D-DA

JUNE 6, 194

From One Family Tree

36 NOLTE COUSINS SERVED IN WAR; TWO WOUNDED

Roderick Nolte · Jarol Nolte · Mark Nolte · Vernon Nolte · Karac Nolte · Ruben Nolte · Arthur Nolte · Arnold Nolte · Martin Nolte

Roy Nolte · Earl Nolte · Erwin Nolte · Milton Nolte · Gerald Nolte · Paul Nolte · Bernhardt Nolte · Don Nolte · Mildon Nolte
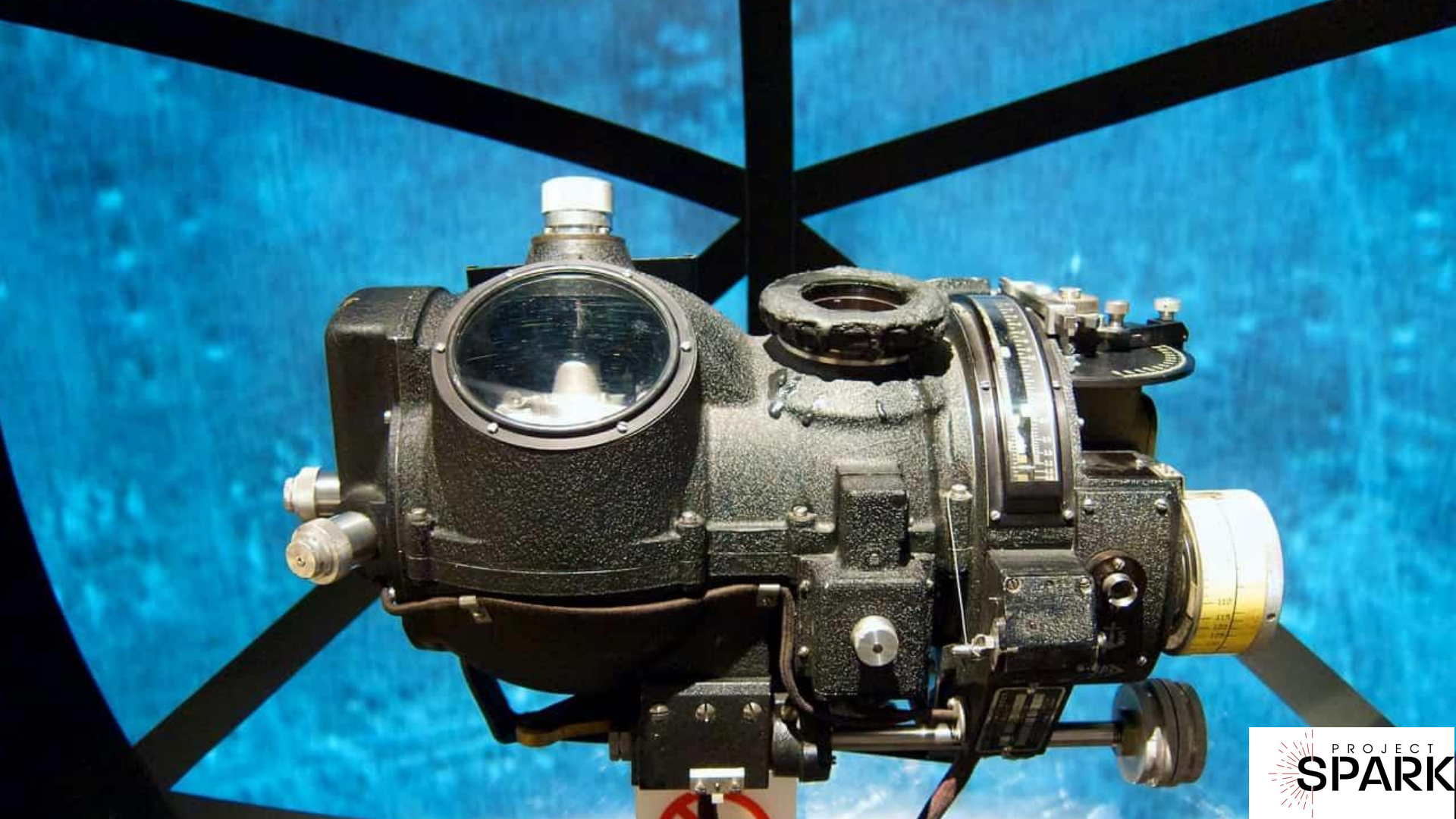
THE FAMILY TREE of Mr. and Mrs. Carl Nolte, former farmers of Martin county, Minnesota, furnished "timber" of unusual proportions for Uncle Sam's armed forces during the recent war.

Carl Nolte was born in Germany in 1942, and in 1869 he and his wife, Louise, settled in Illinois. In 1885 they moved to Martin county where they farmed until Nolte's death in 1918.

They had 12 children, of whom eight still are living, five residing in Martin county.

