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2015 Study Update

Regional Center for Workforce Education and Training, Woodbridge Campus, Northern Virginia Community College

Prepared for The **SkillSource** Group, Inc.
On Behalf of Northern Virginia Community College

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1. Executive Summary

This study evaluates the local business demand for the Regional Center for Workforce Education and Training (RCWET) at the Woodbridge Campus of Northern Virginia Community College. Chmura produced this assessment, focusing on business demand within Prince William County, Manassas City, Manassas Park City, and the Springfield and Mount Vernon-Lee areas in Fairfax County.[1]

Chmura used a mixed-method approach, combining secondary data analysis with primary data from focus groups and interviews with stakeholders, job seekers, and representatives from each major industry sector. The main results of the study are summarized below.

Five of the nine major industry sectors have expanded in the RCWET region since 2008.

- Employment has continued to grow in the RCWET region, adding an estimated 17,890 jobs since 2008. Employment growth in the region fared better than across Virginia during the recession and rebounded relatively quickly.
- Education and health services is the largest industry sector in the region. Employment in this sector has expanded more than any industry—from 22.9% in 2008 to 25.5% in 2014. The government sector experienced the fastest growth, at a 3.7% average annual rate from 2008-2014. Education and health (+2.7%) and leisure (+2.1) also experienced growth at a faster rate than the regional average.
- Industries that have seen a decline in employment include manufacturing (-4.9%), information industries (-6.5%), financial activities (-1.3%), and construction (-1.0%).
- The annual average wage in the RCWET service region is above the state average, reflecting the regional industry mix and the cost of living.

Half of the 22 occupation groups in the region are expected to experience an annual labor shortage over the next nine years.

- Based on the 22 major occupations classified by the Standard Occupational Classification (SOC) system, office and administrative support is the most prevalent occupation in the RCWET region. As of the fourth quarter of 2014, this occupation employs 50,758 people—equivalent to 14.3% of total employment.
- In terms of detailed occupations, the largest in the RWCET region were retail salespersons (13,807 employees) and cashiers (9,251). The next-largest occupations by percent of total employment

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[1] The core of the study region is Prince William County, Manassas City, and Manassas Park City. In addition, the Springfield and Mount Vernon-Lee area of Fairfax County, to the north of Prince William County, are also included in the study area, due to its proximity to Woodbridge. Specifically, the Springfield area includes the following zip codes: 22015, 22060, 22079, 22122, 22150, 22151, 22153, 22152, 22156, 22158, 22159, 22160, and 22199. The Mount Vernon-Lee area includes the following zip codes: 22314, 22121, 22303, 22306, 22307, 22308, 22309, 22310, 22315, 22302, 22304, and 22312.

were food preparation and serving workers, janitors and cleaners, waiters/waitresses, general office clerks, and elementary school teachers.

- The largest shortage is expected in the construction and extraction group, with a predicted shortage of 339 workers per year. Significant annual shortages are also expected in installation, maintenance, and repair (180 workers), healthcare support (132 workers), and computer and mathematical science (107 workers).

Among high-skill occupations, many expected shortages are in information technology. Strong business demand for those skills could create a potential opportunity for the RCWET.

- Computer-related occupations made up a significant portion of the expected shortages among high-skill occupations. Computer systems analysts are expected to experience the greatest shortage (36 workers), with software developers, applications also experiencing a positive gap (9 workers).
- Due to existing cybersecurity businesses, one area of particular interest to the RCWET is the shortage of information security analysts. Information security analysts are primarily responsible for implementing and maintaining the security of an organization's operating network. Other responsibilities may include response to computer security breaches, revision of an organization's existing defense strategy, and maintenance of privacy and integrity of an organization's records and information. The projected demand for information security analysts is projected to grow on average 5.3% each year over the next ten years, far exceeding the average demand growth of 3.5% for all other occupations.

Workforce training programs and cybersecurity-focused training programs garnered the strongest interest among regional businesses.

- Chmura evaluated business demand for 21 service programs, and 15 of them received relatively strong business interest.
- Workforce training programs are popular with both businesses and job seekers. Of all business participants, 78% indicated an interest in Career Development Workforce Training programs, including training in leadership and soft skills. 56% of businesses expressed interest in both job fairs and job placement services.
- Another high-demand area which garnered strong interest among businesses was cybersecurity-related programs. Over 60% of businesses professed an interest in cybersecurity training. Businesses were also interested in the related programs of Security + certification and information assurance, with 41% and 48%, respectively, showing interest.
- General information technology programs generated interest among businesses and job seekers, with 56% of businesses interested in information technology workforce training, and 52% interested in information technology certification.
- In comparison with the initial 2009 feasibility study, overall business demand in the RCWET is strong. Support for many programs increased since 2009.
- The popularity of a testing center and job fairs remained since the 2009 study, with 44% and 56% interest, respectively, in 2015. Over the past six years, the demand for IT-related workforce training has continued to grow, showing higher percentages than in 2009.

Demand was modest across categories for RCWET facility space.

- Consistent with the 2009 study, business demand for RCWET facility space was lower than demand for service programs. Of all business participants, 74% expressed an interest in using at least one type of facility space, still a significant increase from the 53% interested in 2009.
- Training classrooms and meeting space were the most desired features, with 48% and 46% of business participants demonstrating interest in the use of those spaces. Distance learning and videoconferencing were not far behind, with 41% and 33% of businesses interested, respectively. Very little interest was shown in telework, temporary office space, robotics space, and a forensics lab.

A heavy consensus among businesses suggests that the RWCET should be flexible with business demand.

- Businesses consistently emphasized the need for the RWCET to be flexible in adapting to their needs in the center's method of training, content delivery, and use of facility space. This sentiment was also expressed in the previous 2009 study.
- In terms of training, businesses generally desire short-term training that can be prepared quickly to suit their needs. In order to meet their changing needs, the RCWET would need to switch gears and deliver different training when necessary.
- In order to respond to changing market trends, a potential way to meet constant new demand would be to bring in training contractors (in addition to existing full-time staff) when new needs arise.
- Another aspect of flexibility is training logistics. Because businesses generally want employees to have uninterrupted workdays, weekend or night training is preferred. Online training is another flexible option that wouldn't interfere with a trainee's work schedule.
- Businesses feel that facility space needs to be flexible in order to meet ever-changing training needs. Representatives would like the RCWET to include "flex space" that can quickly and easily be configured into different kinds of space (i.e. training space, meeting space, or trade show space).

Businesses emphasized other factors for the RCWET to be successful.

- One of the key points highlighted by businesses was that the RCWET should not offer services already offered by community colleges or other local agencies. They pointed to current skilled trade training and business service assistance already offered in the Northern Virginia area.
- Businesses agree that the services and facility space offered at the RCWET needs to be both useful and different—when compared to other organizations in the region.
- Business participants point to industry certification, career development, and information technology skills as being useful in matching businesses with job seekers.
- Particular emphasis was placed on the need for workers with information technology skills. Both job seekers and businesses were interested in the RCWET providing these services. Cybersecurity, in particular, was emphasized by businesses as being a high-demand industry requiring certification and training. Other programs such as computer programming and cloud-based training were also of interest.
- Cybersecurity interviewees explained that the field is changing rapidly and the need for training is continuous throughout a career in cybersecurity. However, the key drivers of choice to use the RCWET (from a business perspective) will be cost, expertise of training providers, and proximity of the training location to the business.

The high demand for cybersecurity professionals within the RWCET region creates a unique opportunity for training.

- Over the next 10 years, the RCWET region is expected to see a 5.3% increase in average annual demand for information security analysts, compared with 3.5% expected growth for all regional employment.. Due to the region's close proximity to Washington D.C., a hub for cybersecurity jobs, the demand for cybersecurity professionals is higher than ever before.
- The RCWET is uniquely prepared to meet regional business demand for cybersecurity training and certification. The incorporation of computer labs, networks, and a red vs. blue lab has equipped the RCWET to meet business demand in upcoming years to reduce the projected shortage of cybersecurity professionals. In addition, the ability to meet job seeker demands will enable them to move into this high-paying and growing occupation.
- Cybersecurity interviewees in this study verified the need for cybersecurity professionals in the region, and confirmed that the RCWET, in collaboration with industry, could be an ideal provider of cybersecurity training. All interviewed companies expect to grow and hire additional cybersecurity professionals over the next three years.

The main conclusions of this update study are summarized below:

- This study finds that regional businesses continue to have strong interests in the RCWET. Six years since the 2009 feasibility study, the interests among businesses remain strong for most of the service training programs recommended in the 2009 study. In addition, business demand for new service programs also arose as a result of the changing economy in the region.
- Among all potential service programs, two categories—workforce training and cybersecurity training programs—were identified with the broadest business interests. In addition, general information technology training programs and other business service programs also received business support. In terms of facility needs, a majority of business representatives reported that they are likely to use at least one type of space at the RCWET.
- Cybersecurity is one of the key growth areas for the regional economy whose employment is projected to be fast growing. In this regard, the RCWET is uniquely prepared to meet regional business demand for cybersecurity training and certification.
- Businesses consistently emphasized the need for the RWCET to be flexible in adapting to their needs in the center's method of training, content delivery, and use of facility space. Businesses also stressed the need for the RWCET to avoid offering redundant services in order to be very successful.

2. Background

In 2009, The SkillSource Group (SSG) contracted Chmura Economics & Analytics (Chmura) to complete an economic feasibility study for a workforce training center at the Woodbridge Campus of Northern Virginia Community College—officially named the Regional Center for Workforce Education and Training (RCWET).[2] The 2009 Chmura study conducted a survey of 277 regional businesses. The two key questions asked of the regional businesses were: (1) what is the demand for various service training programs, and (2) what is the demand for specialized space needs at the proposed center? This feasibility study determined that regional businesses, especially those in eastern Prince William County, had a need for a workforce development center.

The 2009 Chmura study found that a substantial majority (76%) of the surveyed businesses reported that they were likely to use at least one of nine service programs planned for the RCWET. The potential offerings included in the survey were career development programs, business assistance functions, and job fair hosting. Eighty-five percent of businesses in eastern Prince William County said they were likely to use the center for one of the workforce programs.

Aside from service training programs, 53% of the surveyed businesses reported that they were likely to use the proposed center for one or more space services that include computer lab space, conference space, training classrooms, and telework facilities. In eastern Prince William County, close to two-thirds (64%) of respondents said they were likely to use the RCWET for specialized space.

In addition, the return on investment analysis in the 2009 Chmura study estimated annual economic benefit of $181 million (2009 dollars) accrued from productivity improvements, cost savings, up-skilling, and job attraction resulting from the workforce development center. These annual benefits will last for the duration of the center.

Since the 2009 Chmura study, the Commonwealth of Virginia constructed a state-of-the-art workforce education and training facility at the Woodbridge campus. The center is scheduled to open in early 2016. Considering that national and regional economies have experienced significant changes since 2009, The SkillSource Group, in collaboration with Northern Virginia Community College, initiated a study update concerning regional demand for the future RCWET. Chmura Economics & Analytics (Chmura) was contracted to perform this study. To this end, Chmura conducted stakeholder focus groups and interviews, as well as business and job seeker focus groups to understand business demand for the RCWET. In addition, Chmura also performed a case study of the cybersecurity industry in the state and region.

This rest of the report is organized as follows:

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[2] Source: Economic Feasibility Study for a Workforce Development Center at the Woodbridge Campus of the Northern Virginia Community College. Prepared by Chmura Economics & Analytics, July, 2009. This study is referred to as the 2009 Chmura study in this report.

- Section 3 illustrates the proposed methodology for this study, including data collection and analysis methods
- Section 4 provides an economic background of the study region
- Section 5 is an evaluation of the feasibility of the center through results from the interviews and focus groups
- Section 6 presents the case study on the cybersecurity industry
- Section 7 concludes the study
- A supplement to the report includes focus group and interview notes

3. Methodology

3.1. Study Area Definition

This study area is the same one defined in the 2009 Chmura study. The study region includes Prince William County, Manassas City, and Manassas Park City. Two areas in Fairfax County—the Springfield and Mount Vernon-Lee areas—are also included due to their proximity to the Woodbridge campus and easy access to the campus via I-95. Figure 3.1 presents a map of the study area including the location of the Woodbridge campus of NOVA.

