



# The Next-Gen IMT Apprenticeship

A Return On Investment Study

## AT A GLANCE

This study measures the business impact of the Industrial Manufacturing Technician Registered Apprenticeship program on six apprenticeship sponsors.

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# About the Author

## Jonathan Payne

Dr. Payne's work includes supporting the development of registered youth apprenticeship, the design and conduction of this ROI study of sponsors of Industrial Manufacturing Technician registered apprenticeships, and the continued development and implementation of the Possible Futures project, creating a career awareness and exploration program for middle-grade (6–10) students scaffolding young people to complete high school and attain postsecondary credentials with value in the labor market.

Prior to joining JFF, Dr. Payne served as a public educator for over a decade. Most recently, he was a technology integrator at one of the largest high schools in Maine. In that role, he worked closely coaching classroom teachers—implementing technology into daily classroom instruction and assessments to increase student outcomes—and fellow technology staff—supporting the district's one-to-one Chromebook deployment. He also facilitated the creation of the district's K–6 technology scope and sequence and coordinated teacher technology professional development including the creation of a micro-credentialing course suite for just-in-time staff support.

Dr. Payne also served as a science teacher for seven years, focusing mainly on chemistry and engineering, where he helped initiate a STEM Diploma endorsement. Additionally, he has been an enthusiastic educational activist, participating in local, state, and national educational policy discussions as a union president and elected union leader at the state and national levels.

Before entering education, he was also an apprentice preservation and restoration carpenter and a field biologist.

Dr. Payne has a PhD in public policy with a concentration in educational leadership from the University of Southern Maine. He also holds a master's degree in teaching and learning—also from USM—and a bachelor's degree in marine and freshwater biology from the University of New Hampshire.

## Abstract

An underdeveloped talent supply pipeline has resulted in a skills gap and a skilled labor shortage in the manufacturing sector across the United States. This is potentially the result of a lack of diversity in educational opportunity offered to students, an emphasis on college enrollment rates as a high school performance metric, and the conflation

of college and career readiness. The Industrial Manufacturing Technician (IMT) Registered Apprenticeship offers one solution to increase the basic skills of the labor pool in a variety of skilled manufacturing settings such as food processing plants, foundries, plastics manufacturers, and biomedical production facilities.

However, some research suggests that cost plays a significant factor in a business's decision to sponsor apprenticeship. To date, very little research regarding cost-benefit analysis or return on investment (ROI) for sponsors of apprenticeship has been conducted in the United States.

Therefore, this research studies ROI for sponsors of the IMT Registered Apprenticeship. It uses a mixed methodology consisting of an interview in conjunction with an accounting framework. The study was conducted with six sponsors of Registered Apprenticeship (three businesses and three intermediaries).

Only three of the six sponsors were able to provide the full complement of data required to calculate an ROI, with estimated revenues being the least available data. However, all three of the sponsors that were able to provide all of the requisite data saw a positive ROI during the term of the apprenticeship.

This study also recommends three additional areas of research and policy that would assist policymakers and educators to better prepare the workforce: increase empirical research of the benefits and costs of Registered Apprenticeships across all sectors; proliferate the results of that new empirical research, thereby increasing the implementation of Registered Apprenticeships; and increase the involvement of intermediary sponsors, such as labor unions and community colleges, in establishing and maintaining Registered Apprenticeships.

## Acknowledgments

The methodology used in this research relies heavily on *A Pilot Benefit Cost Analysis Study of Sponsors of Registered Apprenticeship in Maine* (the pilot study).<sup>1</sup> Both the research described in this paper and the pilot study sought to better understand the monetized and non-monetized benefits and costs associated with sponsoring a Registered Apprentice. The two studies differ in that the pilot study was limited to a cost-benefit analysis for sponsors of RA programs in Maine and was also open to all sectors and all sizes of sponsors. This new research builds upon the completion of the pilot study by making some small adjustments to the accounting framework to eliminate

extraneous variables. This research is also delimited to sponsors of the IMT (17.3029-09) Registered Apprenticeship in the manufacturing sector.

As part of the national American Apprenticeship Initiative grant, JFF worked in partnership with the Working for America Institute of the AFL-CIO, the Wisconsin Regional Training Partnership (WRTP), Michigan State AFL-CIO Workforce Development Institute (MI WDI), Labor Institute for Training (LIFT), Keystone Development Partnership (KDP), and Chicago Federation of Labor Workforce and Community Initiative (CFL Initiative) to establish and promote the IMT hybrid manufacturing apprenticeship nationwide. A select number of employers and intermediary partners participated in the study. All partners provided valuable input without whom we would not have been able to do this work.

## About JFF's Center for Apprenticeship & Work-Based Learning

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JFF is a national nonprofit that drives transformation in the American workforce and education systems. For 35 years, JFF has led the way in designing innovative and scalable solutions—including apprenticeship and work-based learning programs—that create access to economic advancement for all. These programs are proven methods for connecting people to good careers while providing employers with skilled workers. The Center consolidates JFF's broad skills and expertise on these approaches into a unique offering. We partner with employers, government agencies, educators, industry associations, and others to build and scale effective, high-quality programs. Visit [jff.org/center](http://jff.org/center).

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# Introduction

To date, only three studies have looked at the benefits and costs of Registered Apprenticeship in the United States. In 2012, Mathematica Policy Research conducted a cost-benefit analysis that calculated benefits of Registered Apprenticeship for apprentices and society.<sup>2</sup> However, the benefits to sponsors were not included in the calculation because, as the researchers stated, “we assumed that employers’ net benefits are zero. We made this assumption because we do not have measures of costs and benefits for employers.” They went on to say that their expectation was that employers must experience a net positive benefit, because their participation in RA is voluntary, adding that if that was in fact the case, then the net social benefit would also be higher.

The other two studies were released within one year of each other, meaning they were being conducted roughly concurrently. The first comprised 13 case studies—of 11 business sponsors and two intermediary sponsors.<sup>3</sup> Only two of the sponsors were able to provide enough data to effectively calculate an ROI, which was found to be 8 percent at one and 40 percent at the other. The second study looked at five business sponsors and three intermediary sponsors, finding ROIs ranging from a 62 percent loss to a 90 percent gain, with an average gain of 31 percent.<sup>4</sup>

Unfortunately, though these preliminary findings seem to indicate a positive ROI for apprenticeship, the wide range of results lends a degree of uncertainty around the fiscal outcomes of sponsoring apprenticeship. In light of research that has shown that the net costs of apprenticeship, real or perceived, have a significant influence on a firm’s decision to use apprenticeships to build its talent pipeline, it seems

## EXPANDED DEFINITION

### **Intermediary Sponsor**

An intermediary sponsor is an organization that functions as the program sponsor but not necessarily as the employer. Intermediary program sponsors often function in a principal-agent relationship to connect apprentices with employers. Common examples of intermediary program sponsors are trade unions and community colleges.

important to have a better understanding of the bottom-line implications of sponsoring Registered Apprenticeship in the United States.<sup>5</sup> Gaps and inconsistencies in information regarding employers' perceived costs and cost-benefit ratio for sponsoring apprenticeship may be preventing U.S. companies from sponsoring Registered Apprenticeships. That is likely especially true for small businesses, whose profit margins are smaller, and which are subsequently less tolerant of any potential negative economic consequences of sponsoring apprenticeships.

**To be clear, there are definite and well-documented benefits to sponsoring apprenticeship. According to a guide published by the U.K. government, the following are the key benefits of apprenticeship as found by the National Apprenticeship Service:<sup>6</sup>**

- A more engaged workforce
- A more motivated and satisfied workforce
- Lower staff turnover
- Fewer skills-related vacancies
- Lower recruitment costs
- A more productive workplace
- A better sponsor reputation
- Greater customer satisfaction

Because of such benefits, the guide suggests that apprenticeship should be thought of as a long-term solution to workforce growth and development that can ensure that skill needs are met now and in the future. However, businesses that are feeling the strains of the skills gap now might not be looking for long-term solutions. Among short-term options are paying full price for fully developed talent, but that can be difficult, given that as of 2012 there were 600,000 unfilled manufacturing jobs in the United States.<sup>7</sup> In addition, the same study reported that 74 percent of manufacturers indicated that employee shortages or inadequate talent availability were limiting their ability to expand and increase productivity. The study's author estimated that overall U.S. unemployment could be reduced by a total of 3.85 million workers if the skills gap were closed, because not only could those 600,000 jobs be filled, but also 500,000 new jobs could be created from manufacturing growth and 2.75 million new jobs could be created in related industries.

