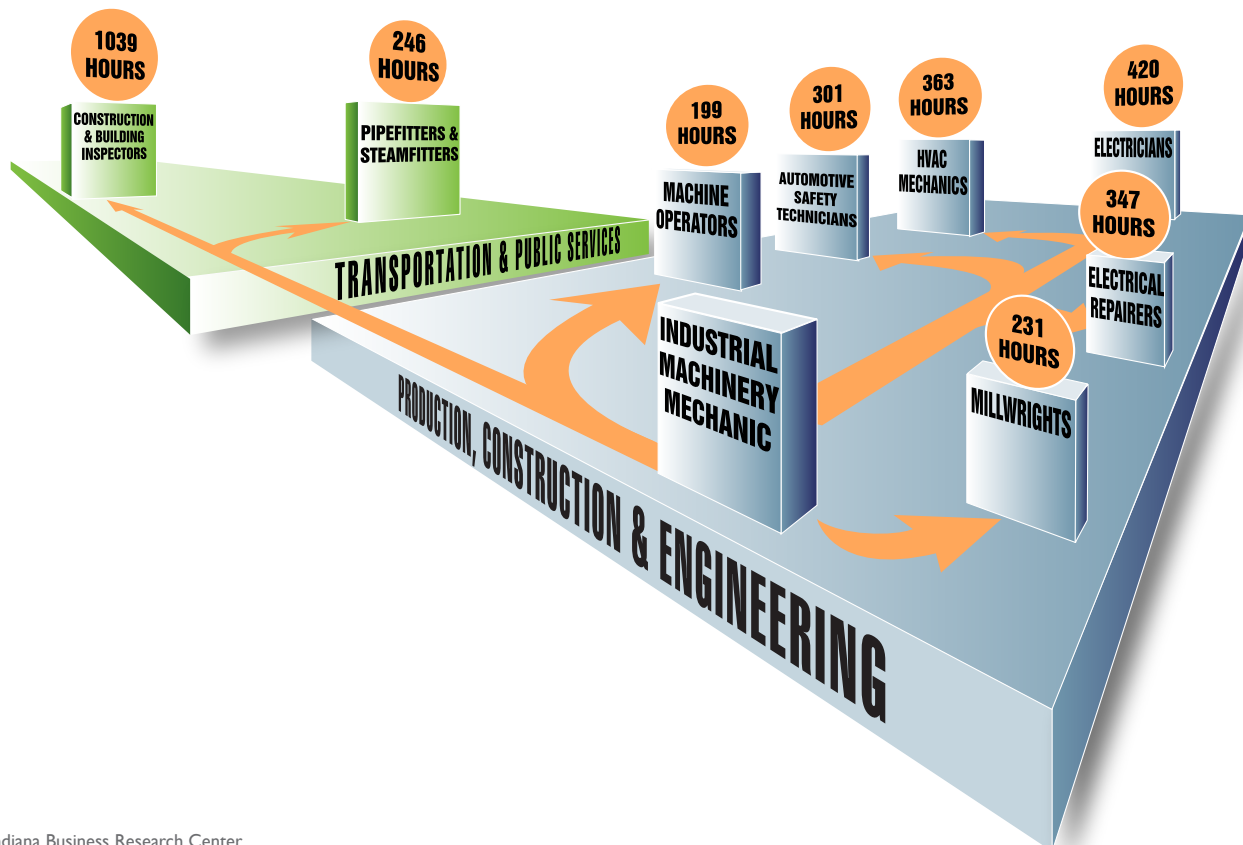
We sought to improve and simplify the methodology. The estimated hours required for education and training were made consistent across different formats—academic, vocational or apprenticeships.

The goal of the pathway time measure is to determine relative ease or difficulty and the length of time, all else being equal. In other words, trip times should not be taken literally but rather as a measure of comparison between different career transitions.

The research team also adjusted time based on the fact that gaining skills and training in one knowledge or skill area usually enhances proficiency in another area. Not all course work or training is sequential or additive. Students often gain knowledge and skills in tandem. As one learns to operate specialized machines, he or she is also gaining experience in instruments and monitoring production processes.