Figure 3.1: Map of Study Area
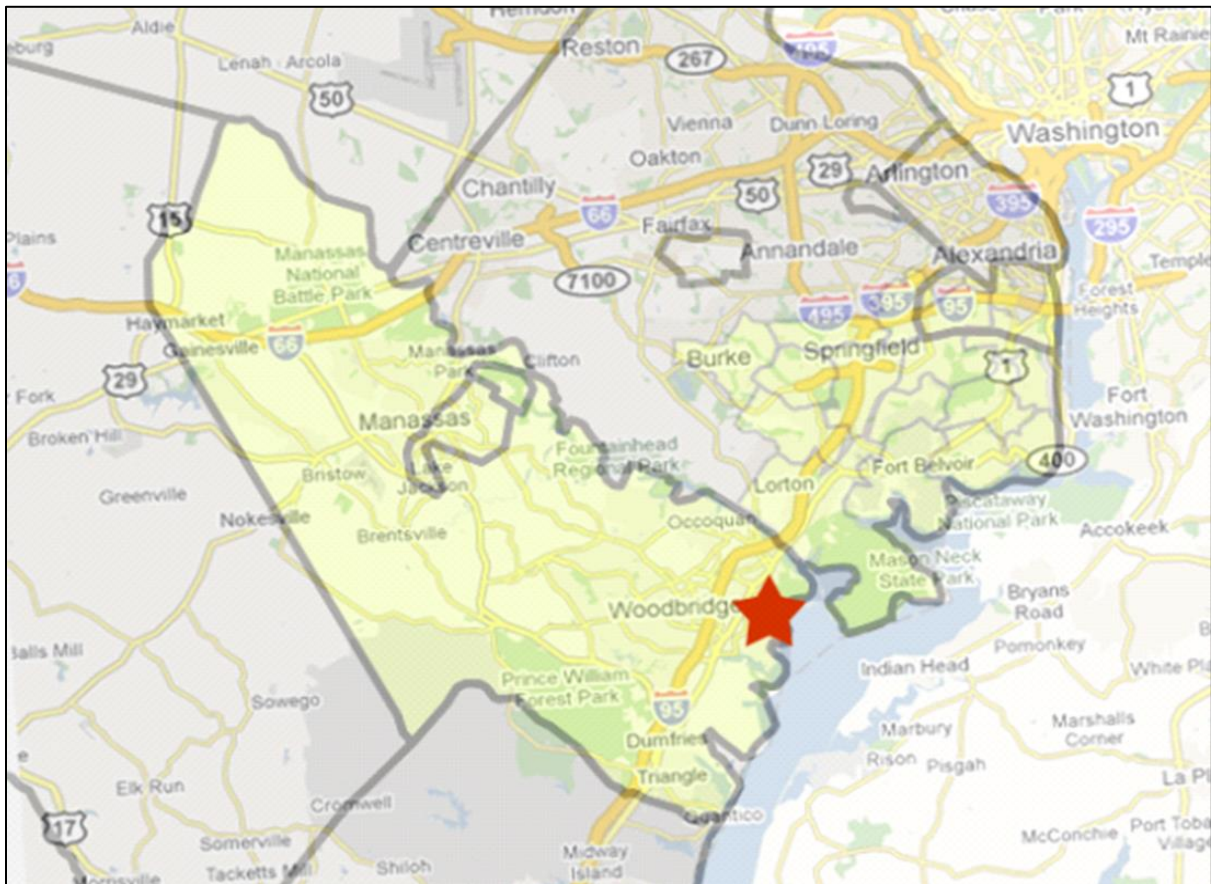
Source: Chmura Economics & Analytics

3.2. Data Collection Methodology

Chmura collected both primary and secondary data for this analysis. Secondary data provide baseline information regarding the region's economy, workforce, and industry trends. The secondary data sources are from Chmura's proprietary JobsEQ® database.[3]

Primary data augment the secondary data with insight into issues and problems that are unique to the study region. For primary data, Chmura conducted interviews and focus groups to gather necessary information from stakeholders, businesses, and job seekers across the study region. More specifically, Chmura held two focus groups on April 10, including economic development officials, workforce development professionals, local government representatives, and educational leaders in the study area. One focus group including job seekers was held on April 30, and two focus groups were conducted on May 6 including business leaders from a diverse set of industries. Additional phone interviews were conducted with business representatives who were unable to participate in the focus group events.

To be consistent with the 2009 Chmura study, Chmura asked a similar set of questions during those focus groups and interviews, aiming to validate the conclusion of the 2009 study—especially regarding the service training programs and space utilization at the RCWET. In addition, Chmura also augmented the list of services and space utilization with a list of new service programs since 2009. The complete focus group and interview transcripts are included in the appendices of this report.

3.3. Analysis Methodology

Secondary data were used to analyze the economic and workforce background of the study region. Chmura's JobsEQ database was used to analyze the industry trends and employment mix of the regional economy. In addition, Chmura also used the same database to analyze local workforce trends, identify demand occupations, and provide occupation gaps.

The proposed workforce training center is conceptually designed to be business-driven in terms of its utilization. An important distinction for this project is that it is not a higher education center where formal classes are offered. As a result, the education demand modeling from secondary data was not applied here.[4] The conclusion regarding RCWET program demand came primarily from analysis of the focus groups and interviews.

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[3] JobsEQ® is copyright © 2015 by Chmura Economics & Analytics and is protected by U.S. Patent 7,480,659; and patents pending.

[4] For example, the educational modeling in JobsEQ estimates the demand for formal degree and certificate programs, but does not apply in this study.

4. Regional Economic Assessment

This section provides a snapshot of regional industries and the underlying labor market. It also updates industry and workforce trends identified in the 2009 report indicating future demand for the workforce development center. The RCWET service region described herein is defined as Prince William County, Manassas, Manassas Park, and the Springfield and Mount Vernon-Lee areas of Fairfax County.

4.1. Industry Trends

4.1.1. Historic Growth of Employment and Wages

The latest data (from the fourth quarter of 2014) indicate that 354,890 people were employed in the RCWET service region, up from 337,000 people in the fourth quarter of 2008 (+17,890). Employment growth in the region fared better than across Virginia during the recession and rebounded relatively quickly. During the worst part of the recession in the region, employment contracted 2.0% over the year ending with the fourth quarter of 2008. This is compared with a 3.9% fall in the state in its worst decline over the year ending with the third quarter of 2009. Employment began expanding in the region on a year-over-year basis in the second quarter of 2010, a quarter before employment expanded in the state. In the 22 quarters since the official end of the most recent recession in 2009, employment in the RCWET service region has averaged 1.0% growth per year, much faster than the 0.3% state average over the same period. Year-over-year employment dropped sharply in the third quarter of 2013, and regional growth has been at or below the state's growth in the six quarters since (Figure 4.1).[5] Anecdotally, construction in the area immediately surrounding the RCWET has expanded rapidly in recent years. Specifically, a new hotel across the street from the RCWET and a wide stretch of new retail space indicate rapid growth in the local area.

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[5] The sharp decline in 2013 is caused by a change in the seasonal pattern of Quarterly Census of Employment and Wages (QCEW) data.

Figure 4.1: Year-Over-Year Percentage Change in Employment

Source: JobsEQ®
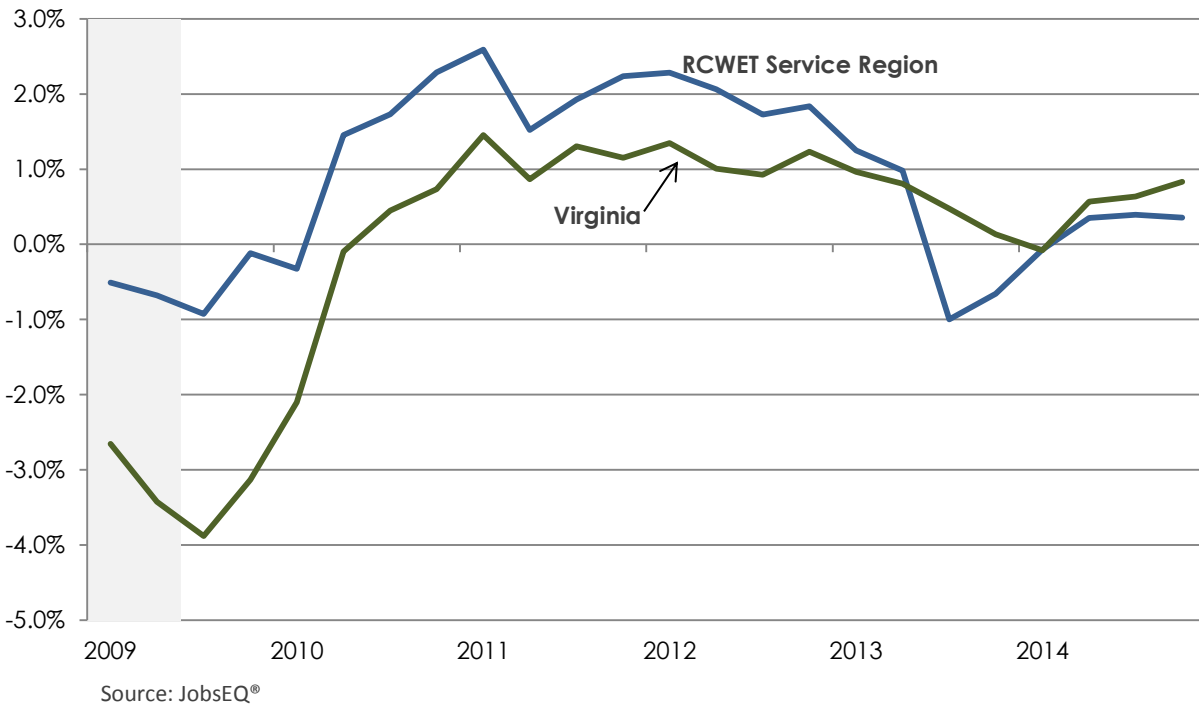
The region supports a diverse industry base. The largest sector in the RCWET service region in 2014 was education and health services, employing approximately 25% of workers in the region. The second-largest sector was professional and business services (19%), followed closely by trade, transportation, and utilities (18%). Manufacturing (2%) and financial activities (3%) account for the smallest shares of regional employment (Table 4.2).

Figure 4.2: Industry Mix-2014

Construction 7%

Education and Health 25%

Financial Activities 3%

Government 8%

Leisure 11%

Manufacturing 2%

Other 7%

Professional and Business Services 19%

Trade, Transportation and Utilities 18%
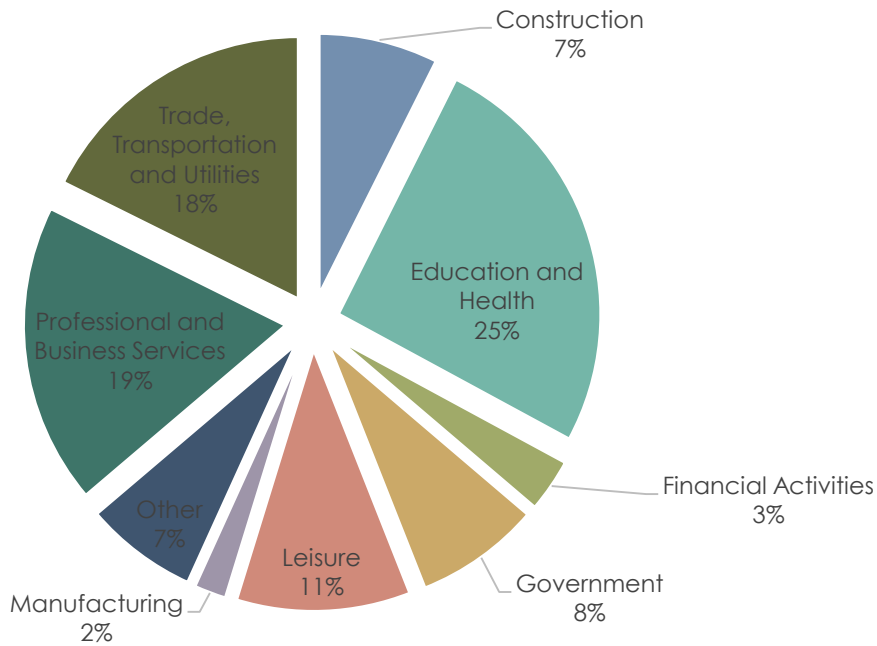
Source: JobsEQ®

The industry mix has shifted somewhat since 2008. The biggest change was expansion of the education and health sector. In 2008, this sector accounted for 22.9% of employment, and its share increased to 25.5% in 2014, resulting from a faster employment expansion than the regional average. Employment in five of the nine major industry sectors expanded in the RCWET region between 2008 and 2014 (Table 4.1). The government sector was the fastest-growing, at a 3.7% average annual rate from 2008 through 2014. Education and health (+2.7%), and leisure (+2.1%) have also grown faster than the regional average. Manufacturing employment has contracted in recent years and declined at a 4.9% annual average pace over the six-year period. Information industries experienced a 6.5% average annual decline between 2008 and 2014; employment also declined over this period on an average annual basis in financial activities (-1.3%) and construction (-1.0%).