According to a paper published seven years ago, the Boston Consulting Group (BCG) “estimates that the shortage of high skill manufacturing workers could worsen to approximately 875,000 machinists, welders, industrial machinery mechanics, and industrial engineers by 2020.”<sup>8</sup>

That paper also cited a RAND Corporation analysis that concluded that the decline of the U.S. machine-tool industry was in part due to firms' disinvestment in worker training and "the collapse of the apprenticeship system that was the main source of skilled labor."

While apprenticeship could help address the skills gap, apprenticeships are drastically underutilized as a standard part of the development and training of the American workforce. In 2013, the United States had only 358,000 registered apprentices and 21,000 unique programs nationwide, whereas Germany, with less than one-third the population, had 1.8 million apprentices and 500,000 sponsoring companies.<sup>9</sup> In England during the 2011-12 academic year, more than half a million new entrants were registered for apprenticeships. Proportional to population, that translates to 2.5 million U.S. entrants, far fewer than the actual U.S. total of 104,332.<sup>10</sup>

In 2015, a broad coalition led by JFF, the Wisconsin Regional Training Partnership, and the AFL-CIO Working for America Institute developed the Industrial Manufacturing Technician Registered Apprenticeship as one solution to increase the basic skills of the labor pool in a variety of skilled manufacturing settings such as food processing, foundries, plastics

manufacturing, and biomedical production facilities. The goals are to "meet demands for quality and safety in a workforce where experienced employees are aging out and new talent is hard to find," and to provide employers the opportunity to "attract and train the skilled workers who will grow this critical sector of the U.S. economy."<sup>11</sup> This 18-month, 3,000-hour Registered Apprenticeship is focused on entry-level production workers. Unfortunately, the same questions about the costs of apprenticeship may still be dissuading employers from sponsoring the IMT RA.

Therefore, the purpose of this study was to perform an ROI and cost-benefit analysis for sponsors of the IMT RA. This study used a mixed methodology, collecting quantitative benefit and cost data and qualitative data pertaining to non-monetized benefits to recruitment, retention, and advancement for six sponsors. As part of this study, the cost and benefit information was used to determine a net cost/benefit and ROI, and interviews were conducted to uncover the non-monetized benefits.



# Results

## Results Summary

### *Quantitative Analysis*

The table below shows the net present value and ROI for each of the intermediary sponsors and business sponsors.

TABLE 1

#### **Net Present Value for Sponsors of the IMT RA**

ORGANIZATION	NET PRESENT VALUE	ROI
Intermediary Sponsor 1	unknown	unknown
Intermediary Sponsor 2	unknown	unknown
Intermediary Sponsor 3	\$130,260	72%
Business Sponsor 1	unknown	unknown
Business Sponsor 2	\$30,128	26%
Business Sponsor 3	\$79,382	46%

The results of the cost-benefit analysis showed, for the one intermediary sponsor and two business sponsors that were able to provide sufficient data for the calculation, positive present values ranging from \$30,128 to \$130,260, for an average present value of \$79,923, indicating an overall benefit. The ROI, for those same sponsors, ranged from 26 percent to 72 percent, with an average of 48 percent, meaning that, on average, every \$1.00 invested in apprenticeship returned \$1.48, with a range of returns from \$1.26 to \$1.72. Two of the intermediary sponsors and one of the business sponsors were unable to provide the data required to accurately calculate either costs or benefits, or both. In these instances, the net present value has been stated as unknown, because it is inevitable

that the businesses in question experienced *some* form of revenue as a direct result of the work of the apprentice, so strictly representing their outcomes as a cost would give the impression of certainty when the opposite is actually the case.

### *Qualitative Analysis*

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The six sponsors (three intermediary sponsors and three business sponsors) employed between 28 and nearly 400 people, and the majority of the sponsors reported that they employ or serve businesses that employ 175 full-time equivalent (FTE) workers. Across the sample of sponsors that were able to provide information regarding the retirement eligibility of their employee populations, approximately 17 percent of employees were 62 years old or older and therefore eligible for retirement, another 28 percent were 57 years old or older and therefore within 5 years of retirement, and another 27 percent were 52 years old or older and therefore within 10 years of retirement. This means that, across the businesses in the sample, nearly 3 out of every 4 employees could potentially retire from the workforce in the next decade. These business sponsors or the businesses with which the intermediary sponsors were working currently have a total of 52 apprentices, with individual businesses' totals ranging from two apprentices to 21 (at the labor union). The businesses represented in the sample have had a total of 21 apprentices complete the IMT RA program and earn a journey worker certification. The retention rates for those new journey workers is near 100 percent, and 8 of them have been promoted within their organizations. During the same timeframe, the businesses in the sample have had only 10 apprentices leave the apprenticeship program before earning their credential. These trends are confirmed by the responses to the qualitative interview questions regarding the impact of IMT on advancement and retention. The average scores from those interviews, out of 5, were 3.8 (advancement) and 4.3 (retention).

TABLE 2

## Non-Monetized Benefits Referenced

BENEFIT	NUMBER OF SITES REFERENCING
Upskilling	4
Retention	4
Comprehensive Training	3+1
Recruitment	3
Increased Productivity/ Product Quality	2

Across the interviews there were also several major themes that emerged, as shown in Table 2.

The most frequently mentioned (four of the six sponsors) non-monetized benefits of sponsoring the IMT RA were upskilling of the incumbent workforce and retention of apprentices after the completion of their apprenticeships. Three of the six sponsors specifically referenced the comprehensive nature of the IMT RA program in that it provided apprentices the opportunity to more fully understand all aspects of the business, and another sponsor referenced “building a foundation that would provide apprentices with the ability to move throughout the organization,” which is semantically similar to “comprehensive,” and therefore led to the notation “3+1” in the table. Three of the six sponsors specifically mentioned sponsoring the IMT RA as a recruitment tool to attract new talent to their organizations and get them into a talent pipeline. Lastly, two of the six sponsors stated that their employees were more productive and that the products they produced were of higher quality as a result of sponsoring the IMT apprenticeship.

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## RESULTS

### Intermediary Sponsors vs. Business Sponsors

When it comes to the establishment and sponsorship of Registered Apprenticeship, intermediary sponsors such as unions, community colleges, and other entities are a special case within the labor market. These entities might act as agents to connect apprentices, who act as principals, with businesses. Unions have engaged in sponsoring apprenticeship for several reasons, “in particular, unions are well situated to identify and codify the occupational skills requirements necessary for

registering an occupation as apprenticeable.”<sup>12</sup>

In more recent years, this role has been filled by other groups such as community colleges, nonprofits, and for-profit organizations.

Because these intermediary sponsors function as the agent in those labor relations, some of the costs of the apprentice/sponsor relationship are different than when an apprentice acts as their own agent. For example, a labor union or community college might provide or subsidize the related technical instruction for the apprentice and therefore absorb some of the cost burden for training the apprentice, while the business that hires the apprentice pays the costs associated with wages and benefits.

Therefore, the calculation of benefits and costs when intermediary sponsors act as agents in the establishment of the apprentice/sponsor relationship is slightly more complicated because of the involvement of a third party. While that does slightly complicate the understanding of who incurs the costs and benefits, the majority of the financial benefits (in the form of billable work conducted by the apprentice) are still realized by the business that does the contracting. And, because the training and administrative requirements of the apprenticeship are paid for by the intermediary sponsor, businesses that contract apprentices through them likely assume lower risk than in an apprenticeship sponsored by a business alone.

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**“In particular, unions are well situated to identify and codify the occupational skills requirements necessary for registering an occupation as apprenticeable.”<sup>12</sup>**

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# Intermediary Sponsor 1

## *Qualitative Analysis*

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Intermediary Sponsor 1 is a private nonprofit in one of the Mid-Atlantic states that works with four businesses, each of which employs between 75 and 200 employees. The workforce development consultant who was interviewed indicated that approximately 10 percent of the labor pool with which Intermediary Sponsor 1 works might be eligible for retirement. The organization has been sponsoring IMT Registered Apprenticeship since March of 2018, because the program provides structured training that gives it a competitive advantage both by enticing current workers to upskill and by attracting new talent.

Intermediary Sponsor 1 has 13 registered apprentices, all of whom are still in the process of completing the 3,000-hour training program; no one has left or been removed from the program. The sponsor indicated that it feels that the IMT RA program is doing a good job (4 out of 5) both in preparing apprentices to replace the retiring workforce and in impacting the promotion of the workforce in general. It also indicated that the IMT apprenticeship program has made a substantial impact (5 out of 5) on the retention of employees in general.

## *Quantitative Analysis*

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As seen in Table 3, the annual cost for sponsoring each apprentice was \$50,607 in year 1 and \$22,024 for the 1,000-hour portion completed in year 2.

