## Artificial Intelligence in the Workforce

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16 May 2024

National and Regional Implications



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## Abstract

As part of the Information Technology Industry Sector Partnership (IT ISP) initiative lead supported and bv Workforce Solutions Lower Rio, the purpose of this paper is to gauge the overall impact of artificial intelligence on the nation's and the Rio Grande Valley's workforce. This paper aims to identify occupations and industries most impacted as well as skills gaps and labor shortages. The research also provide suggestions aims to and strategies that can be incorporated by various stakeholders throughout the community to better prepare for a changing workplace.

## Introduction

Artificial intelligence (AI)—a topic that has long elicited a variety of strong reactions-is a rapidly expanding field that doesn't cease to amaze. Ranging from one of the most advanced natural language processing systems, known as ChatGPT. to the everyday smartphone AI, Siri, artificial intelligence has undoubtedly transformed various aspects of our lives. Naturally, such rapid development in recent years has led to much alarm. Not only is AI making unprecedented achievements possible, such as vastly improved speech recognition and quicker development of medications, but also it is giving rise to unforeseen consequences, such as algorithm biases and distribution of deepfake technology.

Despite disagreements over the direction AI is headed, one thing is certain—AI will transform the workforce and jobs in every industry. Importantly, attempting to portray AI as either "good" or "bad" falls short of capturing the influence AI will truly have. Perhaps we may not experience the over-dramatized apocalyptic downfall of humanity caused by artificial intelligence-driven beings, as is often portrayed in popular media, but rather a gradual transformation of the ways we complete many tasks. Artificial intelligence can be used as a valuable tool to improve many when utilized work processes and. intentionally, can steer various industries and the economy in a positive direction. When asked about whether he believes AI will replace humans in the workforce, Harvard Business School Professor, Karim Lakhani, expressed," "Humans with AI will replace humans without [AI]," reflecting a central message also prevalent throughout this research: conversations that leaders engage in should not include fear or apprehension about Al, but rather how to better equip individuals for a changing workforce ("The New World of Work").



## What is AI?

To create a better prepared workforce, it is important to understand what artificial intelligence is. Artificial intelligence is a form of technology that "thinks" and "learns" like a human. In other words. Al is a system that mimics intelligence to perform tasks typically done by people. There are 3 main types of AI that are crucial to define-Artificial Narrow Intelligence (ANI), Artificial General Intelligence (AGI), and Artificial Super Intelligence (ASI). ANI primarily focuses on one type of task - such as spam email filtering or self-driving cars and is the most prevalent type of AI today. Although it seems immensely potent, it is often referred to as "weak" AI since it cannot do tasks beyond those assigned without requiring human intervention. As for AGI, it is a type of AI that has the ability to match human intelligence and even surpass it. It can learn from experience and improve itself, resulting in very powerful computer systems. However, AGI is still largely theoretical and under development, as is ASI. Artificial Super Intelligence refers to the concept of AI becoming so advanced that it surpasses human levels of intelligence and cognition. In theory, ASI could develop self-awareness and its own prospects, but there is much controversy as to whether this will ever be possible and how long it will take to reach that level of intelligence (Ranjitha 1). Some other crucial terms to become familiar with include machine learning, deep learning, and neural networks.

"The easiest way to think about [these terms] is to think of them as a series of AI systems from largest to smallest, each encompassing the next," say experts at IBM, "Artificial intelligence is the overarching system. Machine learning is a subset of AI. Deep learning is a subfield of machine learning, and neural networks make up the backbone of deep learning algorithms" ("AI vs Machine Learning").

Two other terms that are important to note throughout the paper are generative AI (GenAI), which refers to a type of artificial intelligence that generates a form of text or media by learning patterns from the input, and automation, the process of repetitive tasks being streamlined by technology. Often, automation and AI are used interchangeably, but they are two different things: "The difference between Al and automation is that Al aims to stimulate human thinking. Put another way; automation works with data—Al 'understands' data" ("Automation vs Al"). Al can be used to augment automation, so the definitions can often blur. However, a clear distinction will be made throughout this paper when referencing a type of technology.