Table 4.1: Employment By Industry in RCWET Service Region

| Industry	2008	2008 Mix	2014	2014 Mix	Avg. Annual Growth
Construction	27,934	8.3%	26,243	7.4%	-1.0%
Education and Health	77,009	22.9%	90,518	25.5%	2.7%
Financial Activities	12,815	3.8%	11,837	3.3%	-1.3%
Government[6]	22,244	6.6%	27,597	7.8%	3.7%
Leisure	33,658	10.0%	38,157	10.8%	2.1%
Manufacturing	9,689	2.9%	7,171	2.0%	-4.9%
Other[7]	27,102	8.0%	24,840	7.0%	-1.4%
Professional and Business Services	64,272	19.1%	65,846	18.6%	0.4%
Trade, Transportation and Utilities	62,277	18.5%	62,681	17.7%	0.1%
Total Employment	337,000	100.0%	354,890	100.0%	0.9%

Source: JobsEQ®

Similar to employment, the annual average wage in the RCWET service region has grown steadily above the state, climbing at a 3.0% annual average pace over the past 13 years compared with 2.8% in the state (Figure 4.3). However, wage growth slowed after the recession. Since the fourth quarter of 2008, wage growth has slowed to a 1.5% average annual pace, slightly below the state's 1.7% growth rate. Over the year ending with the fourth quarter of 2014, wage growth was much slower than the 13-year average, increasing only 0.2% in the RCWET service region compared with 0.7% in the state.

The changing industry mix in the RCWET service region has contributed to wage growth below the state average in 2014. In particular, employment in the high-wage professional, scientific, and technical services sector declined 3.3% over the year ending with the fourth quarter of 2014, compared with a 1.9% decrease in Virginia. This sector accounts for about 12.0% of employment in the RCWET service region. Despite the recent slowing in wage growth, the regional average wage is still higher than the state average. As of the fourth quarter of 2014, the annual average wage of the RCWET service region was $63,562—21.6% higher than the state average wage of $52,289 (Figure 4.2).

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[6] The government sector only includes employment for industries that do not have a private-sector counterpart. For example, employment in government-owned educational institutions is classified under education, and employment in government-owned hospitals is classified under healthcare.

[7] Other industries include agriculture, mining, information, and other services.

Figure 4.3: RCWET Service Region Average Wage Trend

Source: JobsEQ®
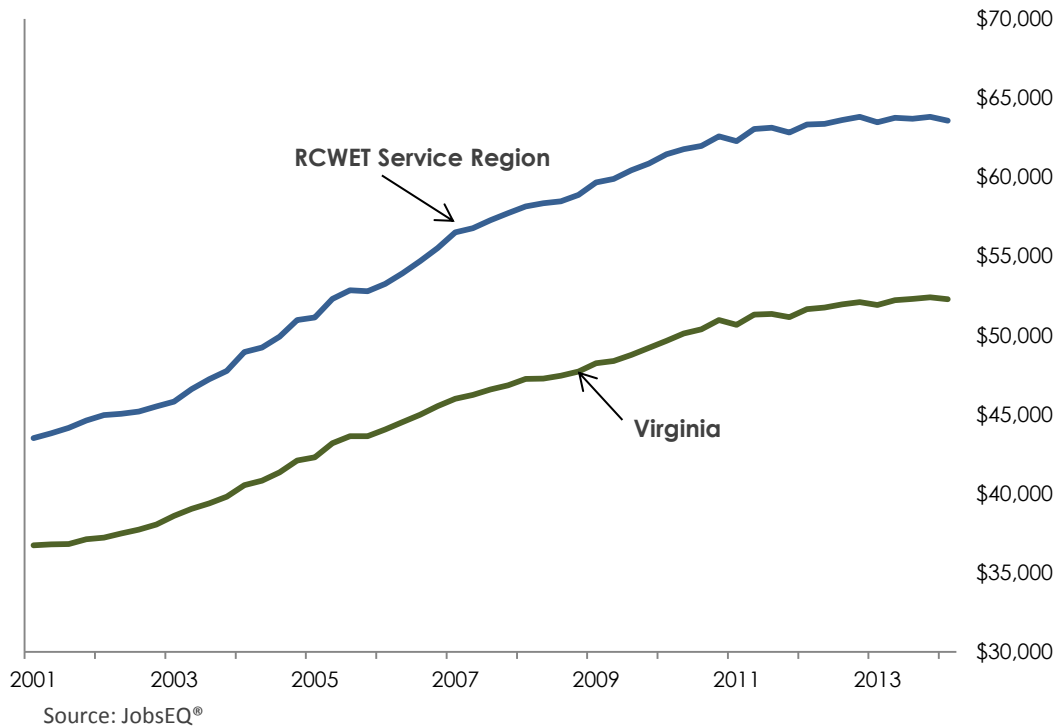
Of all industry sectors, government wages were the highest in the region, at $94,838 in 2014 (Table 4.2). Professional and business services ($83,291), financial activities ($75,074), manufacturing ($70,370), and other ($64,582) all had a higher average wage than the all-industry average in 2014. The leisure industry's average wage was only $21,206 in 2014, making it the lowest of the sectors.

Table 4.2: Average Wages By Industry in RCWET Service Region

Industry	2008	2014	Avg. Annual Growth
Construction	$52,733	$54,666	0.6%
Education and Health	$47,385	$50,387	1.0%
Financial Activities	$63,771	$75,074	2.8%
Government	$86,650	$94,838	1.5%
Leisure	$19,970	$21,206	1.0%
Manufacturing	$62,043	$70,370	2.1%
Other	$61,978	$64,582	0.7%
Professional and Business Services	$75,245	$83,291	1.7%
Trade, Transportation and Utilities	$38,907	$41,990	1.3%
Total Average	$58,142	$63,562	1.5%

Source: JobsEQ®

Average annual wage growth varied significantly by sector in the RCWET region between 2008 and 2014 (Table 4.2). Financial activities wages grew at a 2.8% average annual pace over this period, the fastest among the sectors. Wages for manufacturing (2.1%), professional and business services (+1.7%), and

government (+1.5%) all increased faster than the all-industry average; construction wages, however, advanced only 0.6% a year.

4.1.2. Industry Outlook

As shown in Figure 4.4, the Bureau of Labor Statistics forecasts that between 2012 and 2022, eight of the nine major industry sectors are expected to gain jobs in the nation. Employment in construction is expected to grow the fastest (+2.6% annual growth rate), followed by education and health (+2.5%) and professional and business services (+1.8%). Only manufacturing (-0.5%) is expected to contract.

Adapting the national projections from the Bureau of Labor Statistics for regional growth patterns in JobsEQ®, employment in the RCWET service region is likely to grow faster than the national average in six of the nine major industry sectors between 2014 and 2024. Employment in the construction and professional and business services sectors are likely to grow the fastest, government employment is expected to minimally change, and manufacturing employment is expected to contract in the next decade or so. Overall, total employment is expected to expand 1.6% in the RCWET service region over the next 10 years.

Figure 4.4: RCWET Region
Regional and National Industry Projection
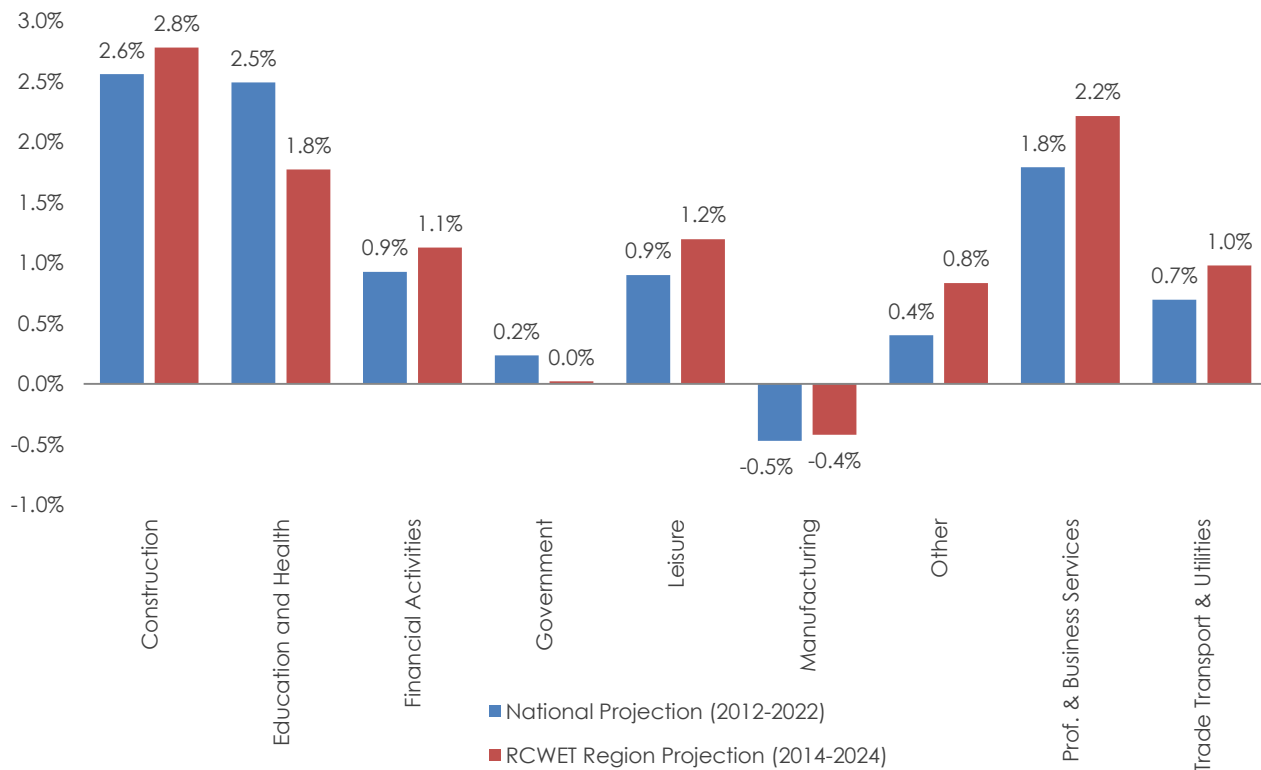
Source: Bureau of Labor Statistics and JobsEQ®

4.2. Workforce Trends

4.2.1. Occupation Mix

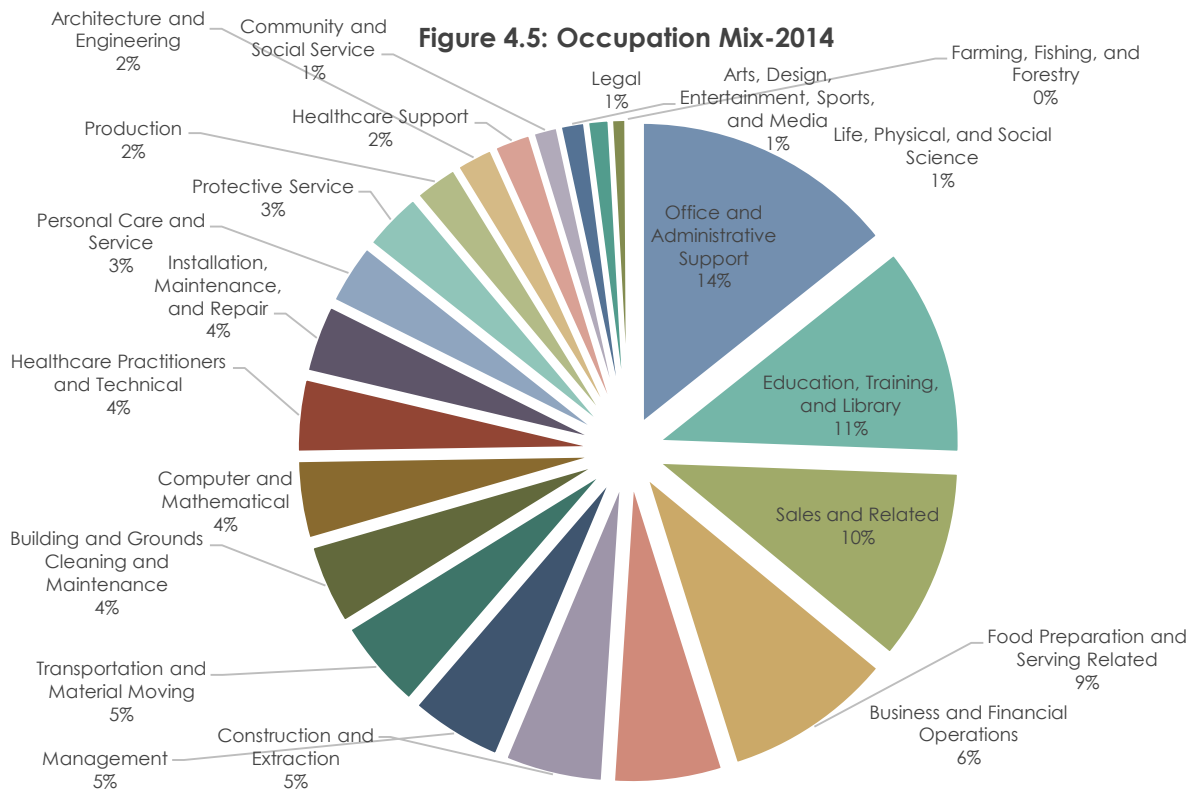Based on the 22 major occupations classified by the Standard Occupational Classification (SOC) system,[8] office and administrative support is the most prevalent occupation in the RCWET region, accounting for 50,758 people as of the fourth quarter 2014 or 14.3% of all jobs (Figure 4.5 and Table 4.3). These occupations generally pay below-average wages across all occupations in the region, with average annual wages of $39,800 compared to $53,200 for all occupations. The next-largest occupation groups in the region are education, training, and library (11.3% of total); sales and related (10.4%); food preparation and serving related (9.2%); and business and financial operations occupations (5.9%).