TABLE 3

**Annual Cost of Sponsoring an Apprentice for Intermediary Sponsor 1**

YEAR	APPRENTICE WAGES	INSURANCE & BENEFITS	FICA	SUPERVISOR TRAINING	JOURNEY WORKER TRAINING	RELATED TECHNICAL INSTRUCTION	ANNUAL COST	PRESENT COST
1	\$29,500	\$8,850	\$2,257	unknown	unknown		\$50,607	\$48,197
2	\$16,000	\$4,800	\$1,224	unknown	unknown	\$10,000	\$22,024	\$19,976
								\$68,173

In this case, each apprentice's wage began at \$14.50 per hour for the first 1,000 hours of the apprenticeship, and after that time the apprentice received an increase of \$0.50 per hour for the next 1,000 hours and another increase of \$1.00 per hour for the final 1,000 hours of the 3,000-hour apprenticeship program. The intermediary sponsor estimated that the insurance and benefits package cost the business approximately 30 percent of each apprentice's wage. Federal Insurance Contributions Act (FICA) contributions made by the sponsor match those made by the apprentice and equal 7.65 percent of gross annual wages. Intermediary Sponsor 1 does not contribute to any retirement programs for its employees. Because the sponsor is an intermediary and not the actual employer, it was unable to provide estimates for the time either journey workers or supervisors/forepersons were engaged in training. The sponsor did state

that, over the course of the apprenticeship, it paid roughly \$10,000 in costs associated with related technical instruction. The sponsor was unable to provide with any degree of accuracy any expenses that were spent for wastage and the associated repairs/fixes, machine downtime, or other costs incurred directly related to sponsoring the apprenticeship.

The sponsor was unable to provide the billable wage rate for a journey worker and was also unable to provide the per-unit price of goods generated by the apprentice during the term of the apprenticeship. That makes it impossible to calculate the revenue generated by the apprentice during the term of apprenticeship. The only revenue side benefit was \$3,000 per year, per apprentice, for up to five apprentices, which was secured for the employer by the intermediary sponsor.



## Intermediary Sponsor 2

### *Qualitative Analysis*

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Intermediary Sponsor 2 is a community college (CC) in one of the Mid-Atlantic states functioning as an intermediary to connect apprentices with local manufacturing companies. The CC engages in sponsoring RA because, “As a community college it is part of our mission and strategic goals to provide affordable access to high-quality career education.” The CC indicated that Registered Apprenticeship provides a program with training that will help upgrade worker skills and create a career pathway with wage gains because “companies need employees and we are helping them with building a pipeline and keep employees.” The CC added that the wage gains are a way for companies to show that they value their employees, which decreases turnover.

The sponsor indicated that it feels that the IMT RA program is doing a good job (4 out of 5) both in preparing apprentices to replace the retiring workforce and in impacting the promotion of the workforce in general, but that it was too soon in the implementation of the apprenticeship program to determine the impact on the retention of employees in general.

The CC selected one of the businesses with which it works as an example. This business has approximately 101 full-time employees and has been sponsoring the IMT RA since July 2019. The business currently has two apprentices, both of whom were incumbent workers. The business stated, “Having the [apprenticeship] program located in the industrial park makes it very practical and convenient for our apprentices to go from work to class. The classroom setting is a great blend because it helps to ease the transition of being in a structured learning program [that is also set] in the familiar work locale. This program brings apprentices, mentors, and managers together from different companies in the park and provides the opportunity for interaction and integrated learning experiences, which is resulting in building a skilled workforce and learning community locally.”

### *Quantitative Analysis*

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As seen in Table 4, the annual cost for sponsoring each apprentice was \$66,900 in year 1, and \$30,330 for the 1,000-hour portion of the apprenticeship completed in year 2.

TABLE 4

**Annual Cost of Sponsoring an Apprentice for Intermediary Sponsor 2**

YEAR	APPRENTICE WAGES	INSURANCE	FICA	RETIREMENT	SUPERVISOR TRAINING	JOURNEY WORKER TRAINING	RELATED TECHNICAL INSTRUCTION	ANNUAL COST	PRESENT COST
1	\$37,943	\$18,000	\$2,903	\$-	unknown	\$1,580		\$66,900	\$63,715
2	\$19,080	\$9,000	\$1,460	\$-	unknown	\$790	\$6,475	\$30,330	\$27,510
									\$91,225

In this case, the apprentice's wage began at \$18.79 per hour for the first 750 hours of the apprenticeship, after which the apprentice received an increase of \$0.30 per hour for the final 2,250 hours of the 3,000-hour apprenticeship program. The annual costs for medical, dental, vision, short-term disability, and life insurance, plus a 6 percent matching contribution for 401(k) was estimated at a total of \$18,000. FICA contributions made by the sponsor match those made by the apprentice and equal 7.65 percent of gross annual wages. It was estimated that a journey worker, removed from productive work, spent a total of about one hour per week, throughout the course of the apprenticeship, engaged in training the apprentice. This represents an opportunity cost for the company equal to the hourly wage of the journey worker plus the disaggregated hourly cost of all benefits. Thus, the opportunity costs of training are \$1,580 in year 1 and \$790 for the last third of the apprenticeship during the first half of year 2. No estimate for the supervisors/

forepersons who were engaged in training were provided. The sponsor did state that, over the course of the apprenticeship, it paid roughly \$6,475 in costs associated with related technical instruction. The sponsor was unable to provide with any degree of accuracy any expenses due to wastage and the associated repairs/fixes, machine downtime, or any other costs incurred directly related to sponsoring the apprenticeship.

The sponsor was unable to obtain the billable wage rate for a journey worker or per-unit price on goods generated by the apprentice during the term of the apprenticeship, which makes it impossible to calculate the revenue generated for the company by the apprentice during the term of apprenticeship. The only revenue-side benefit the sponsor was able to specify was the availability of \$3,000 per year per apprentice, for up to five apprentices, in grant funds to defray the cost of related technical instruction.

## Intermediary Sponsor 3

### *Qualitative Analysis*

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Intermediary Sponsor 3 is a labor union of riggers, machinery movers, and erectors. It is located in one of the Midwestern states and does business across a large portion of that state. It currently has about 215 journey worker members and deals with several fairly large contractors on a regular basis. The union has been sponsoring the IMT RA since June of 2018. Since then it has had six apprentices complete training, and it currently has 21 apprentices. None of its apprentices have failed to finish the apprenticeship.

The union sponsors the IMT RA because it means better pay rates for its members, better training, better-quality training, and a better-quality employee for the contractors with whom it works. The union also sponsors a longer and more intensive Machinery Mover and Machinery Erector Registered Apprenticeship. The union apprenticeship coordinator indicated that sponsoring RA provided a competitive advantage for manufacturers because many of them lack any internal training program, and the IMT RA fills that void.

Of the union's membership, approximately 10 percent currently are eligible to retire. The union apprenticeship coordinator indicated that the IMT RA program was doing a great job (5 out of 5) both in preparing apprentices to fill vacated roles caused by retirement in the near future and in the general retention of all the employees/members. However, the union is not as certain about the degree to which sponsoring the IMT RA had impacted the overall advancement opportunities for all its members.

## Qualitative Analysis

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Because Intermediary Sponsor 3 is a labor union, it functions as an agent in a principal-agent relationship with apprentices. Its pay scales are based on the collective bargaining agreement it negotiated with the regional contractors' associations and apply to all contractors and all union members, including apprentices. As such, the calculations are representative of any theoretical apprentice, not of a specific apprentice.

Apprentices with Intermediary Sponsor 3 are paid wages and benefits pursuant to the collective bargaining agreement. The apprentice wages are based upon percentages of the journey workers' wage. IMT apprentices' starting wage is \$24.00 per hour for the first 1,200 hours of the 3,000-hour apprenticeship. After that, wages increase to \$24.60 per hour for the remaining 1,800 hours.

Apprentices receive other benefits through the union, per the collective bargaining agreement, as follows:

Health and Welfare	\$10.00/hr.
Pension	\$18.50/hr.
Apprenticeship and Training	\$1.20/hr.
Annuity	\$8.21/hr.
Other	\$0.28/hr.
<b>Total Benefits</b>	<b>\$38.19/hr.</b>

In the case of Intermediary Sponsor 3, the costs for supervisor training, administrative costs associated with establishing and maintaining the apprenticeship, and the recruitment of new apprentices are all incurred by the union, which is supported by local dues. Those costs have therefore been excluded from the cost calculations. The journey worker opportunity cost has also been excluded, based on the statement from the union apprenticeship coordinator that the productive downtime as a result of training would be negligible.

Table 5 shows the annual costs incurred by a business sponsoring an apprentice through Intermediary Sponsor 3. The annual cost is \$128,569 in year 1 and \$64,672 in year 2.