Finally, we estimated the longest sequence of courses or training required to fulfill the most important knowledge or skills requirement for an occupation. This sequence is the dominant skills gap. To the

Figure 8: Trip Times to Transition from an Industrial Machinery Mechanic to Selected Occupations



Source: Indiana Business Research Center

dominant skills gap, analysts added the non-overlapping portions of other additional training time to derive the total trip time. The trip time is the skills gap measured in hours of preparation. If the pathway clusters are how occupations are grouped in two dimensions, then **Figure 8** shows how trip time, or preparation time, is measured in the third dimension.

7.2 Results of the Trip-Time Method

As mentioned above, researchers used O*NET’s five job zone categories—zone one occupations requiring little or no preparation and zone five occupations needing extensive preparation—as the basis for calculating transitional trip time. As **Figure 9** shows, the pathway clusters have different proportions of occupations within each of the five job zones. Some pathway clusters have a disproportionate share of high-preparation occupations—the information and investigation cluster for example—and other pathway clusters have a relatively larger share of occupations with lower preparation requirements. Moving up a job zone typically requires a significant investment in education and training. In the same way, moving from one pathway cluster to another may require a substantial amount of time in additional education and training, especially if the transition entails moving up a job zone level.

Based on **Figure 9**, one would expect that, on average, moving from the construction and extraction cluster to the information and investigation cluster would need a massive amount of education and time.

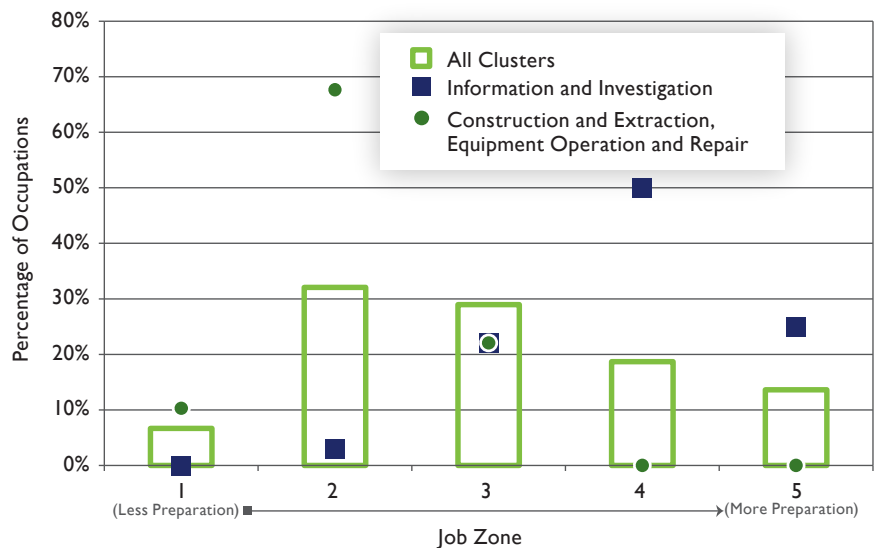
The pathway cluster method used to group occupations might suggest that all within-cluster trip times would be less than trip times between clusters, but this is not always true. Occupations were grouped into pathway clusters according to many criteria including personal traits of the worker (such as highly social) and work activities (such as handling heavy objects), not just knowledge and skill levels. In addition, some subject

areas require many years to master. The trip time to move from being an atmospheric scientist to being an operations research analyst would be considerable, even though both are in cluster 1. Finally, stepping down the job zone ladder is easier than stepping up or moving within. The trip time for the atmospheric scientist—job zone 4—to move into being a billing, cost and rate clerk—job zone 2—would be minimal.

As a rule, however, it is easier to move within clusters. **Figure 10** presents this case graphically by showing the average trip time to transition from the three production, construction and engineering sub-clusters (originating clusters) to the other clusters. Transitions from engineering and applied technology (Cluster 3a) to any other cluster require more trip time than transitions within that sub-cluster, with the exception of the other two production sub-clusters (3b and 3c). Those two sub-clusters have a greater proportion of occupations in job zones 1 and 2, thus making it relatively easier, on average, to make the change to occupations in Cluster 3a.

The production, construction and engineering clusters have a preponderance of the automobile and construction sector occupations—those sectors hardest hit by the Great Recession. Given that trip

Figure 9: Percentage of Occupations in Each Job Zone, Selected Clusters



Source: IDWD and IBRC, using O*NET data

times between clusters are greater than trip times within clusters, and given that the clusters are based on the similarities and differences of worker requirements, worker traits and job demands, a displaced worker would be well served to consider occupation options within his or her cluster first.