## How AI is Impacting Industries Nationally

Although the idea of Al can seem frightening to some, especially given the uncertainties and controversy regarding its potential, the reality is, we are already surrounded by it and benefit from it daily. Something as simple as unlocking our phone with FaceID, using Google Maps on the commute to work, or scrolling through the suggestions prompted by Netflix, are all ways we regularly use AI. For those who typically use social media, AI is responsible for the types of posts it shows as well as the friends it suggests. When shopping on Amazon, an AI algorithm suggests specific items to buy based on past purchases and other people's similar purchases. When it suspects suspicious activity, AI is to thank for sending an alert of potentially fraudulent activity or a low balance (Marr 1). On a more sophisticated scale, AI can be used to perform surgeries, aid in agricultural production, assist with the development of cures for diseases, and so much more. Given its immense potential, it is necessary to understand just how much it is impacting everything.

Recently, there has been major expansion related to GenAl, a form of artificial intelligence that generates output in visual, audio, or language format by employing machine learning. Some of the most prominent new uses of generative AI include ChatGPT. GitHub AlphaCode, Copilot, Bard, Cohere Generate, Claude, DALL-E, and others.



It is estimated that GenAI alone will "add the equivalent of \$2.6 trillion to \$4.4 trillion annually" to the global economy, and this "would increase the impact of all artificial percent." intelligence by 15 to 40 Importantly, GenAI will influence work activities and labor productivity. McKinsey estimates, "...half of today's work activities could be automated between 2030 and 2060, with a midpoint in 2045." In terms of labor productivity, "Generative AI could enable labor productivity growth of 0.1 to 0.6 percent annually through 2040," and, "Combining generative AI with all other technologies, work automation could add 0.2 to 3.3 percentage points annually to growth," ("The productivity economic potential" 3).

## Effect on Industries Nationally

Even though AI will impact every industry and transform many aspects of work, there are a few industries that will be most impacted by GenAI, especially in terms of revenue. Such industries include banking, science & technology related industries (including IT, high tech, and life sciences), and health care. In the banking industry, banks can expect to see an additional \$200 billion to \$340 billion in revenue annually. Not only will AI increase monetary gains, but also, it will improve various essential work functions such as customer satisfaction, employee experience, and fraud detection. Other key areas that will benefit from AI in banking are marketing, operations, customer and software/knowledge applications. Banks are taking advantage of technology such ChatGPT to facilitate work as processes.

BANK

To name an example, major financial institutions like Morgan Stanley are using GPT-4 enabled AI assistants to help wealth managers find solutions for their clients. Banking institutions have realized speed to which generative the AI assistants can sift through large amounts of data, information, and policies and provide answers to customer concerns. Generative AI can also help banks improve and speed their coding processes such as by identifying defects in the code. Additionally, generative AI can create tailored marketing materials by drawing upon large data sets and profiles/histories. customer However, there are factors financial institutions must keep in mind when exploring AI such as the level of regulation for different processes, the technological proficiency of the end user, the level of automation desired, and the limits to the data being accessed ("The economic potential" 28). In order to avoid facing issues with the increased usage of generative AI, it is crucial to remained involved in new processes being implemented. It is no surprise that science and technology related industries also benefit from AI in terms of revenue and improved work processes.

To name an example, according to McKinsey & Company's, "The economic potential of generative AI," software engineering occupations can benefit from "reduced time spent on certain activities, such as generating initial code drafts, code correction and refactoring, rootcause analysis, and generating new system designs."

In the same article, McKinsey & Company also state that "software developers using Microsoft's GitHub Copilot completed tasks 56 percent faster than those not using the [AI] tool." Not only that, but also, software engineers using AI reported feeling an improved work environment. Another facet in the science and technology industries that is flourishing as a result of AI is the research and design (R&D) component. According to the same article by McKinsey & Company, research indicates the technology could deliver productivity with a value ranging from 10 to 15 percent of overall R&D costs." In the life sciences and chemical industries, AI is being used to create models that can "generate candidate molecules, accelerating the process of developing new drugs and materials." Additionally, AI helps speed up the production and improvement of designs, reduces costs, optimizes designs for manufacturing, aids in improving product quality, and accelerates trial phases.