TABLE 5

### Annual Cost Incurred by a Business for Sponsoring an Apprentice from Intermediary Sponsor 3

YEAR	APPRENTICE WAGES	BENEFITS	FICA	ANNUAL COST	PRESENT COST
1	\$48,480	\$76,380	\$3,709	\$128,569	\$122,446
2	\$24,600	\$38,190	\$1,882	\$64,672	\$58,659
					\$181,106

The training director felt that the amount of wastage generated by apprentices would likely be negligible and said machine downtime would occur only in the event of an accident.

Table 6 shows the annual revenue per apprentice for businesses contracting apprentices through Intermediary Sponsor 3. These revenues were calculated using a 40-hour workweek at a rate of \$125 per hour, which the union apprenticeship coordinator said is representative of the rate billed for that type of work in the area. This was multiplied by 50 weeks (or a total of 2,000 hours) a year. Apprentices' vacation time is not paid for by a contracting business. Neither companies nor the union receive additional revenue as a result of sponsoring an apprentice.

TABLE 6

### Annual Revenue per Apprentice from Intermediary Sponsor 3

YEAR	VALUE OF PRODUCT/ BILLED HOURS	OTHER SOURCE OF BENEFIT	ANNUAL REVENUE	PRESENT REVENUE
1	\$209,375	\$-	\$209,375	\$199,405
2	\$123,438	\$-	\$123,438	\$111,961
				\$311,366

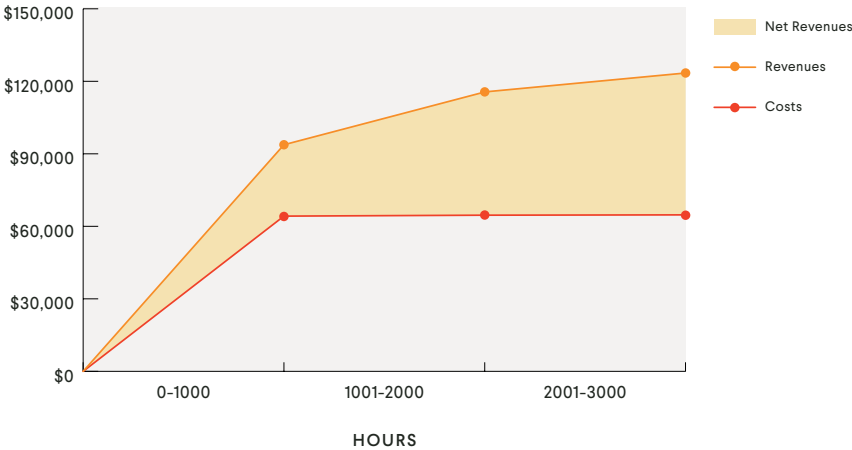
Therefore, Table 6 shows that the annual revenue realized by a business for sponsoring an apprentice from Intermediary Sponsor 3 is \$209,375 in year 1 and \$123,438 in year 2 (1,000 hours).

The net present value realized by a business for sponsoring an apprentice from Intermediary Sponsor 3 is shown in Table 7. Given a 5 percent discount rate, the present cost of capital invested in each apprenticeship is \$181,106, and the present revenue is \$331,366. Therefore, the net present value realized by a business as a result of sponsoring an apprentice from Intermediary Sponsor 3 is \$130,260.

TABLE 7

**Net Present Value Realized by a Business for Sponsoring an Apprentice from Intermediary Sponsor 3**

NET PRESENT COST/ BENEFIT	PRESENT REVENUE	PRESENT COST
\$130,260	\$331,366	\$181,106





## Business Sponsor 1

### *Qualitative Interview*

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Business Sponsor 1 is a manufacturing business that produces paper and hygiene products and operates at several locations within a Mid-Atlantic state. The talent development specialist interviewed stated that the company participates in Registered Apprenticeships because “it is one of the best ways to move forward. We are able to bring in new hires with potential and put them through a clear pathway in the company.” Those new hires include both high school graduates and current workforce participants looking for a career change, but the company wants young apprentices, and to “get them in at the earliest entry point possible.” The apprenticeship program is also an intentionally well-rounded program that has improved new-hire retention. Business Sponsor 1 also sponsors the Industrial Maintenance Technician (IMT2)—Machine Operators and Mechanics Registered Apprenticeship.

Business Sponsor 1 has about 400 full-time employees and nine registered apprentices. It began sponsoring the IMT Registered Apprenticeship in August

of 2017 and has had four apprentices complete the apprenticeship program since its inception. Six other individuals began the apprenticeship program but either canceled the apprenticeship or had it canceled. The talent development specialist said that factors contributing to incomplete apprenticeships included attendance and safety issues and life changes, such as marriage or a family move. The talent development specialist added that all the canceled apprenticeships were discontinued early in the process.

Of the 400 FTEs, approximately 25 percent are 62 years old or older and therefore eligible for retirement. Approximately 133 additional employees are 57 years old or older and therefore within five years of retirement eligibility. And approximately 133 additional employees are 52 years old or older and therefore within 10 years of retirement eligibility. This means that over 80 percent of the employees at Business Sponsor 1 have the potential to retire within the next 10 years.

The talent development specialist said that sponsoring the IMT Registered Apprenticeship has had a significant

impact on the preparation, advancement, and retention of employees in general, adding that his advice to other businesses is, “Do it!” According to his statement, “The apprenticeship program is a win-win on so many levels, for high school grads to avoid student loan debt . . . For companies, it’s tough to find people because unemployment is so low. Your next new hire is already working at another company! The apprenticeship program is part of the recruitment, benefits, and perks program. It’s a plus for high schools, a plus for colleges, and a plus for pre-apprentices.”

### Quantitative Analysis

For Business Sponsor 1, the annual cost of sponsoring an apprentice is \$39,567 in year 1 and \$17,874 in year 2 (Table 8), when the final third of the 3,000-hour apprenticeship is completed. Note that this cost estimate lacks information on insurance for health, life, and disability, and on workers’ compensation premiums paid by the employer on behalf of the apprentice. Because those are major costs of employment (potentially between \$5,000 and \$20,000 or even more), the total cost estimate is undoubtedly low. The total costs including insurance are likely closer to \$70,000 to \$100,000 over the duration of the apprenticeship.

TABLE 8

### Annual Cost of Sponsoring an Apprentice for Business Sponsor 1

YEAR	APPRENTICE WAGES	INSURANCE	FICA	RETIREMENT	SUPERVISOR TRAINING	RELATED TECHNICAL INSTRUCTION	ADMIN.	MISC.	ANNUAL COST	PRESENT COST
1	\$30,740	unknown	\$2,352	\$1,000	\$3,875	\$1,100	\$100	\$400	\$39,567	\$37,683
2	\$16,046	unknown	\$1,228	\$500	\$0	\$0	\$100	\$0	\$17,874	\$16,212
										\$53,895

The major difference between years 1 and 2 was the wages paid to the apprentice. The apprentice made \$15.00 per hour for the first 520 hours of the apprenticeship, \$15.50 per hour during the next 1,780 hours, and \$16.28 per hour for the remaining 700 hours. FICA is calculated based on a rate of 7.65 percent of the total salary paid to the apprentice. The company provides its apprentices with a retirement account and contributes \$1,000 per year, or a total of \$1,500 during the 18-month apprenticeship program.

The supervisor said there were no instances where a journey worker was engaged in training an apprentice and as a result was not also engaged in productive work. Therefore, the opportunity cost for journey worker training is zero. The supervisors at the company make approximately \$60,000 per year, or about \$30.00 per hour, and additional compensation costs for them arise from the 7.65 percent FICA and the unknown amount for insurance. Supervisors are involved in about 120 of the 3,000 hours of each apprentice's training. Related technical instruction is paid by the employer and totals \$1,100 in year 1, but no additional training costs were provided for year 2. The company does not specifically record its expenditures on recruitment, wastage, or machine downtime.

The talent development specialist was unable to provide the billable wage rate for a journey worker or the per-unit price on goods generated by the apprentice during the term of the apprenticeship. Therefore, it is not possible to calculate the revenue generated for the company by the apprentice during the term of apprenticeship.

However, the talent development specialist did say that the apprentices were 30 percent as productive as a fully skilled, fully trained journey worker in the first quarter of their apprenticeship; 75 percent in the second; 85 percent in the third; and 100 percent in the fourth. Along with this data on relative productivity, the talent development specialist said the company uses grant funds to defray as much as 20 percent of the cost of related technical instruction.

## Business Sponsor 2

### Qualitative Analysis

Business Sponsor 2, located in a Midwestern state, specializes in custom steel fabrication. The company has been sponsoring Registered Apprenticeship since 2018. According to the representative interviewed, RA helps the company build a more skilled workforce, saves an enormous amount of training time, “makes my employees happier,” and “gives them a sense of pride.” He added that, because of the custom nature of the company’s product, highly skilled workers are needed.