7.3 Trip Times for Automotive Occupations

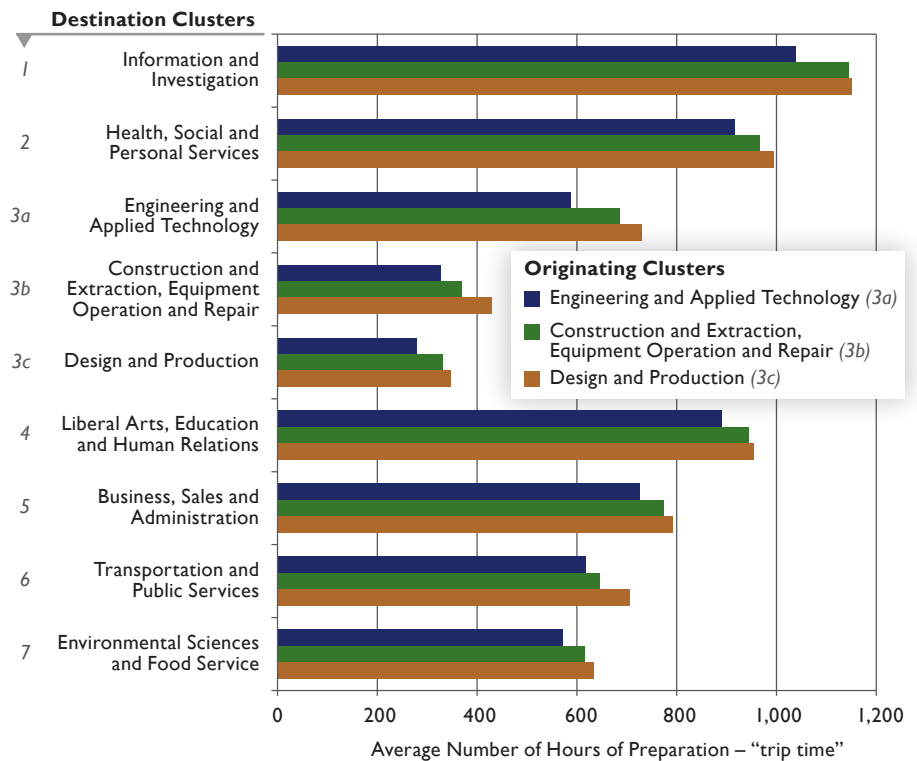
This section puts the pathway cluster and trip-time research into practice. While it focuses primarily on automotive originating occupations, the Driving Change analysis and resources are applicable to all occupations.³³

7.3.1 From Auto to Green and High-Wage/High-Demand³⁴

A displaced autoworker would likely entertain several options before committing to an educational or retraining program. **Table 20** provides two transition options for selected automotive occupations, one within the originating cluster and one outside. These examples also have relatively short trip times, which some workers may prefer in order to adopt new career opportunities as quickly as possible. Moreover, transitions within the same pathway cluster allow workers to move to an occupation that is much more similar to their previous occupation in terms of worker requirements, worker traits and job requirements.

The most common job among automotive workers is team assembler. As **Chapter 4** showed, almost 33,000 team assemblers lost their jobs in the last few years in the tri-state region. While job opportunities within the automotive industry may be declining, there are opportunities for these workers both within

Figure 10: Average Trip Time from Production, Construction and Engineering Clusters to All Clusters



Source: IDWD and IBRC, using O*NET data

their pathway cluster (production, construction and engineering) and outside of their cluster. If a team assembler wanted a green job that is considered high-wage/high-demand, then he or she could transition to a hazardous materials removal worker with approximately 300 hours of training time. That worker could also transition to an insulation worker in the environmental sciences and food service cluster with slightly less time, about 250 hours of training time.

Production helper is another auto sector occupation in decline. These workers can make relatively fast transitions both within their cluster to machine setter, operator and tender positions or outside their cluster to truck drivers, heavy and tractor-trailer operators. While the relative trip time is the same for these two destination occupations—and one must be aware that the trip time measure, like other alternative career tools, is not perfect—within cluster occupations share many similarities. The dislocated worker would

³³ The detailed report has considerably more material. Please visit <http://www.drivingworkforcechange.org/reports/careerpathways.pdf>

³⁴ High-wage/high-demand jobs are occupations that are expected to grow in demand and earn a wage rate greater than the state average.