In the healthcare/medical field, AI is also making notable contributions. In particular, the pharmaceutical and medical-product industry can expect to reap significant financial gains ranging "from 2.6 to 4.5 percent of annual revenues across the pharmaceutical and medical-product industries, or \$60 billion to \$110 billion annually" ("The economic potential" 30). According to the same source, this is primarily due to AI's potential to reduce the time it takes to research, develop, and test drug. While it may take а new pharmaceutical companies around 10 to 15 years and approximately 20% of revenue invested in R&D to develop a new drug, AI can shorten several stops of the process significantly. For example, McKinsey & Company claim that an important step in the drug development process known as lead identification, which involves molecule identification, typically takes several months. However, with the help of generative AI, this step can be completed in a mere several weeks. Moreover, AI can help improve the automation of preliminary screening, a process in which chemicals are screened to find the ones that result in the desired effects and also, it can enhance indication finding, a process involving the identification of "diseases, symptoms, or circumstances that justify the use of a specific medication or other treatment, such as a test, procedure, or surgery." Similarly, AI can improve and speed up the ability to test the drugs through clinical trials, a crucial process that has resulted in high success rates so far.

In the field of education, leading experts are still grappling to understand the true potential of AI and to what extent it is beneficial or detrimental for teachers and students. While some experts compare increased AI usage in the classroom to the ubiquitous usage of the calculator, others ponder on the result of over-dependence on new technology and whether it will negatively affect the quality of education students receive. Currently, "AI language models can serve as practice students for new teachers," and may even "provide real-time feedback and suggestions to teachers, creating a bank of live advice based on expert pedagogy." Al even has the potential to "produce post-lesson reports that summarize the classroom dynamics" and provide metrics regarding "student speaking time or identification of the questions that triggered the most engagement." Additionally, AI can provide the latest updates in a certain field of study to help teachers stay up to date with their curriculum development (Chen 1).

Nationally, generative AI will impact the business functions of various industries differently, which is evident in Figure 1. The marketing and sales component of most industries will be highly impacted as well as the software engineering business Meanwhile, the talent function. and organization business aspect will be much less likely affected by generative AI for most industries. For the banking industry, the marketing and sales. customer software engineering operations. and business functions will be the most impacted by generative AI.

As for healthcare, the same business functions will be highly impacted as well as chain and the supply operations component. For the high-tech industry, the software engineering business function will be the most impacted. Another crucial industry, the education sector will see the highest impact in the supply chain and operations component. According to Figure 2, using generative AI for the sales, marketing, software engineering, customer operations, and product research & design alone could drive the revenue of businesses up tremendously. In fact, 75% of the total annual impact of generative AI falls within these business functions.



#### Figure 1. Generative AI Use Cases.

Generative AI use cases will have different impacts on business functions across industries.											
Generative AI productivit impact by business function	y tions <sup>1</sup>	4 2		SUR	N N		Se )		lalen.		
Low impact	High impact	areina and a	er openal	A DANGE R	enginee	A ORE THE	ales and h	and find	A BO DO TAIL	or gan tal	2
	Total, % of industry revenue	Total, \$ billion	760- 1,200	340- 470	230- 420	580- 1,200	290- 550	180- 260	120- 260	40- 50	60- 90
Administrative and professional services	0.9-1.4	150-250									
Advanced electronics and semiconductors	1.3-2.3	100-170									
Advanced manufacturing <sup>3</sup>	1.4-2.4	170-290									
Agriculture	0.6-1.0	40-70									
Banking	2.8-4.7	200-340									
Basic materials	0.7-1.2	120-200									
Chemical	0.8-1.3	80-140									
Construction	0.7-1.2	90-150									
Consumer packaged goods	1.4-2.3	160-270									
Education	2.2-4.0	120-230									
Energy	1.0- 1.6	150-240									
Healthcare	1.8-3.2	150-260									
High tech	4.8-9.3	240-460									
Insurance	1.8- 2.8	50-70									
Media and entertainment	1.8-3.1	80-130									
Pharmaceuticals and medical products	2.6-4.5	60-110									
Public and social sector	0.5-0.9	70-110									
Real estate	1.0-1.7	110-180									
Retail*	1.2-1.9	240-390									
Telecommunications	2.3-3.7	60-100									
Travel, transport, and logistics	1.2-2.0	180-300									