Figure 4.5: Occupation Mix-2014

Architecture and Engineering 2%
Community and Social Service 1%
Production 2%
Healthcare Support 2%
Protective Service 3%
Personal Care and Service 3%
Installation, Maintenance, and Repair 4%
Healthcare Practitioners and Technical 4%
Computer and Mathematical 4%
Building and Grounds Cleaning and Maintenance 4%
Transportation and Material Moving 5%
Management 5%
Construction and Extraction 5%
Legal 1%
Arts, Design, Entertainment, Sports, and Media 1%
Farming, Fishing, and Forestry 0%
Life, Physical, and Social Science 1%
Office and Administrative Support 14%
Education, Training, and Library 11%
Sales and Related 10%
Food Preparation and Serving Related 9%
Business and Financial Operations 6%

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[8] With occupation definitions based on the Standard Occupational Classification (SOC) system, there were 354,890 workers identified in the RCWET service region in more than 800 occupations as of the fourth quarter of 2014. The total occupation employment figure here does not exactly match the total industry figure quoted earlier, because the computation method for converting industry employment to occupations results in a slight discrepancy between the two totals.

Table 4.3: Occupation Structure of RCWET Region (2014-Q4)

Occupation Group	Employment	% of total	Average Wage
Architecture and engineering	7,121	2.0%	$88,500
Arts, design, entertainment, sports, and media	4,745	1.3%	$63,600
Building and grounds cleaning and maintenance	15,374	4.3%	$27,400
Business and financial operations	20,848	5.9%	$81,400
Community and social services	4,770	1.3%	$53,400
Computer and mathematical science	15,000	4.2%	$93,900
Construction and extraction	18,805	5.3%	$45,400
Education, training, and library	40,036	11.3%	$59,300
Farming, fishing, and forestry	334	0.1%	$36,500
Food preparation and serving related	32,542	9.2%	$23,500
Healthcare practitioners and technical	14,026	4.0%	$80,600
Healthcare support	7,085	2.0%	$32,100
Installation, maintenance, and repair	13,021	3.7%	$49,900
Legal	2,821	0.8%	$115,500
Life, physical, and social science	4,172	1.2%	$82,000
Management	17,686	5.0%	$126,200
Office and administrative support	50,758	14.3%	$39,800
Personal care and service	11,650	3.3%	$28,100
Production	8,399	2.4%	$37,600
Protective service	11,468	3.2%	$50,600
Sales and related	36,909	10.4%	$37,300
Transportation and material moving	17,323	4.9%	$36,000
Total	354,890	100.0%	$53,200

Source: JobsEQ

In terms of detailed occupations (six-digit SOC level), retail salespersons (13,807 employees) and cashiers (9,251), both of which are part of the sales and related occupation group, were the largest occupations in the RCWET service region (Table 4.4) as of the fourth quarter of 2014. The next-largest occupations were combined food preparation and serving workers, janitors and cleaners, elementary school teachers, general office clerks, and waiters/waitresses. There were also large numbers of employees working as secretaries (not including legal, medical, and executive), teacher's assistants, and secondary school teachers. Though these are the largest occupations in terms of employment, several primarily require on-the-job training and may not have a significant impact on the demand for training providers unless they are seeking up-skilling in order to move into more advanced careers paying higher wages. The large number of low-skilled occupations could be a pool of potential workers to support economic development efforts and potential new businesses in the region.

Table 4.4: Top 20 Occupations in RCWET Region (2014-Q4)

Occupation	Occupation Group	Employment
Retail Salespersons	Sales and related	13,807
Cashiers	Sales and related	9,251
Combined Food Preparation and Serving Workers, Including Fast Food	Food preparation and serving related	8,883
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	Building and grounds cleaning and maintenance	7,866
Elementary School Teachers, Except Special Education	Education, training, and library	7,739
Office Clerks, General	Office and administrative support	7,395
Waiters and Waitresses	Food preparation and serving related	6,522
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	Office and administrative support	6,442
Teacher Assistants	Education, training, and library	6,157
Secondary School Teachers, Except Special and Career/Technical Education	Education, training, and library	5,442
General and Operations Managers	Management	5,337
Customer Service Representatives	Office and administrative support	4,773
Stock Clerks and Order Fillers	Office and administrative support	4,573
Bookkeeping, Accounting, and Auditing Clerks	Office and administrative support	4,251
Registered Nurses	Healthcare practitioners and technical	3,979
Security Guards	Protective service	3,832
Accountants and Auditors	Business and financial operations	3,674
Laborers and Freight, Stock, and Material Movers, Hand	Transportation and material moving	3,651
Business Operations Specialists, All Other	Business and financial operations	3,592
Middle School Teachers, Except Special and Career/Technical Education	Education, training, and library	3,582

Source: JobsEQ®

4.2.2. Demand Occupations

To understand occupation demand, Chmura classified each occupation into categories based on the skills required. Only those with medium and high skill levels are presented here as they are more germane to the mission of the RCWET. Occupations that require medium skill levels necessitate work experience in a related occupation, a postsecondary vocational award, or an associate's degree. High skill level occupations require a bachelor's degree or higher.

Over the ten-year period from 2014 to 2024, demand for elementary school teachers (except special education) is expected to show the largest increase in the RCWET service region among occupations requiring high or medium skill levels, with an expected annual average demand of 301 jobs per year. Elementary school teachers are followed by teacher assistants (+205 jobs per year) and general operations managers (+203 per year). Secondary school teachers (+202), accountants and auditors (+182), registered nurses (+160), first line supervisors/managers of retail sales workers (+157) and

applications software developers (+129) are also expected to see significant annual average increases in demand in the region.

Table 4.5: Top 20 High and Medium Skill Level Occupations by Employment Growth (2014-2024)

Occupation	Skill Level	Annual Average Demand	Annual Change
Elementary School Teachers, Except Special Education	High	301	3.27%
Teacher Assistants	Medium	205	3.03%
General and Operations Managers	High	203	3.30%
Secondary School Teachers, Except Special and Career/Technical Education	High	202	3.13%
Accountants and Auditors	High	182	4.03%
Registered Nurses	Medium	160	3.44%
First-Line Supervisors of Retail Sales Workers	Medium	157	3.75%
Middle School Teachers, Except Special and Career/Technical Education	High	139	3.27%
Software Developers, Applications	High	129	3.95%
First-Line Supervisors of Office and Administrative Support Workers	Medium	125	3.46%
Heavy and Tractor-Trailer Truck Drivers	Medium	118	3.32%
Computer Systems Analysts	High	112	4.38%
Management Analysts	High	112	3.69%
Cooks, Restaurant	Medium	112	3.35%
First-Line Supervisors of Food Preparation and Serving Workers	Medium	107	3.86%
Computer User Support Specialists	Medium	90	3.93%
Hairdressers, Hairstylists, and Cosmetologists	Medium	85	4.58%
Nursing Assistants	Medium	84	3.56%
Software Developers, Systems Software	High	78	3.95%
Market Research Analysts and Marketing Specialists	High	75	4.70%

Source: Chmura Economics & Analytics and JobsEQ®

4.3. Occupation Gaps Analysis

4.3.1. Demand Projections

In this section, Chmura provides demand projections by occupation group for the ten years from 2014 to 2024 (Table 4.6) in the RCWET service region. Total demand is derived from job replacement (which varies according to different turnover rates and expected retirement by occupation) and growth (due to industry growth and demand). Occupations with high job replacement are generally those with high turnover rates since turnover accounts for about 70% of overall demand. The largest occupation groups in terms of job replacement are sales and related, food preparation and serving related, and office and administrative support. These same occupation groups are among the largest in annual demand as well.

Overall, Chmura projects total demand for all occupations in the RCWET service region to exceed 147,000 jobs from 2014 to 2024 for an annual average demand of 14,713 jobs. The sales and related occupation group is expected to have the highest annual employment demand at 1,766. Office and administrative support (1,697 jobs) and food preparation and serving related (1,618) are projected to follow closely behind. The education, training, and library occupation group is projected to need 1,410 additional jobs annually, while the construction and extraction group is expected to need nearly 1,000 jobs each year. Healthcare support occupations and personal care and service occupations together are expected to demand nearly 1,000 jobs each year, and are tied for the fastest-growing occupation group with a 4.2% average annual growth rate. Construction and extraction occupations (4.1%) and food preparation and serving related occupations (4.1%) are also expected to grow at a fast pace.

Table 4.6: Annual Average Demand Projections by Occupation Group (2014-2024)

Occupation Groups	Q4 2014 Employment	Annual Total Employment Demand	Annual Demand from Growth	Annual Demand from Replacement	Annual Avg. Demand Change
Architecture and engineering	7,121	289	106	183	3.5%
Arts, design, entertainment, sports, and media	4,745	227	67	159	4.0%
Building and grounds cleaning and maintenance	15,374	591	221	370	3.3%
Business and financial operations	20,848	802	338	464	3.3%
Community and social services	4,770	184	70	113	3.3%
Computer and mathematical science	15,000	680	413	268	3.8%
Construction and extraction	18,805	939	554	385	4.1%
Education, training, and library	40,036	1,410	513	896	3.1%
Farming, fishing, and forestry	334	13	2	11	3.3%
Food preparation and serving related	32,542	1,618	418	1,200	4.1%
Healthcare practitioners and technical	14,026	629	328	301	3.8%
Healthcare support	7,085	360	218	142	4.2%
Installation, maintenance, and repair	13,021	537	205	332	3.5%
Legal	2,821	85	30	55	2.7%
Life, physical, and social science	4,172	181	48	133	3.7%
Management	17,686	744	288	456	3.6%
Office and administrative support	50,758	1,697	498	1,199	2.9%
Personal care and service	11,650	588	257	330	4.2%
Production	8,399	281	63	218	2.9%
Protective service	11,468	431	132	299	3.2%
Sales and related	36,909	1,766	502	1,264	4.0%
Transportation and material moving	17,323	661	230	431	3.3%
Grand Total	**354,893**	**14,713**	**5,501**	**9,209**	**3.5%**

Source: JobsEQ®

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Economics & Analytics

4.3.2. Supply Projections

Occupation supply is driven by population growth and the skill attainment of the labor force. Chmura expects that from 2014 to 2024, the supply of workers for each of the 22 occupation groups will increase. The overall labor supply is projected to grow 3.6% annually over the ten-year period in the RCWET service region, which translates to 15,050 new workers entering the workforce per year. Among individual occupation groups with at least 100 workers, food preparation and serving related labor supply is expected to increase the fastest at 4.7%, followed by legal (4.5%); education, training, and library (4.5%); life, physical, and social science (4.5%); and personal care and service occupations (4.3%). Community and social service (4.1%); arts, design, entertainment, sports, and media (4.1%); and sales and related occupations (3.9%) are also expected to see large annual increases in labor supply. Installation, maintenance, and repair (2.4%) and construction and extraction occupations (2.8%) are the occupation groups with the slowest projected annual average growth rates in the region.

Table 4.7: Annual Average Supply Projections by Occupation Group

| Occupation Groups	Annual Average Employment Supply (2014-2024)	Annual Avg. Change, Employment Supply
Architecture and engineering	267	3.2%
Arts, design, entertainment, sports, and media	234	4.1%
Building and grounds cleaning and maintenance	558	3.1%
Business and financial operations	752	3.1%
Community and social services	237	4.1%
Computer and mathematical science	574	3.3%
Construction and extraction	596	2.8%
Education, training, and library	2,220	4.5%
Farming, fishing, and forestry	21	5.0%
Food preparation and serving related	1,901	4.7%
Healthcare practitioners and technical	567	3.5%
Healthcare support	228	2.8%
Installation, maintenance, and repair	350	2.4%
Legal	157	4.5%
Life, physical, and social science	229	4.5%
Management	718	3.5%
Office and administrative support	1,771	3.0%
Personal care and service	613	4.3%
Production	293	3.0%
Protective service	457	3.4%
Sales and related	1,734	3.9%
Transportation and material moving	573	2.9%
Total	15,050	3.6%

Source: JobsEQ®

4.3.3. Occupation Gaps

The occupation gap indicates the overall imbalance between future labor demand and supply of workers for a particular occupation. A negative gap indicates a labor surplus while a positive gap indicates a shortage; the gaps are measured by the annual average number of workers for the region. Note that occupations with relatively high annual demand may still show a labor surplus if supply is projected to grow faster than demand.