“If I can offer apprenticeship it goes a long way in recruitment of

talent” because otherwise “I have to find guys who are already doing this or find new guys and teach them.”

The company has 28 FTEs. Of those, six are 62 or older and therefore eligible for

retirement, and two are less than 10 years away from retirement age. The company had six registered apprentices start the program. Of those, five are still with the company and on track to earn their certificate. The business representative

stated that the apprenticeship training does a good job (4 out of 5) of preparing the apprentices to replace the retiring employees, but they all need more experience before they can master the craft needed to produce the company’s custom products. Two specific areas in which apprentices often require additional time before they are fully prepared to replace retiring workers are doing higher math and reading blueprints.

The company representative stated that sponsoring RA provided a competitive advantage, giving him more confidence

in the quality of the company’s product, making recruitment easier, and allowing workers to be more productive, “because the apprentices know what they are doing and what they need to do.”

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**“I’m going to keep them excited about their work and give them opportunities to grow.”**

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He added, “We are producing at a rate faster than we ever have before, and that’s because of the apprenticeship program, which in turn lets us take on a higher volume of work.” In addition, he said, the program has taught the apprentices some

core skills that have made the shop much safer. Lastly, sponsoring apprenticeship was also found to be a benefit (4 out of 5) to the retention of employees because “I can offer training to help people advance and if I can keep them engaged and allow them to progress I’m going to keep them excited about their work and give them opportunities to grow.”

*Quantitative Analysis*

As seen in Table 9, the cost for sponsoring the apprentice was \$82,944 in year 1 and \$42,302 in year 2. (Apprentices complete the 3,000-hour training program halfway through year 2.)

TABLE 9

**Annual Cost of Sponsoring an Apprentice for Business Sponsor 2**

YEAR	APPRENTICE WAGES	INSURANCE	FICA	RETIREMENT	SUPERVISOR TRAINING	JOURNEY WORKER TRAINING	ANNUAL COST	PRESENT COST
1	\$34,500	\$22,800	\$2,639	\$1,035	\$13,936	\$12,553	\$82,944	\$78,994
2	\$18,000	\$11,4400	\$1,377	\$540	\$6,968	\$4,017	\$42,302	\$38,369
								\$117,363

In this case, the apprentice’s wage began at \$17.00 per hour for the first 1,500 hours of the apprenticeship and increased to \$18.00 per hour for the remaining 1,500 hours of apprenticeship. Insurance paid by the employer totaled \$22,800 annually. FICA contributions made by the sponsor are equal to those made by the apprentice, at a rate of 7.65 percent of gross wages. The business also contributed 3 percent of the apprentice’s gross wages to a retirement account.

The business manager estimated that the supervisor’s wage during the time of the apprenticeship was \$30.00 per hour, plus 7.65 percent FICA, the 3 percent retirement contribution, and the total disaggregated cost of insurance. The supervisor is engaged in

training for an average of 6.25 hours each week over the course of the 3,000-hour apprenticeship.

The business manager stated that the wages for the journey workers engaged in training during the time of the apprenticeship were \$26.00 per hour, plus 7.65 percent FICA, the 3 percent retirement contribution, and the total disaggregated cost of insurance. He said the supervisor is engaged in training for an average of 4 hours each week during the course of the 3,000-hour apprenticeship. The business did not spend anything on related technical instruction, nor did it have any information about wastage or associated repairs/fixes specifically attributable to the work of the apprentice.

The annual revenue as a result of sponsoring an apprentice for Business Sponsor 2 is shown in Table 10. The annual revenue in year 1 was \$93,880, and for the portion of year 2 when the apprentice was completing training, it was \$64,035.

TABLE 10

### Annual Revenue from Sponsoring an Apprentice for Business Sponsor 2

YEAR	VALUE OF PRODUCT/ BILLED HOURS	OTHER SOURCES OF BENEFIT	ANNUAL REVENUE	PRESENT REVENUE
1	\$85,380	\$8,500	\$93,880	\$89,410
2	\$64,035	\$-	\$64,035	\$58,082
				\$147,491

The value of product / billable hours is calculated using estimates of the marginal productivity of an apprentice relative to a fully skilled, fully trained journey worker. In this case, the apprentice’s marginal productivity was estimated at 50 percent in the first quarter and 60 percent, 75 percent, and 95 percent in the subsequent quarters. The journey worker’s hourly work was valued at \$71.15. Additionally, the company received an



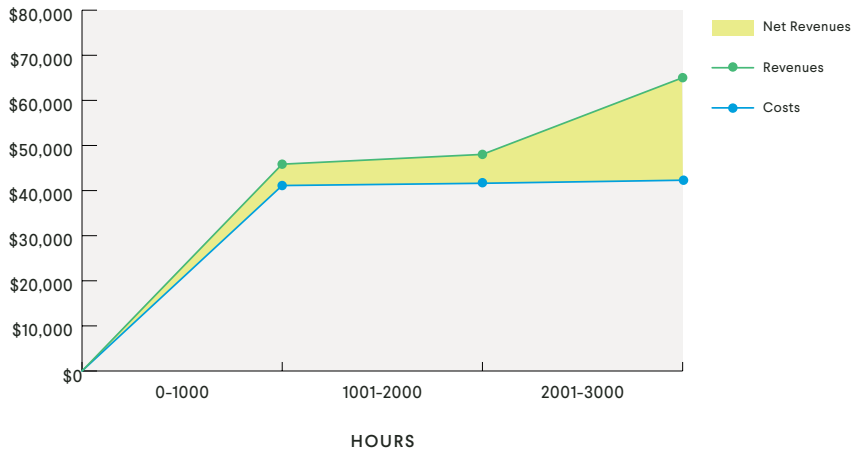
incentive from a local labor board, which subsidized 50 percent of the apprentice’s wages for the first six months (1,000 hours) of the apprenticeship. This uncommon benefit was fairly substantial, coming to \$8,500 and helping defray the costs associated with sponsoring RA.

Table 11 shows that, given a 5 percent discount rate, the present cost of capital invested in apprenticeship for Business Sponsor 2 is \$117,363, and the present revenue is \$147,491. That means the net present value realized by Business Sponsor 2 as a result of sponsoring an apprentice is \$30,128.

TABLE 11

### Net Present Value of Sponsoring an Apprentice for Business Sponsor 2

NET PRESENT COST/ BENEFIT	PRESENT REVENUE	PRESENT COST
\$30,128	\$147,491	\$117,363



## Business Sponsor 3

### *Qualitative Analysis*

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Business Sponsor 3, located in a Midwestern state, specializes in industrial surfacing processes. The company has 108 FTEs, three of whom are 62 years old and are therefore eligible for retirement, 15 of whom are within five years of retirement eligibility, and 10 of whom are within 10 years of retirement. That means approximately 25 percent of the company's workforce could retire within the next 10 years. The business director who was interviewed indicated that apprenticeship is doing an excellent job (5 out of 5) in preparing the new apprentices to replace the retiring workforce.

The company has been sponsoring Registered Apprenticeship since 2016, attracted by “the long-term development and the well-rounded training of the apprentices. They learn enough to grow and advance within the organization over time.” In addition, with a German parent, the company is inclined to follow the German apprenticeship model. RA also fits in with the company's motto of “Finding a better way.”

The company stated that “the program has been the foundation to build off from and gain experience” for young workers. What the company sees as valuable experience is not limited to learning how to weld part A to part B, but also learning with more depth about the things the company makes and *why* part A gets welded to part B. Along with their training on the shop floor, apprentices also spend time in “sales, and finance, and purchasing, so they are going to understand the entire process.”

The company currently has 11 apprentices, of whom four are registered apprentices. Another 11 have completed their apprenticeships and earned their journey worker certificate, and eight of those individuals have been promoted within the company. Those first eight apprentices were all incumbent workers, as part of a strategic plan to ensure the success of the apprenticeship program by having those individuals become the journey worker trainers for future cohorts.

Since the company began sponsoring apprenticeship, only one apprentice has not completed the program, having been terminated for disciplinary reasons.

The business director said the apprenticeship program has been a long-term talent supply pipeline that has helped the business build “the best employees for the organization” and set people up to grow and advance within the business in the future.

*Quantitative Analysis*

As seen in Table 12, the annual cost for sponsoring the apprentice was \$25,968 in year 1 and \$57,615 in year 2. (The apprenticeship program lasts 18 months.)