2,600-4,400

Note: Figures may not sum to 100%, because of rounding. Excludes implementation costs (eg. training, Ecenses). <sup>a</sup>Excluding software engineering. <sup>a</sup>Includes aerospace, dollense, and auto manufacturing. <sup>a</sup>Including auto retal. Source: Comparative Industry Service (CIS), IHS Markit; Oxford Economics; McKinsey Corporate and Business Functions database; McKinsey Manufacturing and Supply Chain 360; McKinsey Sales Navigator; Ignite, a McKinsey database; McKinsey analysis

#### McKinsey & Company

Figure 2. Using Generative AI.



Note: Impact is averaged.

<sup>1</sup>Excluding software engineering.

Source: Comparative Industry Service (CIS), IHS Markit; Oxford Economics; McKinsey Corporate and Business Functions database; McKinsey Manufacturing and Supply Chain 360; McKinsey Sales Navigator; Ignite, a McKinsey database; McKinsey analysis

McKinsey & Company

In terms of automation potential, there are industries certain that are most susceptible. As seen below in Figure 3, such industries include accommodation and food services, with an automation potential rate of 73%, manufacturing, with a rate of 59%, and transportation and warehousing, with a rate of 58%. The agriculture, retail trade, minina. and construction industries also have high rates of automation potential. On the other hand, industries such as health care, professional/technical information, and services have some of the lowest rates of automation potential. The total automation potential rate in the United States is an estimated 46% among the industries listed. Although this may seem alarming, the annual labor productivity growth rate among these industries has experienced an increase of 0.8% from 2000-2016 with the information industry taking the lead with a rate of 6.2%. Even though there are various industries with a high probability of experiencing automation, automation and AI may actually help increase labor productivity, facilitate business functions, and increase overall revenue.

## Effect on Occupations Nationally

According to Muro, Maxim, and Whiton's article, "Automation and Artificial Intelligence," it is estimated that by 2030, around 25% of U.S. employment will experience high exposure to automation while around 36%, medium exposure and 39%, low exposure.

The levels of exposure refer to the probability of occupations being impacted by automation. As seen in Figure 4, occupations consisting of predominantly routine, repetitive tasks that are typically lower paying - such as production, construction, transportation. and manufacturing - are most likely to be automated while jobs requiring higher levels of educational attainment that typically pay higher wages - such as health business, care, education, and legal services are less likely to face automation. Also seen in Figure 4, educational attainment insulates certain occupations from automation. Occupations requiring higher levels of educational achievement have among the lowest automation potential rates, something for community leaders to consider when deciding on strategies for dealing with the increasing influence of Al.

In general, Heartland States are most likely to face higher rates of automation as well as smaller, rural communities and lesseducated regions, as seen in Figure 5. Metropolitan regions like the Washington-Arlington-Alexandria, DC-VA-MD-WV area have a very low automation exposure rate, 17.7% specifically, given 50.2% of their population have a bachelor's degree or higher. Alarmingly, at the bottom of the list of educational attainment is the McAllen-Edinburg-Mission, TX metropolitan area with only 18.3% of the population obtaining a bachelor's degree or higher and an automation exposure rate of 23.2% (Muro et al. 42).

According to McKinsey, men, people between the ages of 16-24, and underrepresented communities tend to have jobs that are at higher risk of being automated. Office support, customer service, and food service-related jobs are among the most negatively affected or threatened jobs while STEM, creative, business, and legal related roles are being enhanced by AI ("Generative AI" 4-9).