Figure 4.6 examines the gaps among occupation groups in the RCWET region. Exactly half of the 22 occupation groups in the region are expected to have a positive gap or labor shortage. The largest shortage is projected in the construction and extraction occupation group with a shortage of 339 workers per year. The annual shortages in installation, maintenance, and repair (180 workers); healthcare support (132); and computer and mathematical science (107) are also expected to be substantial. In contrast, the largest annual surplus in labor for the RCWET service region is expected to be in the education, training, and library group with an excess of 806 workers, followed by food preparation and serving related (254), and office and administrative support (155).

**Figure 4.6: RCWET Region Occupation Gaps by Occupation Group
Annual Average (2014-2024)**
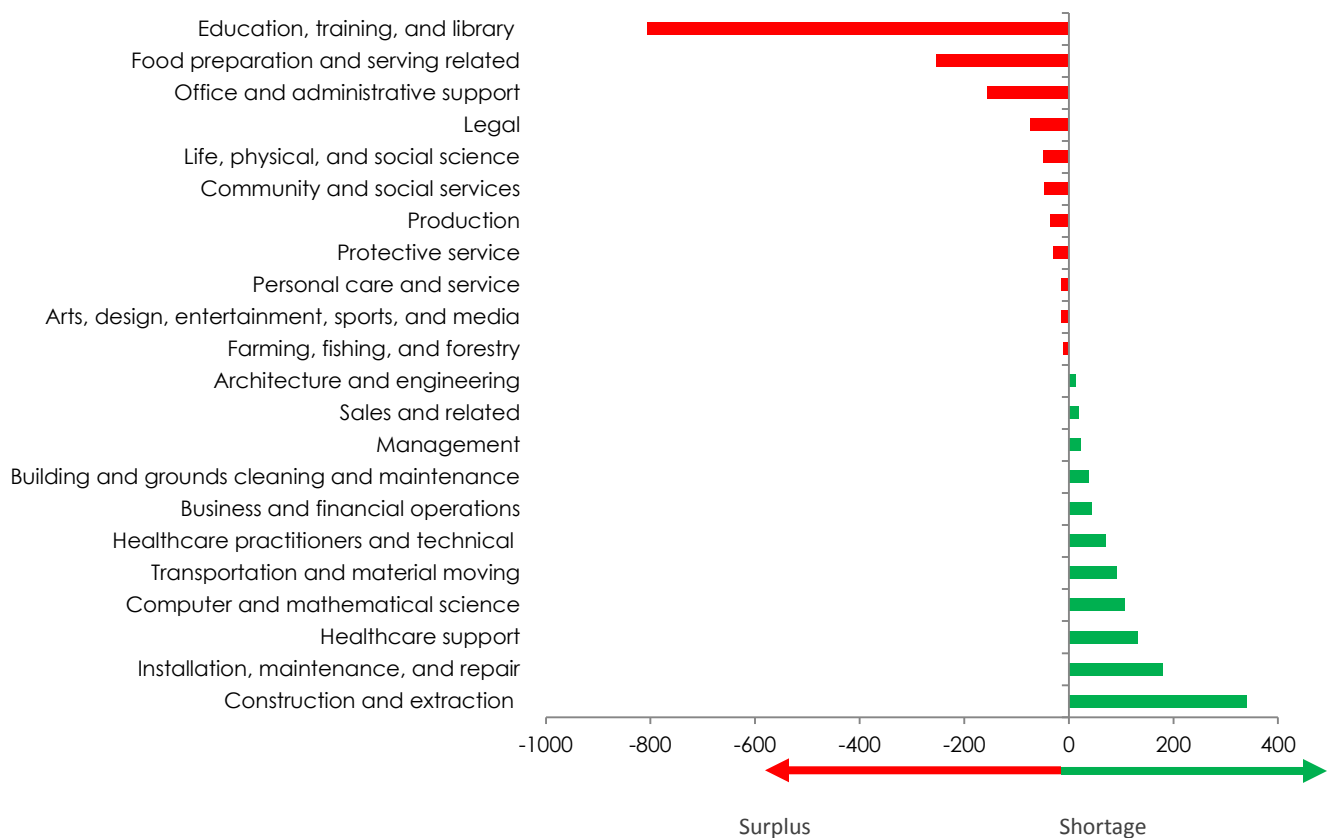
Source: JobsEQ®

Figure 4.7 describes the workforce gaps in greater detail, highlighting the ten-largest expected surpluses and deficits at the occupation level. Several occupations with the largest expected annual surplus of workers—elementary school teachers (208), waiters and waitresses (118), and cashiers (112)—are also in

the top 20 occupations in terms of employment for the RCWET service region. Despite the large demand for teachers in the study area, the projected annual supply of new graduates with such degrees suggests a surplus for that occupation.[9] Specifically, the demand for elementary teachers (Table 4.5) in the study area is estimated to grow 3.3% a year versus an estimated increase of 5.1% per year in supply. Many of the occupations with expected deficits require some level of certification, such as carpenters (63), home health aides (58), electricians (57), and heavy and tractor-trailer truck drivers (50).

Figure 4.7: RCWET Region, Significant Occupation Gaps by Occupation Annual Average (2014-2024)


Source: JobsEQ®

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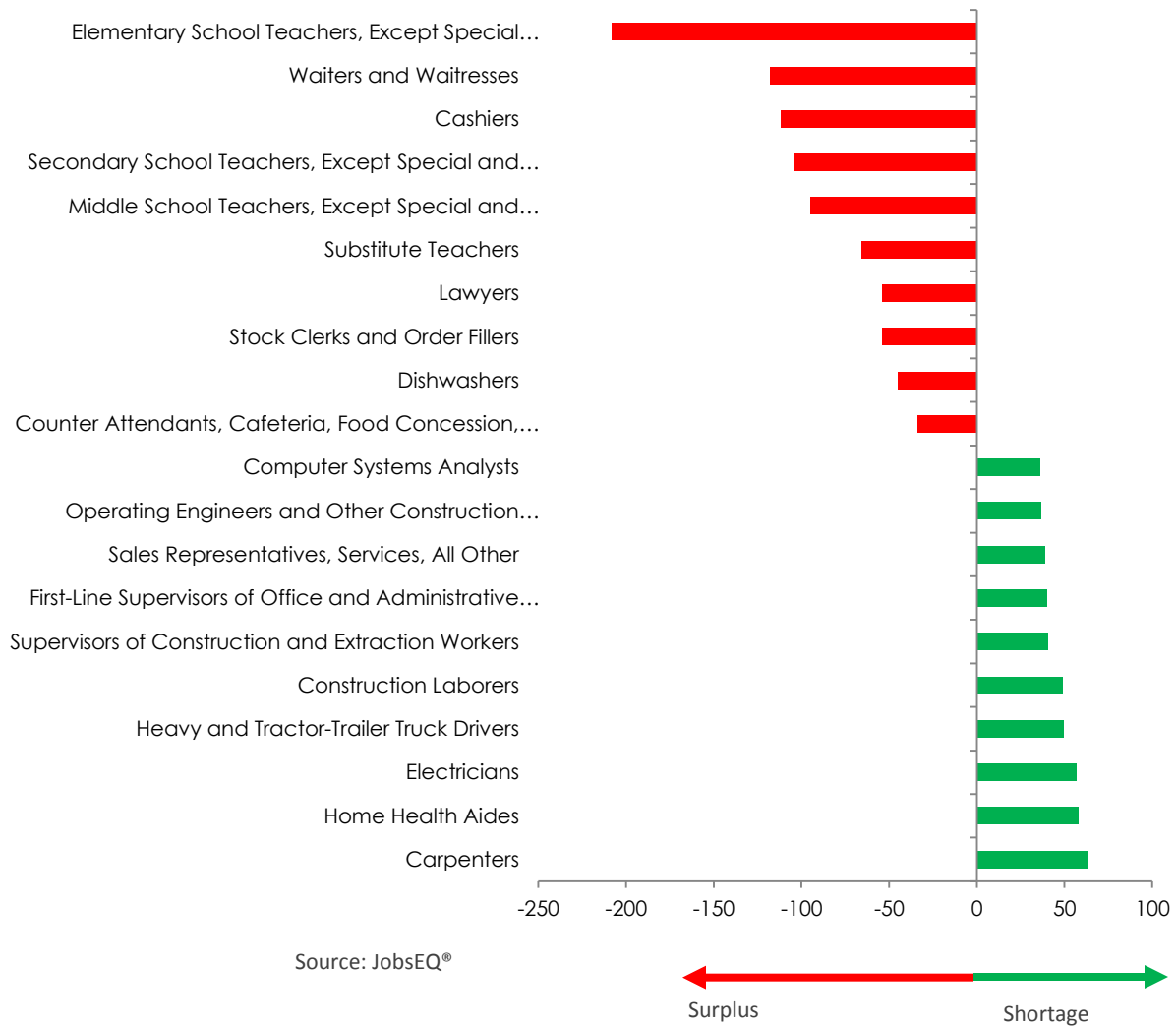
[9] Occupation gaps are calculated as the difference between the projected demand and the projected supply of occupations. Note that it may be possible for an occupation to have a fast growth rate, yet still have a labor surplus in the future if supply grows faster than demand.

Finally, Figure 4.8 shows the occupation gaps among highly-skilled occupations. Specifically, each of the occupations shown typically requires at least a bachelor's degree or higher for an entry-level position. The projected surpluses are dominated by education occupations, especially elementary, middle, and secondary school teachers. Many of the largest expected shortages are in computer occupations, including computer systems analysts) and software developers, applications.

Notably, there is an expected shortage of information security analysts, further stressing the importance of the cybersecurity lab at the RCWET. These workers are typically responsible for planning, implementing, upgrading, or monitoring security measures for the protection of computer networks and information, and may ensure appropriate security controls are in place and respond to computer security breaches and viruses. The projected demand for information security analysts represents an annual demand growth of 5.3%, far exceeding the average demand growth of 3.5% for all other occupations. Moreover, the study area (as defined in Figure 3.1) represents only a portion of Northern Virginia. Cybersecurity focus group participants and interviewees confirmed the occupation gap and confirmed that total demand for these cybersecurity occupations is large in the broader Northern Virginia region and greater Washington, D.C. area.

**Figure 4.8: RCWET Region: Significant Occupation Gaps in
High-Skill Occupations, Annual Average (2014-2024)**
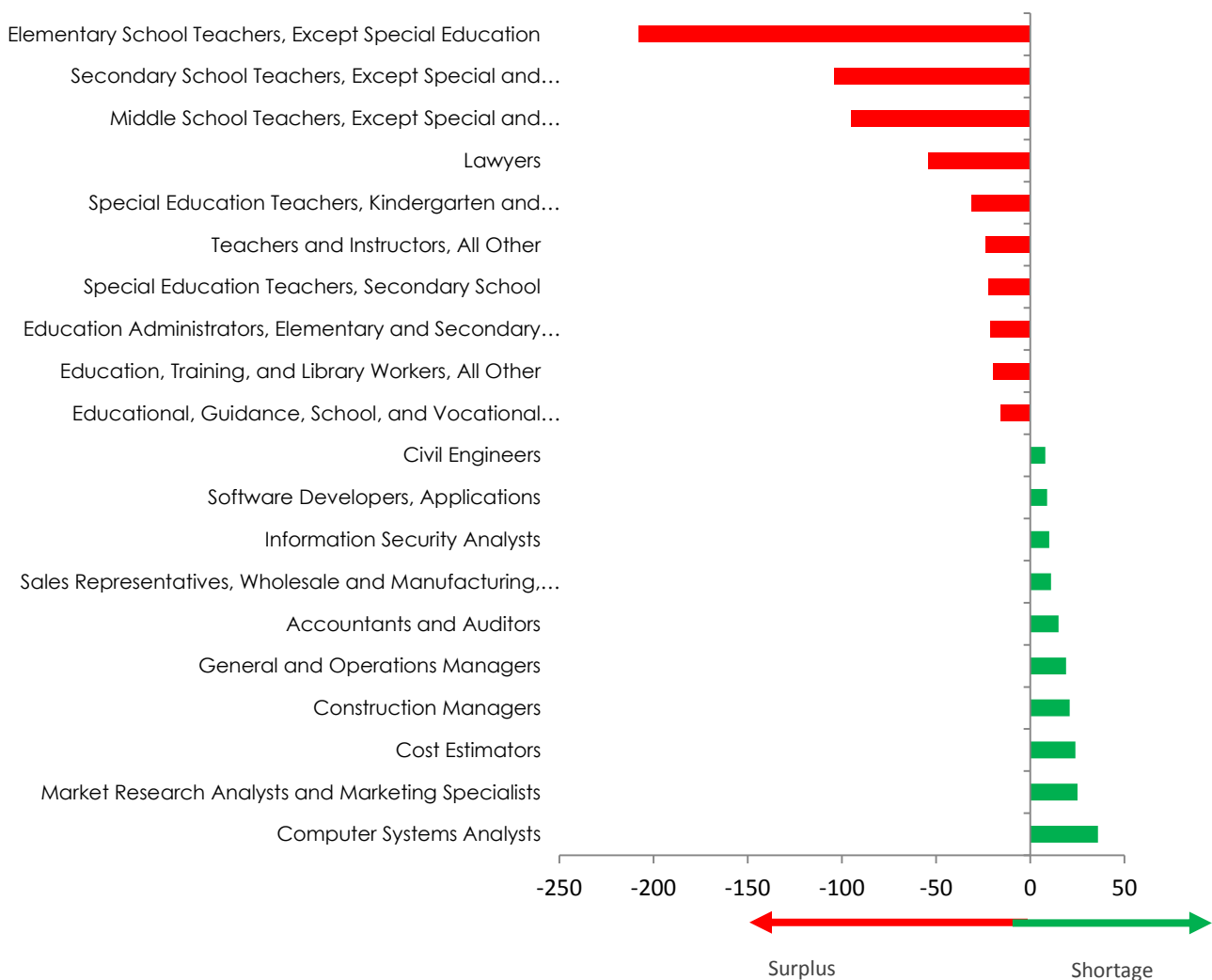
5. RCWET Demand and Opportunity Analysis

5.1. Study Participants

To understand the business need for the RCWET at the Woodbridge campus of NOVA, Chmura conducted a series of focus groups and one-to-one interviews in spring 2015. A total of 55 individuals participated in the study.[10] They are from the following three main groups (Table 5.1): business, job seekers, and stakeholders.