TABLE 12  
**Annual Cost of Sponsoring an Apprentice for Business Sponsor 3**

YEAR	APPRENTICE WAGES	INSURANCE	FICA	RETIREMENT	SUPERVISOR TRAINING	JOURNEY WORKER TRAINING	RELATED TECHNICAL INSTRUCTION	ANNUAL COST	PRESENT COST
1	\$35,220	\$12,564	\$2,694	\$704	\$46,230	\$20,055	\$8,500	\$125,968	\$119,970
2	\$18,380	\$6,282	\$1,406	\$368	\$21,152	\$10,028		\$57,615	\$52,259
									\$172,228

In the case of Business Sponsor 3, the apprentice wage structure was as follows:

TABLE 13  
**Business Sponsor 3 Wage Progression**

HOURS	WAGE
0-400	\$17.00
401-920	\$17.50
921-1,440	\$17.75
1,441-1,960	\$18.00
1,961-2,480	\$18.25
2,481-3,000	\$18.50

The employer pays health, dental, and short- and long-term disability insurance premiums. FICA contributions made by the sponsor are equal to those made by the apprentice. Business Sponsor 3 contributes 2 percent of the apprentice’s salary to a retirement account for the apprentice.

The business manager estimated that the supervisor’s wage during the time of the apprenticeship was \$28.00 per hour, with additional costs of 7.65 percent FICA and health insurance. She said the supervisor spent approximately 25 hours each week for the entire duration of the apprenticeship engaged in training. The business manager stated that the wages for the journey workers engaged in training during the time of the apprenticeship were \$38.00 per hour, with 7.65 percent FICA and health insurance as well. The business spent a total of \$8,500 on related technical instruction during the term of the apprenticeship. The business manager did not recall with any degree of accuracy any expenses that were a result of wastage and the associated repairs/fixes or any machine downtime, nor were there any other miscellaneous costs worth noting.

The annual revenue per apprentice for Business Sponsor 3 is that of a billable work rate of \$125 for 40 hours per week, for 50 weeks in year 1 (2,000 hours) and 25 weeks in year 2 (1,000 hours), assuming apprentices receive two weeks of vacation each year.

The company receives \$3,000 of additional revenue in the form of grants as a result of sponsoring RA. Therefore, as shown in Table 14, the annual revenue of sponsoring an apprenticeship for year 1 is \$169,524 and for year 2 is \$82,086.

TABLE 14  
**Annual Revenue of Sponsoring an Apprentice for Business Sponsor 3**

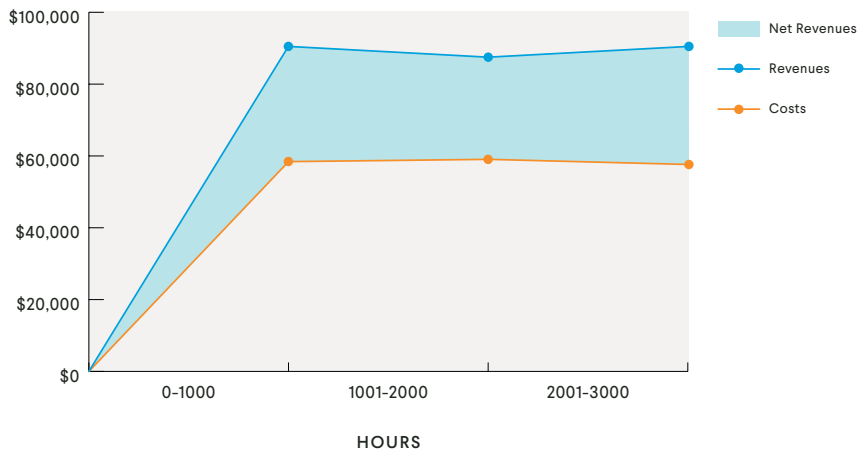
YEAR	VALUE OF PRODUCT/ BILLED HOURS	OTHER SOURCES OF BENEFIT	ANNUAL REVENUE	PRESENT REVENUE
1	\$175,000	\$3,000	\$178,000	\$169,524
2	\$87,500	\$3,000	\$90,500	\$82,086
				\$251,610

Table 15 shows that, given a 5 percent discount rate, the present cost of capital invested in apprenticeship is \$172,228 for Business Sponsor 3, and the present revenue is \$251,610. That means the net present value realized by Business Sponsor 3 as a result of sponsoring an apprentice is \$79,382 over the course of the 18-month, 3,000-hour, apprenticeship.

TABLE 15

### Net Present Value of Sponsoring an Apprentice for Business Sponsor 3

NET PRESENT COST/ BENEFIT	PRESENT REVENUE	PRESENT COST
\$79,382	\$251,610	\$172,228





## Conclusions

Some conclusions can be drawn from this research, based on both the data that is present and the data that is absent. The most obvious limitation of the study, the sample size, is indicative of the difficulty in getting sponsors to participate in this type of research. In this study, the original sample pool consisted of 52 sponsors across 11 states. Ultimately, only six of those businesses were willing to participate, and only three were able to provide a full complement of data sufficient to calculate an ROI. This same difficulty was highlighted in *The Benefits and Costs of Apprenticeships: A Business Perspective*.<sup>13</sup> That study looked at only 11 business sponsors and 2 intermediary sponsors from a nationwide pool, and only 2 of the participating sponsors were able to provide data that was sufficient to calculate ROI. Similarly, *A Pilot Benefit Cost Analysis Study of Sponsors of Registered Apprenticeship in Maine* began with a total sample pool of approximately 100 sponsors across Maine and was able to acquire data sufficient for calculating the ROI for five business sponsors and three intermediary sponsors.<sup>14</sup> This general lack of willingness to participate and lack of data mean that the results have limited generalizability and are transferable only to similar situations and contexts, and with a high degree of variation.

It is also evident that recording, maintaining, and compiling accurate data is not necessarily a strength for many employers. Three of the sponsors in this research sample were unable to provide some portion of the cost or benefit data. Intermediary Sponsors 1 and 2 were both unable to provide the data required to calculate the cost of a supervisor's time spent engaged in training, and Intermediary Sponsor 1 was unable to provide the data to calculate the cost of

the time a journey worker was engaged in training. Compounding the difficulty of drawing conclusions from the data, the three sites that were able to provide a full complement of data had such a wide range of costs that it was impossible to use those figures to estimate such costs for the three that could not provide data. What is likely more compelling is that Intermediary Sponsors 1 and 2 and Business Sponsor 1 were all unable to provide a means of estimating the productivity of their workers. In the case of Business Sponsor 1, the information required was proprietary and it would not divulge it. Neither Intermediary Sponsor 1 nor Intermediary Sponsor 2 were able to provide an estimate of the billable rate of the journey worker, nor the productivity of the apprentices relative to the journey worker. These findings echo those in *The Benefits and Costs of Apprenticeships*, which stated that “it also became evident that most firms do not compile and analyze comprehensive cost and benefit data that allows them to carefully measure the return on their investment in these programs. Most firms were able easily to provide information on costs... Only a few firms with whom we spoke were able to provide clear quantitative data on the benefits they identified from their apprenticeship programs. One barrier to doing so was that key benefit data would be derived from their production metrics,

while cost data would reside in human resources or payroll, and firms did not on their own blend those data sets to examine how their productivity measures related to how workers were hired and trained. The few firms that did have benefit data weighed it against program costs, and one even went as far as calculating a measure of ROI for apprentices versus other hires. Such complete analysis, however, was not the norm.”<sup>15</sup> The issue of the separation of the data loci is likely exacerbated when an intermediary sponsor is involved, though the presence of an intermediary sponsor has other benefits that likely outweigh this drawback.

Both this research and the earlier research conducted in Maine suggest that, in order to aggregate all of the necessary information and ensure accurate outcomes, it is essential to both provide a detailed list of costs and revenue data to sponsors prior to the interview and ensure that representatives from both HR/payroll and management/production are engaged in the process.

## Monetary Benefits

From the data available, it is possible to draw several conclusions. First, Table 1 shows the summary of the three intermediary sponsors and the three business sponsors of the IMT Registered Apprenticeship.