Figure 3. Automation Potential by Industry

Industrial family	Annual labor productivity growth, 2000-16	Automation potential
Accommodation and Food Services	-0.8%	73%
Manufacturing	2.9%	59%
Transportation and Warehousing	0.2%	58%
Agriculture, Forestry, Fishing and Hunting	3.3%	57%
Retail Trade	0.9%	53%
Mining, Quarrying, and Oil and Gas Extraction	3.2%	51%
Other Services (except Public Administration)	-1.6%	49%
Construction	-1.0%	47%
Wholesale Trade	1.7%	44%
Utilities	-0.2%	43%
Finance and Insurance	1.1%	42%
Arts, Entertainment, and Recreation	0.4%	41%
Administrative and Support and Waste Management and Remediation Services	2.1%	41%
Real Estate and Rental and Leasing	2.1%	40%
Government	-0.1%	37%
Health Care and Social Assistance	0.2%	36%
Information	6.2%	35%
Management of Companies and Enterprises	0.1%	34%
Professional, Scientific, and Technical Services	0.9%	34%
Educational Services	-0.7%	27%
U.S. total	0.8%	46%

Automation potential and labor productivity growth for 20 major "industry groups"

Source: Brookings analysis of BLS, Census, EMSI, Moodys, and McKinsey data

#### Figure 4. Automation Potential by Occupation

#### Current-task automation potential, average wages, and educational requirements for representative occupations

Occupation group	Average wage	Automation potential	Typical education required
Food Preparation and Serving Related Occupations	\$23,900	81%	Less than Bachelor's Degree
Production Occupations	\$37,200	79%	Less than Bachelor's Degree
Office and Administrative Support Occupations	\$37,300	60%	Less than Bachelor's Degree
Farming, Fishing, and Forestry Occupations	\$27,800	56%	Less than Bachelor's Degree
Transportation and Material Moving Occupations	\$36,100	55%	Less than Bachelor's Degree
Construction and Extraction Occupations	\$48,900	50%	Less than Bachelor's Degree
Installation, Maintenance, and Repair Occupations	\$46,700	49%	Less than Bachelor's Degree
Sales and Related Occupations	\$40,600	43%	Less than Bachelor's Degree
Healthcare Support Occupations	\$30,500	40%	Less than Bachelor's Degree
Legal Occupations	\$106,000	38%	Bachelor's Degree or More
Computer and Mathematical Occupations	\$87,900	37%	Bachelor's Degree or More
Protective Service Occupations	\$45,800	36%	Less than Bachelor's Degree
Personal Care and Service Occupations	\$26,500	34%	Less than Bachelor's Degree
Healthcare Practitioners and Technical Occupations	\$79,200	33%	Bachelor's Degree or More
Life, Physical, and Social Science Occupations	\$72,900	32%	Bachelor's Degree or More
Management Occupations	\$118,000	23%	Bachelor's Degree or More
Community and Social Services Occupations	\$47,200	22%	Bachelor's Degree or More
Building and Grounds Cleaning and Maintenance Occupations	\$28,000	21%	Less than Bachelor's Degree
Arts, Design, Entertainment, Sports, and Media Occupations	\$58,400	20%	Less than Bachelor's Degree
Architecture and Engineering Occupations	\$84,300	19%	Bachelor's Degree or More
Education, Training, and Library Occupations	\$54,500	18%	Bachelor's Degree or More
Business and Financial Operations Occupations	\$75,100	14%	Bachelor's Degree or More
U.S. total	\$49,600	46%	
Occupations requiring Less than Bachelor's Degree	\$36,500	55%	
Occupations requiring Bachelor's Degree or More	\$80,100	24%	