Table 5.1: Participants in Chmura Study

Industry	% of Regional Employment	Business	Jobseekers	Stake holders	Total
Construction	7%	1			1
Education & Health	25%	3	1	15	19
Financial Activities	3%	1			1
Government/Military	8%	2		5	7
Leisure	11%	1			1
Manufacturing	2%	2	1		3
Other Service	7%	3	1		4
Professional & Business Service	19%	12	3		15
Trade, Transportation & Utilities	18%	3	1		4
Total	**100%**	**28**	**7**	**20**	**55**

Note: The military representatives are included in the Business Column

Source: Chmura Economics & Analytics

- Businesses: Over twenty business representatives from all major industry sectors and military installations participated in two focus groups, as well as multiple one-to-one interviews. In addition, representatives from Prince William County Chamber of Commerce also participated in the business focus groups, as they represent the business community in the region. This balanced representation of regional businesses ensures that business voices from all sectors are received by the RCWET.

- Job seekers: Seven job seekers participated in a focus group. Representatives were from manufacturing, education and health, and professional and business services industries.

- Stakeholders: These were representatives from Northern Virginia Community College, The SkillSource Group, and the Northern Virginia Workforce Investment Board (WIB). In addition, representatives from local governments and state agencies also participated in the stakeholder focus groups.

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[10] Please see the Appendices for detailed information regarding focus groups and surveys.

5.2. Evaluation of Service Programs

Study participants were presented with a list of service programs and asked whether or not they would use each program at the RCWET or if they would expect other businesses in the region to use the program. Chmura used a conservative approach to count the number of businesses and jobseekers in favor of certain programs. The number and percent of businesses and job seekers interested in a program presented in the tables below thus represent a clear "Yes" confirming their desire for a particular program. Responses that were not counted in the calculation of participants' interest include "not sure," "not applicable," "no," and blanks (no response). In other words, if 40% of business participants expressed interest in a program, that does not mean 60% of them were not interested. Some of them simply may have been unsure at the time of the study. Given the number of respondents and the fairly strict guidelines used in calculating interest, endorsement by a majority (greater than 50%) is indicative of strong interest.

5.2.1. Re-evaluation of 2009 List of Service Programs

The first step in the evaluation of business demand is to examine whether regional business demand has shifted since the 2009 study. The 2009 Chmura study asked businesses to report their likelihood of using the RCWET in the following nine broad service programs:

- Information Technology Programs for Staff Development
- Information Technology Certifications
- Other Certifications and Licensure Programs
- Testing Center for Federal, State, and Industry Certification and Licensure Exams
- Career Development Programs for Staff Development
- Government Contracting Technical Assistance
- Other Business Assistance Programs
- Services to Help Recruit and Screen New Employees
- Job Fairs

The 2009 study found that a testing center and jobs fairs were the most desired programs with 42% of regional businesses likely to utilize these two types of services offered by the RCWET. These two programs were followed by career development and workforce training services (37% of businesses were interested), services of recruiting and screening new employees (35%), and other certification and licensure programs (33%).

In 2015, an overwhelming majority (92.6%, 25 out of 27) of business representatives reported that they were likely to use at least one of the above services. This is higher than the 76.3% overall interest percentage reported in the 2009 study. This implies that provided that the right mix of services are offered at the RCWET, the center will receive a wide range of support from regional businesses.

Table 5.2: Evaluation of 2009 Service Training Programs

	Business		Job Seekers	
	Number of Business Interested	% of all Business	Number of Job Seeker Interested	% of all Jobseekers
Information Technology Workforce Training	15	56%	3	43%
Information Technology Certification	14	52%	4	57%
Other Certification and Licensure	15	56%	2	29%
Testing Center	12	44%	3	43%
Career Development Workforce Training (including soft skills, leadership)	21	78%	5	71%
Government Contracting Technical Assistance (including clearance)	10	37%	0	0%
Business Assistance Program	10	37%	1	14%
Recruit and Screen New Employees	10	37%	0	0%
Job Fairs and Job Placement	15	56%	6	86%

Note: One surveyed business participant did not answer those questions

Source: Chmura Economics & Analytics

In 2015, business interests in the above programs increased from the 2009 study across the board. Of all nine types of service programs, the career development and workforce training service is the most popular, with 21 business representatives out of 27 (78%) expressing interest. This is significantly higher than 37% that was reported in the 2009 study. Many study participants said their employees needed training in leadership and management, and the RCWET would be the place to offer those skills. Some businesses also desired training in soft skills.

After career development workforce training, more than half of the participants are interested in information technology (IT) workforce training and certification, and the other half in certification and licensures. Those percentages are also higher than the 2009 study, where around 30% of businesses reported interest in 2009. These latest results imply that over the last 6 years, demand for IT-related workforce and training has been both strong and increasing. While testing center and job fairs were the most popular programs in the 2009 study (with over 40% of businesses expressing interest), their popularly remained robust at 44% and 56%, respectively, in 2015. In 2015, the demand for government contracting and business assistance programs are fairly consistent with 2009 study findings, where over 30% of businesses expressed interests in both programs.

Results from the job seeker focus group imply that while a majority of job seekers are interested in career development training (including soft skills training), they also strongly prefer that the RCWET holds job fairs to help them find work. Their desire is also that the RCWET could serve as a bridge between job seekers and businesses. One job seeker expressed interest in business assistance services, as this person is looking to start a new business after years of unemployment.

5.2.2. Evaluation of New Service Programs

In the six years since the 2009 Chmura study, economic changes in Northern Virginia make it necessary to explore several new service programs that may be offered by the RCWET. During the initial fact-finding process in the 2015 study, participants of the stakeholder focus groups from community colleges,

![CHMURA Economics & Analytics]

government agencies, and business communities proposed the following service programs for further examination:

- Knowledge Management
- Alternative Energy/Equipment Training
- Housekeeping Training (handling hazardous materials)
- Electrician/Plumber/Groundskeepers
- Construction, Skilled Trade Training
- Information Assurance
- Security + Certification
- Cloud-Based Training
- Cybersecurity/Forensics/Robotics/Artificial Intelligence
- Computer Modeling/Programming
- CRM, SalesForce, Vendor Training
- Other Software Training (Office, Database)

For those new programs, an overwhelming majority (85.2%, 23 out of 27) of business representatives reported that they were likely to use at least one of the above services. Among those, interest in cybersecurity-related training (including cyber forensics) is the strongest, with 63% of business participants expressing the need. A sizable number of participants are interested in other programs related to computer science and cybersecurity, such as Information Assurance (48%), Security + training (41%), and computer modeling/programming (41%). 48% of the participants are interested in business operation software such as Customer Relationship Management (CRM), Salesforce, and vendor training.

Table 5.3: Evaluation of Additional Service Training Programs

| | Business | | Job Seekers | |
	Number of Business Interested	% of all Business	Number of Job Seeker Interested	% of all Jobseekers
Knowledge Management	9	33%	3	43%
Alternative Energy / Equipment	5	19%	2	29%
Housekeeping Training (handling hazard materials)	6	22%	3	43%
Electrician/Plumber/Grounds Keepers	8	30%	3	43%
Construction Skilled Trade/Auto	7	26%	1	14%
Information Assurance	13	48%	2	29%
Security + Certification	11	41%	2	29%
Cloud Based Training	11	41%	4	57%
Cybersecurity/Forensics/Robotics/AI	17	63%	1	14%
Computer Modeling/Programming	11	41%	3	43%
CRM, SalesForce, Vendor Training	13	48%	3	43%
Other Software Training (Office, Database)	4	15%	2	29%

Note: One surveyed business participant did not answer those questions

Source: Chmura Economics & Analytics

Some of the programs suggested for examination by participants in the 2015 stakeholder focus groups received tepid support from business participants. Many of the programs were related to skilled trade training, such as alternative energy/equipment training, housekeeping training (handling hazardous materials), and construction, skilled trade/auto training. Those are in contrast with job seekers, who expressed interest in those skilled trade training programs.

5.2.3. Categorized Opportunity of Service Programs

Combining the re-evaluation of 2009 programs and the analysis of suggested new programs, Table 5.4 lists the service training programs with the highest demand from regional businesses. Seven programs received strong support (greater than 50%), while an additional eight programs were endorsed by between one-third and one-half of business representatives. Among those, nine programs from the 2009 study remain, while six are new programs proposed in the 2015 study.

Table 5.4: Combined List of Service Training Programs

Categories	Program	Business		Job Seekers	
		Number of Business Interested	% of all Business	Number of Job Seeker Interested	% of all Jobseekers
Workforce Training and Service	Career Development Workforce Training (including soft skills, leadership)	21	78%	5	71%
	Job Fairs and Job Placement	15	56%	6	86%
	Recruit and Screen New Employees	10	37%	0	0%
Cybersecurity Focused	Cybersecurity/Forensics/Robotics/AI	17	63%	1	14%
	Information Assurance	13	48%	2	29%
	Security + Certification	11	41%	2	29%
General Information Technology	Information Technology Workforce Training	15	56%	3	43%
	Information Technology Certification	14	52%	4	57%
	CRM, SalesForce, Vendor Training	13	48%	3	43%
	Computer Modeling/Programming	11	41%	3	43%
	Cloud Based Training	11	41%	4	57%
Other Business Services	Other Certification and Licensure	15	56%	2	29%
	Testing Center	12	44%	3	43%
	Business Assistance Program	10	37%	1	14%
	Government Contracting Technical Assistance (including clearance)	10	37%	0	0%
	Knowledge Management	9	33%	3	43%

Note: One surveyed business participant did not answer those questions

Source: Chmura Economics & Analytics

Those high-demand service programs can be grouped into four major categories. Among those, the first category is workforce training and service, such as job fairs and job placement services. Career development workforce training garners the strongest interest among businesses. This training focuses on skills that can be used in all industries, such as communication, management, leadership, and other soft skills. A fair number of businesses are interested in job fairs and job placement services, which can reduce their recruitment and training costs. Those two services are of the most interest to job seekers as well.

The second major service category is cybersecurity-related training programs. Over 60% of businesses are interested in this training. Due to increased demand for all businesses to safeguard data, and the development of a strong cluster of cybersecurity firms in the Northern Virginia region, there is a strong demand among regional businesses for training in this area. Related service programs such as Information Assurance and Security + training are also popular among businesses. High interest in cybersecurity-related programs is expressed from a wide range of businesses, ranging from retail to financial services.

The third category of training programs with strong business interest is classified as general information technology training. Examples are IT workforce training and IT certification, computer modeling and programing, and software training such as CRM and Salesforce. Though those programs do not focus on cybersecurity, they have support from a wide range of businesses, as demand for general information technology skills remains strong in the region. Many job seekers also consider those skills useful to advance their careers.

Finally, regional businesses are interested in general business training programs, including other certification, business assistance programs, government contracting assistance, knowledge management, and a testing center. While many regional businesses expressed interest in those programs, they also caution against duplication of services as other organizations and community colleges may have already been providing some of those services.

Trainings in skilled trades, such as electrician/plumbing/auto mechanic training, received some endorsements in both the stakeholder and job seeker focus group, but they received lukewarm support in the business focus groups and surveys. As a result, they do not make the list of service programs with strong business demand.