TABLE 1

**Net Present Value for Sponsors of the IMT RA**

ORGANIZATION	NET PRESENT VALUE	RETURN ON INVESTMENT
Intermediary Sponsor 1	unknown	unknown
Intermediary Sponsor 2	unknown	unknown
Intermediary Sponsor 3	\$130,260	72%
Business Sponsor 1	unknown	unknown
Business Sponsor 2	\$30,128	26%
Business Sponsor 3	\$79,382	46%

The table shows that, for those firms that were able to provide a full complement of data, the benefits ranged from a low of \$30,128 to a high of \$130,260 over the course of the 18-month (3,000-hour) apprenticeship program. The average net present value realized by the three sponsors that were able to provide both cost and benefit data was \$79,923. This positive net present value average would suggest that sponsors of the IMT RA experience an overall net benefit during the term of the apprenticeship. This might also suggest that sponsoring apprenticeship is a viable short-run solution for labor supply shortages instead of being exclusively a long-run human capital investment strategy. These positive net present values translate to ROIs ranging from 26 percent to 72 percent, with an average ROI of 48 percent, meaning that, on average, for every \$1.00

invested, sponsors get \$1.48 back at the end of the apprenticeship. In general, these findings support the previous findings of Helper, which calculate an ROI of 8 percent for one sponsor and 40 percent for another, as well as those of Payne, which found ROIs ranging from a 62 percent loss to a 90 percent gain, with an average of a 31 percent gain.<sup>16</sup>

These few results also indicate that the sponsors of RA in the United States experience results that are more similar to those of Swiss firms, which also have a positive ROI during the term of apprenticeship, than to those of German firms, which experience a negative ROI during the term of apprenticeship and recoup their investment in the year(s) following apprenticeship.<sup>17</sup> The difference in experience between Swiss and German firms is largely attributed to the tasks



to which apprentices were assigned. In Switzerland, apprentices were assigned higher-skilled tasks earlier in their training, while at the same time being paid marginally lower wages relative to their German counterparts. As such, the marginal return on a Swiss apprentice is greater, earlier in the term of the apprenticeship. This has potential implications for the way in which programs are designed and indicates that, whenever possible, it is beneficial for the sponsor to have apprentices engaged in revenue-generating tasks as early in their apprenticeships as possible. It also indicates that further investigation into the differences in program design and specifically the tasks in which apprentices engage and the time at which they engage in them in their apprenticeship is necessary to gain a deeper and broader understanding of what makes apprenticeships profitable.

Another factor that became apparent during this research was that the calculation of benefits was difficult for businesses that do not bill for their work at an hourly rate. For those that had a definitive hourly rate for apprentices, such as Intermediary Sponsor 3 (the labor union), the calculation of benefit was simple. Unfortunately, there is an inherent degree of speculation in both the costs, specifically the time journey workers and supervisors spend in training, and the benefits, specifically with relation to marginal productivity. The potential for error, therefore, increases in situations where the amount of time that a journey worker or supervisor spends on training while not at the same time engaged in productive/billable work is largely estimated, or in situations where hourly billable wage rates or marginal productivity is used to calculate the benefits. These have the potential to introduce conscious or unconscious biases on the part of the respondent.

## **Non-Monetized Benefits**

Despite the difficulties with the calculations of the ROI, it still seems that many, if not all, of the sponsors gained other non-monetized

benefits that were at least equally, if not more, important than the actual ROI. Table 2 shows the explicitly mentioned non-monetized benefits referenced by the six sponsors across their respective interviews.

TABLE 2

**Non-Monetized Benefits Referenced**

BENEFIT	NUMBER OF SITES REFERENCING
Upskilling	4
Retention	4
Comprehensive Training	3+1
Recruitment	3
Increased Productivity/ Product Quality	2

Along with the explicitly mentioned benefits to upskilling, retention, comprehensive training, recruitment, and increased productivity, there was also an implicit or underlying belief that apprenticeship was part of a talent pipeline solution. For example, both Business Sponsor 3 and Intermediary Sponsor 2 directly referenced apprenticeship as a component of their talent pipeline. Along with these benefits, several of the other sponsors indicated benefits to the general productivity of their employees and the quality of the products they produce, and they indicated that both provided a significant competitive advantage over their competitors.

**Implications**

A dichotomy seems to exist between apprenticeship as a long-run strategy to building human capital and apprenticeship as a short-run means of addressing a labor shortage. All of the six sponsors represented in this study indicated that apprenticeship is part of their long-run strategy rather than a short-run means of addressing their immediate labor shortages. However, of the three business sponsors, or three representative businesses that hire apprentices through intermediary sponsors in this study, those that were able to provide a full complement of data showed a positive ROI during the term of the apprenticeship, which would indicate that investing in apprenticeship is favorable not just in the long run, but also in the short run.

If this is the case, that could have implications for businesses deciding whether or not to engage in apprenticeship. If it holds true that businesses that engage in sponsoring apprenticeship are doing so as part of long-run strategy and those that do not avoid it because of fears associated with short-run labor costs, then a means of more easily and accurately determining the ROI of RA and continued efforts to build evidence pertaining to the ROI of RA could shift the narrative and result in more firms engaging as sponsors.



# Appendices

## APPENDIX A

# Methodology

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## Overview

To perform a return on investment analysis for sponsors of the IMT RA, a mixed-methodology case study was conducted. The cases in this study were informed by two components. First, a quantitative analysis was designed to determine the costs incurred and the benefits received by sponsors during the term of apprenticeship. Second, a qualitative interview was conducted to uncover any institutional predispositions about sponsoring apprenticeship and preconceived perceptions of costs and benefits. The interview also served as a member check of the quantitative analysis results, as a means to uncover sponsors' perceptions of the accuracy of the results, and as a way to determine any notable limitations. Lastly, the interview was intended to gauge how the sponsor's perceptions of its choice to sponsor apprenticeship might be affected by the quantitative results, and to give sponsors an opportunity to provide advice for other organizations considering sponsoring apprenticeship.

## Research Context

At its inception, this research relied on a database of 52 sponsors across 11 states (Ohio, Minnesota, Indiana, Michigan, Illinois, Wisconsin, Pennsylvania, New York, California, Washington, and Florida), all of which sponsor some form of RA in the manufacturing sector. Not all of them, however, sponsor IMT registered apprentices.

## Next-Gen IMT Partners

### *AFL-CIO Working for America Institute*

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The AFL-CIO Working for America Institute is a nonprofit, 501(c)(3) national workforce intermediary that assists unions, employers, skill-training partnerships, the workforce system, and community organizations by providing employment- and training-related services that help to create, expand, and retain high-quality jobs. Since its formation in 1968 (as the Human Resources Development Institute, or HRDI), the WAI has worked with AFL-CIO institutions (more than 600 state labor federations and local labor councils) and unions, employers, and workforce boards to increase the effectiveness of state and federal workforce systems. The WAI emphasizes increasing the availability of worker-centered employment and training services, giving workers equitable access

to job-driven upskilling opportunities, sustaining joint labor-management training partnerships, and advocating industry sector strategies.

### *The Chicago Federation of Labor Workforce and Community Initiative*

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The Chicago Federation of Labor Workforce and Community Initiative (CFL Initiative) is a unique 501(c)(3) developed, sponsored, and endorsed by the Chicago Federation of Labor in 1994. With 22 years of workforce development experience, it works closely with labor, community organizations, educational institutions, and business associations to meet the needs of businesses and jobseekers. As active partners in workforce development, the CFL Initiative identifies jobseeker and workforce issues, develops solutions, and shares best practices. The CFL Initiative is committed to building the Chicagoland community by championing workforce development.

### *The Workforce Development Institute*

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Michigan State AFL-CIO Workforce Development Institute is a private nonprofit 501(c)(3) corporation established and operated to provide employment and training services to displaced workers and economically disadvantaged residents in the State of Michigan. WDI has successfully operated major Job

Training Partnership Act, Workforce Investment Act, and Workforce Innovation and Opportunity Act dislocated worker projects in Michigan for over thirty years. WDI also has the capability to and has in the past provided technical assistance on job training to labor organizations and public and private organizations that operate employment and training programs. WDI has operated workforce development programs under the JTPA, the WIA, and the WIOA to serve youth, adults, dislocated workers, and welfare recipients.

WDI was established in 1977 as the Labor Employment and Development Program operated by the Michigan State AFL-CIO to provide technical assistance to employment and training program operators and labor organizations on issues related to the labor standards and organized labor involvement mandated by the Comprehensive Employment and Training Act (CETA). LEAD continued to provide such technical assistance under contracts with the State of Michigan.

### *Keystone Development Partnership*

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The Pennsylvania AFL-CIO created the Keystone Development Partnership as a 501(c)(3) to assist unions and their employers to form and sustain labor-management training programs. KDP develops and sustains organizations

that address community and workforce programs, to promote labor management cooperation, and to better serve the public. Today KDP serves this mission by helping to catalyze apprenticeship programs and manage regional industry partnerships. KDP brings together employers, unions, training providers, and public agencies to collaborate on initiatives that improve labor skills and productivity. KDP's work supports WIOA goals by helping to ensure workers have the skills they need to advance their careers and businesses have the talent they need to thrive.

## **Data Collection**

### *Sample*

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This research is delimited to sponsors of IMT (17.3029-09) registered apprentices. As such, the first step in the research process was to identify those sponsors that specifically have IMT apprentices. This reduced the total pool of businesses to approximately 32. The intermediary partners listed above (the CFL, Michigan HRDI, and KDP) contacted the intermediary and business sponsors with which they had good working relationships and that they felt would be able to provide the requisite data for the study. Ultimately, a convenience sample of six sponsors (n=6), three intermediary and three businesses, took part in the study.

The three intermediary sponsors were asked to provide data that was specific to one of the businesses that contracts apprentices through them.