Source: Brookings analysis of BLS, Census, EMSI, Moodys, and McKinsey data

#### Figure 5. Automation Exposure by Metropolitan Area

Rank	Metropolitan area	Share of adults with a BA or higher	Share of jobs in occupations with high automation exposure
1	Washington-Arlington-Alexandria, DC-VA-MD-WV	50.2%	17.7%
2	San Jose-Sunnyvale-Santa Clara, CA	50.1%	18.6%
3	San Francisco-Oakland-Hayward, CA	48.5%	21.8%
4	Raleigh, NC	47.2%	21.5%
5	Durham-Chapel Hill, NC	47.0%	19.3%
6	Boston-Cambridge-Newton, MA-NH	46.9%	20.9%
7	Madison, WI	46.6%	22.2%
8	Bridgeport-Stamford-Norwalk, CT	46.6%	21.1%
9	Austin-Round Rock, TX	42.8%	21.8%
10	Denver-Aurora-Lakewood, CO	42.5%	22.3%
11	Seattle-Tacoma-Bellevue, WA	42.0%	23.2%
12	Minneapolis-St. Paul-Bloomington, MN-WI	40.5%	23.5%
13	Baltimore-Columbia-Towson, MD	39.5%	20.4%
14	New York-Newark-Jersey City, NY-NJ-PA	39.0%	20.5%
15	Portland-Vancouver-Hillsboro, OR-WA	38.9%	24.4%
96	Fresno, CA	20.2%	25.1%
97	Lakeland-Winter Haven, FL	20.1%	28.9%
98	McAllen-Edinburg-Mission, TX	18.3%	23.2%
99	Stockton-Lodi, CA	16.7%	28.7%
100	Bakersfield, CA	16.3%	23.2%

#### Top 15 and bottom 5 metropolitan areas by educational attainment, 2016

Source: Brookings analysis of BLS, Census, EMSI, Moodys, and McKinsey data

## How is the Rio Grande Valley being Affected by AI?

The Lower Rio Workforce Development Board distributed a survey through the Survey Monkey to various platform businesses, educational institutions, and community leaders across the Rio Grande Valley, primarily in Hidalgo, Cameron and Starr Counties, to gauge AI preparedness and awareness. Notably, the response rate for this survey was 12.5%, which may be indicative of the current lack of interest in Al among the community. However, some initial conclusions were drawn based on The their responses. maioritv of respondents are in the Construction. Government, & Other Services industries. When asked if they knew what AI is, the majority of respondents, 79%, responded, "Yes." Only 4% did not know what AI is and 17% expressed they, "Somewhat" know what AI is. The majority of respondents are curious or excited about AI and think AI usage will increase. When asked about the percentage of their job duties they think will be affected, most respondents selected 10-30% of their job duties will be affected. When asked in what way they think their job duties will be affected, 54% of respondents think their productivity will increase and 42% think they will need to learn new skills to interact with AI. Notably, when asked what skills will be most useful for implementing AI in their job/industry, 70% of

respondents selected computer/technical skills as opposed to emotional skills and other soft skills, as seen on **Figure 6**. This reflects a predominant concern held by many that worry coding and computer skills will be vital to learn. Although important, as will be discussed in the Strategies & Considerations section, there are many additional soft skills that will be just as necessary for adapting to AI.

Also importantly, 83% of respondents think person-to-person interaction is verv essential for their job/industry while 17% think it is only somewhat essential. When asked if their place of employment utilizes Al, half of respondents responded, "Yes." For employers using AI, the types of technology most utilized are Natural Language Processing (50%). Machine Learning (42%), Speech Recognition (42%), and Robotic Process Automation (42%). The most common areas where AI is being utilized among employers are the Data Analytics (42%), Marketing/Social Media (42%), and Information Technology (26%) areas. When asked if they feel their place of employment is prepared to use AI, the majority (53%) of respondents said. "Somewhat." The primary concerns surrounding AI were over-dependence on AI (53%) and legal/ethical issues (42%). These are common concerns throughout the nation that the government and leaders are attempting to tackle by drafting policy and setting limitations.

#### Figure 6. Most Useful Skills for Using AI Based on Respondents



Respondents were asked to select from the above skills/options based on which are most important for interacting with AI. The above chart shows the percentage of skills selected from greatest to least.

Discussions are being held about the safety and implications of making AI open source, an approach that allows AI to be available for editing by the public, or closed source, an approach that restricts access yet might improve its security ("Attributes of open vs. closed AI" 1). Lastly, the most predominant strategy prepare beina used to for AI is experimenting with AI technology (42%), and 37% of respondents answered their organization is not doing anything to prepare for Al.