5.3. Need for RCWET Facility Space

Study participants were also presented with a list of possible uses for the facility space and asked whether they see a need for that space at the RCWET. The number and percent of businesses and job seekers interested in a program presented in the tables below thus represent a clear "Yes" confirming their desire for a particular space utilization. Responses that were not counted in the calculation of participants' interest include "not sure," "not applicable," "no," and blanks (no response). Similar to the 2009 study, participants were less likely to endorse alternative uses for the facility than they were to recommend training programs.

While it is assumed that the RCWET will actively design, organize, and deliver the service programs, the RCWET will consist of facility space with various uses that will be accessible to the business community. Utilizing the 2009 study, and augmented with inputs from the initial stakeholder focus group, Chmura evaluated business needs for the following facility space:

- Classrooms for training
- Computer lab
- Conference space
- Distance learning
- Meeting space
- Product demonstration space/trade shows

- Telework
- Temporary office space
- Videoconferencing
- Robotic space
- Forensic lab
- Other

Similar to the 2009 study, business demand for facility space is generally weaker than demand for service programs. Overall, a majority (74%, 20 out of 27) of business representatives reported that they are likely to use at least one type of space at the RCWET. This is higher than 53% that was reported in the 2009 study.

Demand is generally modest across the thirteen categories of facility uses. Training classrooms, meeting space, distance learning, and video conferences were the most desired. Over one-third of regional business participants said they were likely to utilize those proposed facility spaces at the RCWET (Table 5.5). The remaining facility needs had relatively low interest, including product demonstration and trade show space (30%), conference space (30%), and computer labs (30%). On the other hand, an overwhelming majority of business representatives said that they would not need telework space or temporary office space. Very specialized spaces such as a robotics space or a forensics lab have less demand among businesses as well, because not only is expensive equipment required, but these specialized spaces are only applicable to a small segment of regional businesses. Demand is also low for conference space and computer labs.

Table 5.5: Evaluation of RCWET Facility Needs

| | Business | | Job Seekers | |
	Number of Business Interested	% of all Business	Number of Job Seeker Interested	% of all Jobseekers
Training Classrooms	13	48%	3	43%
Computer Lab	8	30%	5	71%
Conference Space	8	30%	2	29%
Distance Learning	11	41%	0	0%
Meeting Space	12	44%	3	43%
Product Demo/Trade Show Space	8	30%	0	0%
Telework	4	15%	1	14%
Temporary Office Space	4	15%	3	43%
Videoconferencing	9	33%	3	43%
Robotics Space	3	11%	0	0%
Skilled Trade Workspace (Welding, Auto, Plumbing)	4	15%	3	43%
Forensics Lab	1	4%	0	0%
Other	4	15%	1	14%

Note: One surveyed business participant did not answer those questions

Source: Chmura Economics & Analytics

The relatively low demand for physical space implies that there is strong preference among regional businesses for the content delivered by the RCWET, not where or how it is delivered. Important content includes information technology, cybersecurity, and career development training, which only require

classrooms and computers with internet access. Some training can be delivered either remotely or online. As a result, only training classrooms and distance learning or video conferencing spaces are of interest to businesses.

Job seekers prefer computer labs by a wide margin, which differs from business demand. They also prefer training classrooms, meeting space, video conferencing space, skilled trade work space, and temporary office space. They also tend to be more focused on their individual needs rather than business needs.

5.4. Other Suggestions from Business Representatives

Through focus groups and interviews, Chmura finds that regional businesses recognize the overall need for a new workforce development center in eastern Prince William County, but they also emphasize that other than providing needed service programs and facilities, there are other characteristics of the center that will have significant impact on the success of the RCWET.

Over and over, businesses emphasized that the RCWET needs to be flexible when considering business demand. That is, RCWET programs need to be created in partnership with the business community rather than being created exclusively by academia. This way, programs will meet the specific needs of businesses in terms of the scope of training—timing, length, and method of delivery, for example. Being flexible is also a sentiment expressed by businesses that participated in the 2009 study.

Being flexible assures that content is relevant and length of training is appropriate. Businesses prefer to hire employees with some experience, yet are not interested their employees participating in structured, long-term training. This is especially true for those in government contract businesses, where workers are hired based on contract agreements. Consequently, they prefer training that can be prepared and delivered fairly quickly, which could last from 1-6 months. Their desire is that the RCWET offer short-term training so it will not interfere with employees' usual work responsibilities. When changes in training needs come, the RCWET should be able to switch gears and deliver different training on demand. The possible implication of this on the RCWET's business model is that rather than the center employing full-time faculty and staff to deliver training, it should consider bringing in training contractors as needs arise. The center can then respond to shifting market trends quickly and also reduce overhead cost.

Another aspect of flexibility is the content delivery method. To avoid disruption of the workday, businesses prefer their employee training not be conducted during business hours, but in the evening or on weekends. A majority of businesses prefer online training because it can be delivered most anytime and anywhere. Some also like a blended approach—online training or instruction combined with brick-and-mortar training and hands-on practices.

The same theme of flexibility is also expressed in the discussion of facility/space use. Participants would like the RCWET to have a "flex space," which can be quickly configured into meeting space, trade show/product demonstration space, or training space. Specialized spaces (forensic lab or robotics space) are less desirable for the RCWET, because they are expensive and have less versatility.

There is, however, potential for the RCWET to rent equipment used in the space. In the public transportation sector, there was recognition that buying a driving simulator would be too expensive, since the technology can change quickly. However, there was interest in the RCWET possibly renting a

simulator that could be used for training by the numerous public transit organizations in the region. It is a needed piece of equipment, but too costly for a single organization to justify renting. By renting the simulator, the RCWET could substantially increase the number of drivers who can be trained, filling a recurring need of the industry, since annual turnover is nearly 30%. This could also help job seekers land relatively high-paying jobs that start at $16-17/hour and peak at $25-26/hour.

Constant communication with the business community is essential for the RCWET to remain relevant to regional businesses. During the course of this study, several business representatives indicated that constant dialogue was needed. Some also recommended their colleagues or connections for the RCWET to follow up with. As a result, the RCWET should consider creating a communication plan that regularly seeks input from business communities.

Business participants in the study emphasized that the RCWET should not offer programs that are also offered by community colleges or other state or local agencies. Some participants mentioned that there is already skilled-trade training (HVAC, safety) at NOVA and business services assistance at Flory Small Business Center in Manassas. Those services do not need to be replicated.

Since the 2009 study, one trend is the increasing importance of cybersecurity for the regional economy. Due to the Center's close proximity to military installations (Fort Belvoir and Quantico Marine base), several contractors specializing in cybersecurity are located in the region. The importance of cybersecurity to businesses is recognized by a wide range of firms—including transportation, retail, and financial services.

The general theme from the job seeker group is that they want the RCWET to be a bridge between them and businesses, providing more individualized services that help them get a job. This includes training in different market-based skills, having counselors match them with potential employers, and providing a space where they can work on their resume or interview skills.

6. Cybersecurity Case Study

6.1. Industry Background

Over the past five years, cybersecurity has emerged as a quickly-growing industry following increases in web attacks, notable security breaches at companies such as Target and Anthem, and recent national security concerns. Cybersecurity, as defined by the National Initiative for Cybersecurity Careers and Studies, is "the activity or process…whereby information and communications systems, and the information contained therein are protected from and/or defended against damage, unauthorized use or modification, or exploitation."[11] Cybersecurity is essentially an invaluable form of information assurance—mitigating risk and protecting organizations from losing key information—to paraphrase one

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[11] Source: "Cybersecurity 101", available at http://niccs.us-cert.gov/awareness/cybersecurity-101. Retrieved May 13, 2015.

focus group participant, it is a key pillar of information assurance.[12] As the primary motivations for cyber-attacks almost always include information theft or the disruption of operations, cybersecurity protection most commonly includes cybercrime prevention, network security, privacy assurance, and information security. In 2014, the estimated annual global cost of attacks such as these was valued at around $445 billion.[13] The demand for workers with cybersecurity training and certification is rapidly increasing as the public and private sectors invest in keeping information secure, protecting the privacy of citizens and organizations, and minimizing the value of economic losses from cybercrime.

The need for cybersecurity crosses every sector of the economy, and recent growth has introduced a new level of demand for skilled cyber professionals. As new threats to digital security emerge and evolve, more industries are starting to realize a need for web and information security services in order to protect their networks and clients. Cybersecurity firms have seen the industry market for their services continue to diversify each year, while many larger organizations have expanded in-house cybersecurity teams. The largest sectors in the cybersecurity market are security, aerospace and defense, and systems integrators such as AT&T and Verizon.[14] Based on a 2013 survey, an estimated 14% of cybersecurity professionals are employed in government, another 14% are in manufacturing, and 13% are estimated to be in aerospace and defense. Almost 19% of all cybersecurity professionals are located in the greater D.C. metro area. Other industries with significant employment of cybersecurity professionals include health/medical services, legal and insurance, education, financial services, and biotechnology.[15] Understaffing of employees with cybersecurity skills is especially prominent in education, healthcare, manufacturing, retail, and wholesale industries, according to a recent survey of cyber professionals.[16]

Because of this sudden growth across industries, the demand for professionals with the credentials to secure networks and protect digital information is higher than ever before. Ninety percent of IT professionals believe that there is a shortage of skilled cybersecurity professionals. Forty-one percent of studied businesses plan to hire more cybersecurity professionals in 2015 and believe it will be difficult to find candidates with the skills they are looking for. Most organizations (53%) take between three to six months to fill a position, while 10% can't fill certain positions at all.[17] The Bureau of Labor Statistics projects the number of information security analysts to grow 37% nationally from 2012 to 2022.[18] Over the next 10 years, the RCWET region is expected to see 5.3% average annual growth in demand for information security analysts, compared with 3.5% expected growth in Virginia over the same period.[19] One factor contributing to the low supply of cybersecurity professionals is that only 36% percent of current

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[12] Focus Group April 30, 2015.

[13] Source: "Defending the Digital Frontier", available at http://www.economist.com. Retrieved May 15, 2015.

[14] Source: "Cybersecurity: A compelling growth area for defense companies?" Available at http://www.alixpartners.com. Retrieved May 13, 2015.

[15] Source: "Cyber Security Census", available at http://nationalcybersecuritycenterva.org. Retrieved May 13, 2015.

[16] Source: "The 2013 (ISC)2 Global Information Security Workforce Study", available at www.frost.com. Retrieved May 27, 2015.

[17] Source: "State of Cybersecurity: Implications for 2015", available at www.isaca.org. Retrieved May 27, 2015.

[18] Source: "Information Security Analysts", available at http://www.bls.gov. Retrieved May 13, 2015.

[19] Source: JobsEQ®

cybersecurity professionals exited college with the intent of working in cybersecurity; 43% currently employed in the industry discovered the field somewhere midway during their careers.[20] This suggests a significant opportunity to promote workforce education in order to increase the cybersecurity employment pool.

Though the desired credentials for cybersecurity professionals vary both by sector and individual job focus, employers primarily look for a specified level of education, certification, and a minimum level of experience in the industry. One of the reasons that it is often difficult for companies to fill cybersecurity positions is there is a high amount of certification and experience required. More than 50% of business professionals report that less than a quarter of applicants are qualified for open positions.[21] The most common certifications suggested or required by employers are listed in the table below.