### *Data Collection Interviews*

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For this study, both the quantitative and qualitative data was collected through a one-hour interview with each sponsor. The initial contact email was sent by the intermediary partner to establish the purpose of the research and connect researchers with the intermediary or business sponsor. Following this initial email, a researcher replied to all parties to establish a date and time for the one-hour interview to take place. The interview began with the quantitative analysis, followed by the qualitative analysis.

### **Data Analysis**

For each of the sponsors, the total costs and annual revenues were calculated (when enough data was present).

#### *Costs*

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The cost of sponsoring an IMT RA (Appendix A) was calculated by adding the total annual costs for the year 1 and half the annual costs for year 2. This was done because the IMT apprenticeship lasts 3,000 hours, with 2,000 hours in year 1 and 1,000 hours in year 2. The costs incurred

by the sponsor during the term of the apprenticeship include:

- **Apprentice wages**
- **FICA**
- **Insurance premiums paid on behalf of the apprentice**
- **Retirement contributions paid by employer**
- **Wages paid to the supervisor for time engaged in training**
- **Journey worker compensation during time engaged in training**
- **Related technical instruction expenses paid by employer**
- **Other miscellaneous costs**

#### *Benefit*

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The annual revenues realized by a sponsor over the term of the apprenticeship were calculated using one of two possible methods, predicated on how the sponsor valued, or billed for, its products or services:

##### **Method A:**

The marginal product value generated (i.e., how many machine parts an apprentice makes).

##### **Method B:**

The marginal productivity of the apprentice (i.e., the apprentice's contribution to building a machine).

Method A uses the actual market value of the product generated or the billable work conducted on behalf of the employer (see *Appendix B*). This method works well for sponsors that produce discrete goods, pieces, parts, or services, but it is difficult to apply in situations where the product is integrated into a more complex product. In those situations, Method B, which calculates the marginal productivity of the apprentice relative to the journey worker, is more appropriate (see *Appendix C*). This method calculates the marginal productivity of the apprentice using an estimate of the productivity of the apprentice relative to a fully skilled journey worker as estimated by the employer. For a detailed explanation of variables, see Appendix C.

### *Present Value Adjustment*

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In an effort to account for the opportunity cost and risk of the potential investment in sponsoring an apprentice, the present revenues and present costs were calculated based on a standard discount rate (see *Appendices D and E*). The discount rate was set at 5 percent because of the relatively short term (18 months) of the investment and the relatively low risk involved.

### *Net Present Value*

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The net present value was calculated using the difference between the present-value revenues and the present-value costs. If the sponsor's revenues were greater than its costs, that would indicate a profitable investment, whereas revenues less than the costs would indicate a net loss on investment. Net present value, then, should indicate whether an investment was worthwhile from a strictly financial perspective.

## Costs

## EQUATION 1

### Annual Costs to a Sponsor of the IMT RA

$$C_T^{app} = W_T^{app} + FICA_T^{app} + I_T^{app} + Ret_T^{app} + W_T^{Sup} + W_T^{jour} + C_T^{rti} + C_T^{misc}$$

VARIABLE	MEANING	DATA SOURCE
$C_T^{app}$	Annual cost of apprenticeship	Calculated
$W_T^{app}$	Total annual wages paid to apprentice	Sponsor
$FICA_T^{app}$	Total annual FICA paid on behalf of apprentice	Calculated as 7.65% of $C_T^{app}$
$I_T^{app}$	Total annual insurance premiums paid on behalf of the apprentice	Sponsor
$Ret_T^{app}$	Total annual retirement contributions paid on behalf of the apprentice	Sponsor
$W_T^{Sup}$	Total wages paid to the supervisor for time engaged in training	Sponsor
$W_T^{jour}$	Total wages paid to the journey worker for time engaged in training	Sponsor
$C_T^{rti}$	Total cost of off-the-job training paid by employer on behalf of apprentices	Sponsor
$C_T^{misc}$	Miscellaneous costs	Sponsor



## Revenue Using Method A

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## EQUATION 2

### Annual Revenues to a Sponsor of the IMT RA as Calculated by Marginal Product Value Generated by the Apprentice

$$R_T^{app} = (Q_T^{app} * P_T) + R_{other}^{app}$$

VARIABLE	MEANING	DATA SOURCE
$R_T^{app}$	Annual revenue received as a result of apprentice's work	Calculated
$Q_T^{app}$	Total quantity of goods produced by apprentice per year	Sponsor
$P_T$	Price per good	Sponsor
$R_{other}^{app}$	All other revenue sources as a result of apprenticeship (e.g., grants)	Sponsor

## Revenue Using Method B

## EQUATION 3

### Annual Revenue to a Sponsor of the IMT RA as Calculated by Marginal Productivity of the Apprentice

$$R_T^{app} = (Q_T^{app} * R_T^{jour}) * P + R_{other}^{app}$$

VARIABLE	MEANING	DATA SOURCE
$R_T^{app}$	Annual revenue received as a result of apprentice's work	Calculated
$Q_T^{app}$	Annual quantity of billable work conducted by apprentice	Sponsor
$R_T^{jour}$	Journey worker billable rate	Sponsor
$P$	Marginal productivity of the apprentice relative to the journey worker	Sponsor
$R_{other}^{app}$	All other revenue sources as a result of apprenticeship (e.g., grants)	Sponsor

## Present Value

## EQUATION 4

### Present Revenue Received by an IMT RA Sponsor

$$R_{Pres}^{app} = \sum_{i=1}^n \frac{R_T^{app}}{(1+r)^n} + R_{other}^{app}$$

VARIABLE	MEANING	DATA SOURCE
$R_{Pres}^{app}$	Present revenue of apprenticeship	Calculated
$n$	Length of the apprenticeship (years)	Apprenticeship agreement
$R_T^{app}$	Annual revenue of apprenticeship	Calculated
$r$	Discount rate (5%)	Approximate annual return of an average risk, average ROI
$R_{other}^{app}$	All other revenue sources as a result of apprenticeship (e.g., grants)	Sponsor

## Present Cost

## EQUATION 5

### Present Cost Incurred by an IMT RA Sponsor

$$C_{Pres}^{app} = \sum_{i=1}^n \frac{C_T^{app}}{(1+r)^n} + C_{other}^{app}$$

VARIABLE	MEANING	DATA SOURCE
$C_{Pres}^{app}$	Present cost of apprenticeship	Calculated
$n$	Length of the apprenticeship (years)	Apprenticeship agreement
$C_T^{app}$	Annual cost of apprenticeship	Calculated
$r$	Discount rate (5%)	Approximate annual return of an average risk, average ROI
$C_{other}^{app}$	All other costs as a result of apprenticeship (e.g., providing uniforms or specialized clothing)	Sponsor

## Net Present Value

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## EQUATION 6

### Net Present Value Realized by an IMT RA Sponsor

$$NPV = R_{Pres}^{app} - C_{Pres}^{app}$$

VARIABLE	MEANING	DATA SOURCE
$NPV$	Net present value	Calculated
$R_{Pres}^{app}$	Present revenue of apprenticeship	Calculated
$C_{Pres}^{app}$	Present cost of apprenticeship	Calculated

# Qualitative Instrument

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## 1. General

- a. What do you perceive as the benefits of sponsoring/engaging in apprenticeship in general?
- b. Aside from the Industrial Manufacturing Technician Registered Apprenticeship, what other Registered Apprenticeships does your organization/business sponsor, if any?
- c. Do you see sponsoring IMT apprenticeships as a competitive advantage?
- d. When did your company begin sponsoring the IMT apprenticeship?
- e. To what extent has IMT apprenticeship impacted your retention of employees in general?

## 2. Demographics

- a. How many full-time employees does your company have?
- b. How many of those employees are over the age of 62 and therefore eligible for retirement?
- c. How many of those employees are 57 or older and therefore eligible to retire within the next 5 years?
- d. How many of those employees are 52 or older and therefore eligible to retire within the next 10 years?
- e. How many IMT apprentices does your company currently have?

## 3. Retention

- a. How many apprentices have completed the IMT apprenticeship through your company?
- b. How many of those apprentices are still employed at your company?
- c. How many IMT apprentices has your company sponsored/employed that have left before obtaining a credential of completion?
- d. Why do you think/know they did not complete?
- e. To what extent has the IMT apprenticeship prepared the apprentice(s) to replace the workers leaving the company?
- f. To what extent has IMT apprenticeship impacted your retention of employees in general?

## 4. Advancement

- a. How many of those apprentices have been promoted within your company since becoming a journey worker?
- b. To what extent has sponsoring apprenticeship impacted the advancement of your employees in general?

## 5. What advice might you give to companies interested in getting involved in Registered Apprenticeship?

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