## The RGV's Economic Impact

In terms of revenue, the industries with the highest impact include the high-tech, banking, and medical production/advanced manufacturing industries. The industry with the lowest economic impact will be the government, retail, construction, trade & logistics, and real estate industries. Overall, GenAI has to potential to generate more than \$1.06 billion in revenue across industries in the Rio Grande Valley. The high impact industries generated \$13.35 billion in revenue while low impact industries generated \$11.82 billion in revenue for 2022. However, with GenAl playing a factor, high impact industries may generate an additional \$691.9 million and low impact industries \$377.05 million, which equates to \$1.06 billion overall. In terms of Gross Regional Product

(GRP), government, health care, and retail trade take the lead while mining, arts, and agriculture forestry fall at the bottom of the list, as seen on **Figure 7** (Lightcast).

## The RGV's Workforce Impact

By analyzing the global and national trends provided by McKinsey & Company and using Lightcast projections, we determined estimates for the potential impact of artificial intelligence in the Rio Grande Valley. It is estimated that by 2030, the RGV will experience numerous occupational shifts as adoption for AI will be high. In the business, legal, and STEM industries, there is an estimated 15, 266 occupational shifts that will occur. In the production industry, an estimated 16, 680 occupational shifts will For occur. mechanical installation & repair, 18,452 occupations are estimated to shift. For construction/builders, an estimated 25,710 occupations will shift. For office support work, an estimated 33,564 roles will experience a shift. Lastly, the industry with the highest estimated occupational shifts in the RGV is the food service sector with an estimated 47,122 jobs shifting. In total, this accounts to 34.4% of jobs in the Rio Grande Valley or 156,754 jobs, as seen in Figure 8.

#### Figure 7. Estimated GRP Growth by 2030 in the RGV



Illustrated is the Gross Regional Product (GRP) potential growth per industry in the Rio Grande Valley region in million sorted by most impacted to least based on a 2022 GRP.



Figure 8. Occupations Most Affected in the RGV by Percentage

The occupations illustrated above are the Hight Impact industries in the Rio Grande Valley. Low Impact industries that may be affected were not included in this chart.

Concerningly, the food service industry and office support roles are some of the largest industries in the Rio Grande Valley, so it is crucial to coordinate strategies to prepare for occupational shifts. Also, a large majority of jobs in the region are lowskilled, low paying jobs, which are the most susceptible to being affected by AI. For this reason, it will be necessary to focus on moving individuals to higher paying jobs and away from the susceptible occupations. To do so will require encouraging higher education enrollment supporting training/upskilling and of employees. In terms of revenue, the hightech, banking, and medical production industries will see some of the highest amounts of revenue. (Lightcast 2023.4).

# Strategies & Considerations

In addition to improving skills such as judgement, analytical adaptability, emotional intelligence, and intellectual curiosity, Muro, Maxim, and Whiton suggest in, "Automation and Artificial Intelligence," an increase in collaboration between government and the private sector focused on spreading a positive, growth-centered message surrounding AI is a helpful strategy. It is equally important to maintain a "human-centered" approach focusing which on AI. means on augmenting human capabilities rather than replacing them ("Human-centered AI" 3).

Some other recommendations by Muro, Maxim, and Whiton include motivating individuals to increase their educational achievement so they can obtain jobs that are less likely to be threatened by automation. In general, moving people to higher paying, higher skilled jobs that are less at risk of being automated is recommended, but to do so requires upskilling and training the workforce. For this reason, it is crucial to focus efforts on creating training programs to prepare people in the labor force for a changing environment and to increase resiliency. major recommendations include Other being wary of ethical implications or knowing when it is appropriate to use AI. Many forms of technology facilitate the way we do things drastically, so it can be easy to over rely on AI. However, remaining cognizant of the sensitivity of different situations. setting frameworks and boundaries for AI, and prioritizing human capabilities can prevent the blurring of ethical lines. Having safeguards in place, such as via policies, can help delineate the exact areas where AI usage is acceptable. For businesses and organizations, it is highly recommended that AI policy is set in place to set a standard for employees to follow. Many organizations, such as school districts, universities and the federal government, are setting regulations in prevent place to the misuse or overreliance on AI ("Automation vs AI" 48-68).