Table 6.1: Common Cybersecurity Certifications

Certification	Certifying Body	Approximate Length of Time to Prepare	Recognized by/employed by (if available)
Certified Information Security Professional (CISSP)	(ISC)[2]	5 years' experience in related field (4 years with bachelor's) plus 5 days of classroom training or similar.	Globally recognized, DoD approved
Certified Information Systems Auditor (CISA)	ISACA	5 years of IS auditing, control, or security work experience, 3-7 day review courses offered, pass exam	Globally recognized, DoD approved, US Federal Reserve requires
Security +	CompTIA	Recommended Network + certification first, knowledge and performance-based exam	Globally recognized, chosen by General Dynamics and Northrup Grumman, DoD approved
Certified Information Security Manager (CISM)	ISACA	5 years' experience in related field, 1-4 day review available, exam	Globally recognized, DoD approved
Cisco Certified Network Professional (CCNP)	Cisco	Must have CCNA Security certification or any CCIE certification, four exams, four recommended five-day training sessions	Globally-recognized, DoD approved
Certified Ethical Hacker (CEH)	EC-Council	Five day training course, two years' experience w/o training, pass exam	Globally-recognized, DoD approved

Source: Chmura Economics & Analytics

Beyond certification, most job postings require a minimum of a bachelor's degree. Computer Science, Computer or Electrical Engineering, or Information Technology degrees are most commonly requested. Some postings only request a high school education or GED, but those typically require a much higher level of experience. According to Chmura's analysis of job postings conducted in May 2015, employers also frequently specify a list of programs and/or operating systems with which an applicant should have prior experience. Looking at related postsecondary awards in the RCWET region, 23 four-year degrees

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[20] Source: "Cyber Security Census", available at http://nationalcybersecuritycenterva.org. Retrieved May 13, 2015.
[21] Source: "State of Cybersecurity: Implications for 2015", available at www.isaca.org. Retrieved May 27, 2015.

were awarded in Computer and Information Systems Security/Information Assurance in 2013, and 90 associate's degrees were awarded in Computer Systems Networking and Telecommunications. The region accounted for about 4.2% of the 550 bachelor's degrees awarded in Virginia in Computer and Information Systems Security/Information Assurance.[22]

National initiatives are expected to impact cybersecurity hiring and training programs in the RCWET region. Since 2009, the federal government has emphasized the importance of cybersecurity in industry, education, and practice through the Comprehensive National Cybersecurity Initiative. President Obama has emphasized cybersecurity as being "one of the most serious economic and national security challenges we face as a nation, but one that we as a government or as a country are not adequately prepared to counter."[23] The goals of this initiative include immediate and future defense against cyber threats and enhancing the future of cybersecurity as an industry by increasing R&D spending, expanding education and training, and uniting the public and private sectors to find answers to various issues concerning cybersecurity.[24] Of particular interest given the proximity of the RCWET to Fort Belvoir and Quantico, the Department of Defense has issued directives which provide guidelines for the certification of their employees, and they have recently changed their approach to testing the aptitude of potential employees. Testing has switched over from a more knowledge-based multiple choice format (DoD Directive 8750) to a method that tests practical application more than information retention (DoD Directive 8140). This recent change illustrates a trend of cybersecurity certifications moving toward more skill-based assessment.[25]

Regional trends also indicate growing demand for cybersecurity professionals in the RCWET region. Over the past decade, Virginia has asserted itself as a national leader in cybersecurity. Due to its close proximity to Washington D.C., a hub for cybersecurity jobs, and the rapid growth of the industry, the demand for cybersecurity professionals is higher than ever before in the state, especially in Northern Virginia. In 2014, Virginia Governor Terry McAuliffe launched the Virginia Cyber Security Commission, expressing the Commonwealth's dedication to cybersecurity education, increasing investment in the industry, and enhancing Virginia's standing as a national leader.[26] According to a keyword search for cybersecurity contracts in the eighth, tenth, and eleventh congressional districts, Northern Virginia received over 180 federal cybersecurity contracts, totaling over $201 million, in fiscal year (FY) 2014 alone. Fort Belvoir received seven cybersecurity-related contracts for work in FY 2014, totaling $27 million, while Quantico received two contracts for cybersecurity-related work totaling $745,000.[27] The National Initiative for Cyber Education has identified nine companies, schools, and agencies in Northern Virginia that

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[22] Source: JobsEQ®

[23] Source: "The Comprehensive National Cybersecurity Initiative", available at https://www.whitehouse.gov. Retrieved May 14, 2015.

[24] Ibid.

[25] Sources: "8570 Certification and the Way Ahead to 8140 Certification", available at http://resources.infosecinstitute.com/. Retrieved May 12, 2015; Focus Group May 6, 2015.

[26] Source: "Executive Order Number 8", available at https://governor.virginia.gov. Retrieved May 11, 2015.

[27] Source: "USA Spending", available at https://www.usaspending.gov. Retrieved May 14, 2015.

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support cyber education.[28] Mach37, a cybersecurity accelerator located at the Center for Innovative Technology, works with newly-launched cybersecurity companies in order to prepare the next generation of cybersecurity startups for the business world. When it started in Fall 2013, there were only 4 companies participating in their training program. Since then, 18 companies have completed the program and they are recruiting for another session in Fall 2015.[29]

The Regional Center for Workforce Education and Training is uniquely prepared to meet business needs for training in cybersecurity. The facility's design was changed during construction to incorporate computer labs, networks, a red vs. blue lab, and other necessary infrastructure for cybersecurity training. The RCWET can expect high demand for cybersecurity training programs from both businesses in the service region and job seekers looking to move into a high-paying and rewarding occupation. The introduction of recent national and statewide initiatives focusing on cybersecurity, the existing strength and projected growth of cybersecurity in the region, and trends of high national demand for cyber skills present a unique opportunity for training in the region.

6.2. Insights from Cybersecurity Interviews

To gain additional insight into the need for best practices in cybersecurity training in the RCWET service region, Chmura asked a number of individuals who are either experts in the cybersecurity field or are involved in recruiting, training, or hiring cybersecurity professionals to participate in focus groups, telephone interviews, and an in-person case study interview. In addition, business representatives in other industries often revealed a need for cybersecurity training—reinforcing the need for cyber professionals across multiple sectors.

Many of the suggestions for successful operation of the RCWET mirrored suggestions from other business representatives. In particular, there was a strong emphasis on the need for the center to be flexible with business demand, to have offerings created in partnership with the industry rather than an academic program, and to update and refine curriculum to keep up with the evolving field of cybersecurity. Regular communication was highlighted as not only necessary for making businesses aware of the center and what it offers, but also for maintaining flexibility and updating programs.

Most notably, all cybersecurity interviewees recognized the high demand for cybersecurity professionals today and expect to hire additional cybersecurity professionals over the next three years. One interviewed participant describing current demand complained that defense contractors are all fishing in the same pond for the same talent pool when it comes to cybersecurity professionals, especially ones with security clearances. Across a wide range of company sizes, all interviewees expected their company to grow over the next three years, and cybersecurity teams were expected to grow on average by 20 additional positions in each company over that period. This suggests there could be higher demand for cybersecurity professionals in the RCWET region than indicated based on the national occupation forecast and regional trends.

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[28] Source: "NICE Cyber Education Map", available at http://csrc.nist.gov/nice. Retrieved May 14, 2015.
[29] Source: "Mach 37 Cohort Companies", available at https://www.mach37.com/. Retrieved May 15, 2015.

Participants also noted a number of factors that complicate cybersecurity training. First, the field of cybersecurity is rapidly changing as new vectors of attack are found and new methods of defense must be developed. For example, the number of attacks against one large company was estimated at around 1,000 per minute. Cybersecurity experts must have training, field experience, and an inquisitive mindset to anticipate methods of attack and discover potential holes in security. An additional concern for government contractors is the recent change in Department of Defense guidelines for cybersecurity training from directive 8570 to directive 8140 (as explained in the industry background above). These factors often result in rapid changes in certification requirements.

It was repeatedly emphasized that certifications and classroom training alone are not sufficient; the field requires hands-on training and experience. One potential problem for the center is that a lot of experience can be pursued independently—outside the classroom or from home with online training providers—without the need for a dedicated cybersecurity training lab. However, as mentioned in our case study interview, hacking is both important for the field and illegal, and should be practiced in a controlled network environment with in-person training and supervision. From interview responses, the RCWET can also aid job seekers tremendously if the curriculum includes on-the-job training or internships with industry partners. This allows job seekers to work in a real cybersecurity environment and put their training into practice while also demonstrating their employability and skills to businesses.

While most participants value experience in the field over classroom training or certification alone, certain certifications were repeatedly mentioned as "worth it" for a company to look for in new hires or to invest in training current employees:

- CISSP: Certified Information Systems Security Professional
- Security +
- CEH: Certified Ethical Hacker
- CISM: Certified Information Security Manager

The cybersecurity field offers a career pathway from entry-level to expert, and interviewees often recommended that the RCWET offer ongoing training for each stage of a career in the field. Basic tasks such as an understanding of cybersecurity practices at a broad level and how to handle a ticket or computer security incident, combined with an internship or other work experience with industry partners, were mentioned as skills needed to get job seekers into entry-level jobs relatively quickly (in a matter of weeks or a few months). Once on the job, it was suggested they build their industry knowledge, return to the RCWET for additional training, and advance to the next level. This professional development can be repeated to keep up with the latest advances and best practices in cybersecurity, earn a certification, and/or gain other business knowledge necessary to progress in their careers, all while building industry knowledge and experience sought after by businesses.

Interviewees often spoke about industry trends and what other businesses in the region could find helpful at the RCWET, but when it came to specific considerations about whether and how their business would use the center, three key business considerations are expected to drive decision making. As one participant summarized, the demand for cybersecurity programs at the RCWET from a business perspective will be driven by (1) cost, (2) expertise of individuals providing the training, and (3) proximity of the training location to the businesses.

The bottom line for many interviewees regarding cybersecurity training is cost—savings for businesses could be realized by decreasing or eliminating fees associated with hiring staffing companies, transportation and lodging costs for training, and cost of setting up a training lab in-house. Multiple interviewees mentioned they currently pay a staffing company to meet their hiring needs in this field, but would prefer to save on business costs by training individuals at the RCWET instead of paying a staffing company. As far as in-house training, high up-front costs of setting up a training lab (roughly estimated in one interview at $1,000 per person at a minimum) have led many to pay employees to travel for training, though they would prefer to stay in the area. One focus group participant mentioned that he currently flies employees to Tennessee to train at a lab there instead of building a lab in-house, while others described moving employees around the state to train at other office locations. Given the savings from not hiring staffing companies or building a lab combined with the RCWET's location convenient to the Washington D.C. metro area—without the traffic problems—many participants indicated it could be more cost effective to train employees at the center.

The expertise of instructors will also be key. Interviewees emphasized the need for a mix of instructors from academic and industry backgrounds, and not just adding another course taught by academics. It is important that instructors recognize the need for experience and hands-on learning in cybersecurity and are able to provide an industry background for job seekers. Many also expressed an interest renting the lab space to do training themselves.

The location of the RCWET is also an important distinguishing factor. The proximity to Quantico and Fort Belvoir, Army Cyber Command, defense contractors, and importantly, the distance away from the worst of D.C. traffic, will contribute to the demand and build credibility in the training programs. From a military demand perspective, there is a need for a transition center in or around the Woodbridge area where soldiers can acquire a business perspective, get an internship, and pursue additional education. Around 1 million service members are expected to separate from the military over the next 5 years, and the Army is already developing a curriculum with companies such as Leidos to transition service members into cybersecurity positions in the region. Many businesses also mentioned an interest in hiring veterans due to their eligibility for security clearance or already having clearance, their training and experience, and their lower attrition rate in a competitive industry with high turnover.

A number of useful insights were provided by cybersecurity contacts in these interviews, but when asked for any final recommendations, the comments were nearly identical across cybersecurity and non-cybersecurity interviews. Continued communication—either in structured interviews or informally between the RCWET and businesses—needs to continue at regular intervals in order for any cybersecurity program to succeed. There is high demand for cybersecurity professionals in the region, but the field is rapidly changing and there are a number of other alternative training paths. Partnership and evolving program development with businesses ensures the programs remain relevant and job seekers have the best chance of getting hired into the cybersecurity field.

7. Conclusions

In conclusion, this study finds that regional businesses continue to have strong interest in the RCWET. In 2009, the feasibility study conducted by Chmura concluded that such a center was feasible based on business demand at that time. Six years later, the interest among businesses remains strong, and demand for new service programs arose as a result of the changing economy in the region.

Among all potential service programs, two categories—workforce training and cybersecurity training programs—were identified with the broadest interests. Workforce training programs are popular with both businesses and job seekers. Of all business participants, 78% indicated an interest in career development workforce training programs, and 56% expressed interest in both job fairs and job placement services. Another high-demand area which garnered strong interest among businesses was cybersecurity-related programs. Over 60% of businesses professed an interest in cybersecurity training. Businesses were also interested in the cybersecurity related programs of Security + certification and information assurance. In addition, general information technology training programs and other business service programs also received business support. In terms of facility needs, a majority (74%) of business representatives reported that they are likely to use at least one type of space at the RCWET.

Businesses consistently emphasized the need for the RWCET to be flexible in adapting to their needs in the center's method of training, content delivery, and use of facility space. Businesses generally desire short-term training that can be prepared quickly to suit their needs. Another aspect of flexibility is training logistics where weekend or night training is preferred. Online training is another flexible option that wouldn't interfere with a trainee's work schedule. Businesses feel that the facility space needs to be flexible in order to meet ever-changing training needs. Representatives would like the RCWET to include "flex space" that can quickly and easily be configured into different kinds of space (i.e. training space, meeting space, or trade show space). In addition to flexibility, businesses also stressed that the RCWET should not offer services already offered by community colleges or other local agencies.

Cybersecurity is one of the key growth areas for the regional economy. Cybersecurity interviewees in this study verified the need for cybersecurity professionals in the region as all of those companies expect to grow and hire additional cybersecurity professionals over the next three years. In this regard, the RCWET is uniquely prepared to meet regional business demand for cybersecurity training and certification. The incorporation of computer labs, networks, and a red vs. blue lab equips the RCWET to meet business demand in upcoming years to reduce the projected shortage of cybersecurity professionals. In addition, the ability to meet job seeker demands will enable them to move into this high-paying and growing occupation.