Table 20: Sample Career Transitions from Automotive Occupations to Green, High-Wage/ High-Demand Occupations

Auto Sector Occupation		Destination Occupation		
Occupation	Pathway Cluster	Occupation	Pathway Cluster	Trip Time (Hours)
Team Assemblers	3c	Hazardous Materials Removal Workers	3b	300
		Insulation Workers, Floor, Ceiling, and Wall	7	250
Helpers—Production Workers	3a	Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	3b	372
		Truck Drivers, Heavy and Tractor-Trailer	6	370
First-Line Supervisors/ Managers of Production and Operating Workers	5	First-Line Supervisors/Managers of Farming, Fishing, and Forestry Workers	5	363
		Computer-Controlled Machine Tool Operators, Metal and Plastic	3a	304
Maintenance and Repair Workers, General	3b	Roofers	3b	214
		Insulation Workers, Floor, Ceiling, and Wall	7	3

Source: IDWD and IBRC

probably feel more comfortable, and perform better, in an occupation in his or her cluster.

7.3.2 From Auto to Non-Green High-Wage/ High-Demand

Limiting transitions from auto sector occupations to only green occupations, as defined by O*NET, greatly reduces a displaced worker’s options. As **Chapter 5** showed, non-green jobs comprised almost 82 percent of all recent HWOL postings in the tri-state region.

Consequently, displaced workers may also want to consider options that are not green. **Table 21** presents a sampling of non-green career transition alternatives for team assemblers and production helpers with relatively short trip times.

7.4 Closing the Skills Gap

One of the Driving Change project goals was to develop a resource to help displaced workers plot a path, in some cases a green path, to a new future. The pathway cluster and trip-time analyses compressed decades of research and data collection on occupations into a relatively simple user-friendly resource for workers in transition.

Workers considering a transition to a new occupation would also benefit from knowing their retraining and

education options. As a result, the Driving Change website also provides a web-based resource to look up educational, training and vocational programs for green and growing occupations. Based on their targeted occupation, users can find all the relevant postsecondary schools offering programs for that occupation within their selected geographic boundary.

This site does not apply to just workers seeking change, but education and workforce development policymakers may also find this site of use because the data present the relative concentration or dearth of educational programs at a highly granular geographic level. For economic development practitioners who may be trying to cultivate the growth of firms or attract new investment, it may expose a region’s training weak spots. If a region does not have a specially trained workforce, what educational programs are nearby to fill the gap?

An astute user of the Driving Change training program website would notice an interesting, but hardly surprising, phenomenon. In the tri-state region, there are no educational programs supporting new and emerging green jobs as defined by O*NET. This most likely means that new and emerging occupations are so new, and the landscape is changing so rapidly, there is not sufficient information to make

the links between educational and technical programs and the characteristics and requirements of those jobs.

For the dislocated autoworker, or any dislocated worker for that matter, the question of how to move from Point A to Point B is far from academic. Training dollars are of little use in workforce development efforts if they fail to move an individual closer to re-employment in a career with a future. This new pathway cluster analysis and using trip time as a simple measure to gauge the ease or difficulty of career alternatives will help these dislocated workers make decisions about which transitions are the most feasible.


These resources, tools and analysis will be online and free of charge, helping today’s displaced workers in the tri-state region find suitable employment, but also serving as a foundation for expanding the workforce development toolkit in the future. 

Table 21: Sample Career Transitions from Automotive Occupations to Non-Green, High-Wage/High-Demand Occupations

Auto Sector Occupation		Destination Occupation		
Occupation	Pathway Cluster	Occupation	Pathway Cluster	Trip Time (Hours)
Team Assemblers	3c	Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	3c	131
		Pipelayers	3b	169
		Coin, Vending, and Amusement Machine Servicers and Repairers	6	306
Helpers—Production Workers	3a	Excavating and Loading Machine and Dragline Operators	3b	198
		Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	3c	203
		Coin, Vending, and Amusement Machine Servicers and Repairers	6	337

Source: IDWD and IBRC