## **Closing Remarks**

AI is a tool that will facilitate and transform many aspects of work. Although change can be concerning, it can also be an opportunity to improve the workforce and shift people into higher paying, new opportunities that will benefit not only them, but the overall economy. Bv replacing many tedious tasks. AI can drastically shift the type of work done and allow people to focus on a higher order level of work. In a rapidly changing environment, it is necessary to continue learning and growing, and to do so will require collaboration between every entity and organization. Although it can be easy to be overwhelmed by the hype of something new, remaining cognizant of potential harmful effects and keeping humans at the center of everything will be crucial.

For small communities like the Rio Grande Valley, it is advisable that leaders begin planning for a shift in the occupations that are most at risk as well as increasing efforts to educate the public on how AI will change their jobs. Additionally, investing in research, combatting misleading information regarding AI, and educating students on the occupations that are most at risk will be helpful in ensuring a smooth transition.



## Works Cited

1. Chen, Claire. "AI Will Transform Teaching and Learning. Let's Get it Right." Stanford University, Human-Centered Artificial Intelligence, 09 March 2023, <u>https://hai.stanford.edu/news/ai-will-transform-teaching-and-learning-lets-get-it-right</u>. Accessed 20 April 2024.

2. Harvard Business Review. "The New World of Work." LinkedIn Webinar, August 2, 2023, <u>https://www.linkedin.com/events/thenewworldofwork-karimlakhani-</u> 7091859772223680512/. Accessed 16 November 2023.

3. IBM Data and AI Team. "AI vs. Machine Learning vs. Deep Learning vs. Neural Networks: What's the difference?" IBM, 06 July 2023, <u>https://www.ibm.com/blog/ai-vs-machine-learning-vs-deep-learning-vs-neural-networks/</u>. Accessed 16 November 2023.

4. Marr, Bernard. "15 Amazing Real-World Applications of Al Everyone Should Know About." Forbes, Forbes Media, 10 May 2023, <u>https://www.forbes.com/sites/bernardmarr/2023/05/10/15-amazing-real-world-applications-of-ai-everyone-should-know-about/?sh=7f55a90285e8</u>. Accessed 16 November 2023.

5. McKinsey & Company. "Generative AI and the Future of Work in America." McKinsey & Company, <u>https://www.mckinsey.com/mgi/our-research/generative-ai-and-the-future-of-work-in-america</u>. Accessed 08 Aug 2023.

6. McKinsey & Company. "Human-Centered AI: The Power of Putting People First." People and Organizational Performance, McKinsey & Company, <u>https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/human-centered-ai-the-power-of-putting-people-first</u>. Accessed 14 December 2023.

7. McKinsey & Company. "The Economic Potential of Generative AI: The Next Productivity Frontier." McKinsey Digital, McKinsey & Company, <u>https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-AI-the-next-productivity-frontier#introduction</u>. Accessed 08 Aug 2023.

8. McKinsey & Company. "The State of AI in 2023: Generative AI's Breakout Year."QuantumBlack,McKinseyhttps://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-

2023-generative-ais-breakout-year. Accessed 08 Aug 2023.

9. McKinsey & Company. "What Is Generative AI?" McKinsey Explainers, McKinsey & Company, <u>https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-generative-ai</u>. Accessed 08 Aug 2023.

10. McKinsey & Company. "What's the Future of Generative AI? An Early View in 15<br/>Charts." McKinsey Explainers, McKinsey & Company,<br/>https://www.mckinsey.com/featured-insights/mckinsey-explainers/whats-the-future-of-<br/>generative-ai-an-early-view-in-15-charts. Accessed 20 Aug 2023.

11. "Attributes of Open vs. Closed AI Explained." SearchEnterpriseAI, TechTarget, https://www.techtarget.com/searchenterpriseai/feature/Attributes-of-open-vs-closed-AI-explained. Accessed 12 December 2023.

12. S., Ranjitha. "What is Artificial General Intelligence?" Great Learning, 20 Sep. 2022, https://www.mygreatlearning.com/blog/artificial-general-intelligence/. Accessed 10 October 2023.

## Gratitude

A special thanks to the Workforce Solutions Lower Rio Board, led by CEO, Francisco Almaraz, and to the various businesses and organizations that participated in the Al Impact Survey. Also, thank you to the Business Relations & Information team, led by Business Relations & Information Manager, Daniel Uribe, for their continuous guidance and support.