If the elder Noltes had been living they would have seen 36 of their kin in army, navy and marine uniforms in World War II.
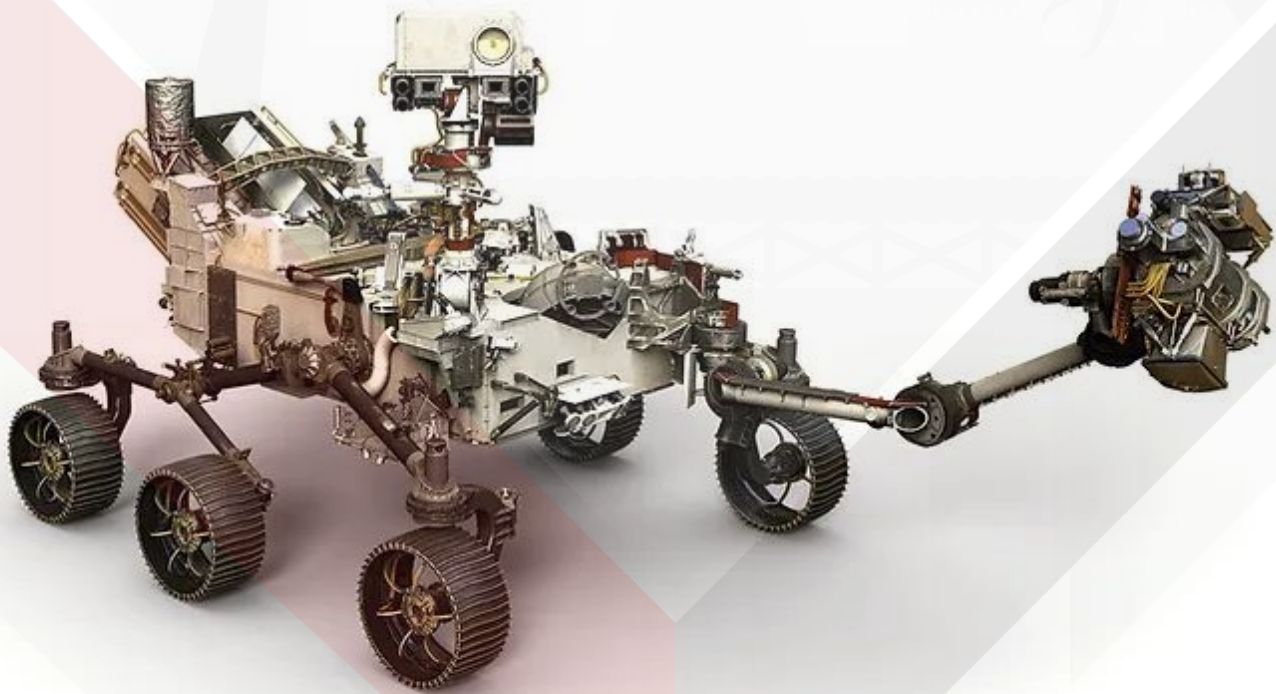
Of the 36 Nolte descendants, all first or second cousins, not one was killed in the war although two, Earl Nolte, son of Fred Nolte, and Reinhardt Wessel, son of Mrs. Amanda Nolte Wessel, were wounded. Five still are in service.

There are 73 first cousins in the family. The service men are sons, sons-in-law or grandsons of the following children of Mr. and Mrs. Carl Nolte: Henry, Carl, Adolph, Will, Gus, Louie and Fred Nolte; Mrs. Emma Nolte Oltman, Mrs. Amelia Nolte Eversman, Mrs. Mathilda Nolte Haegle, Mrs. Louise N. Rose and Mrs. Amanda N. Wessel.

Elmer Haegle · Herbert Haegle · Ray Gordon · John Pittman · Walter Oltman · A. F. Oltman · Clarence Luhmann · Thorall Oltman · Mike Cavanaugh

Gordon Oltman · Raymond Oltman · Marland Oltman · Loren Wessel · Reinhardt Wessel · Walter Wessel · Lewis Topus · Verner Popp · Tom Willi
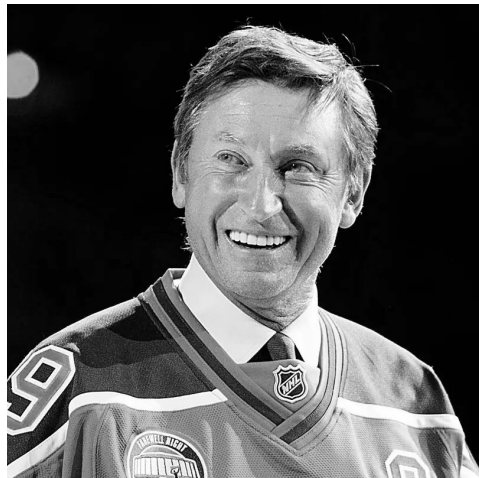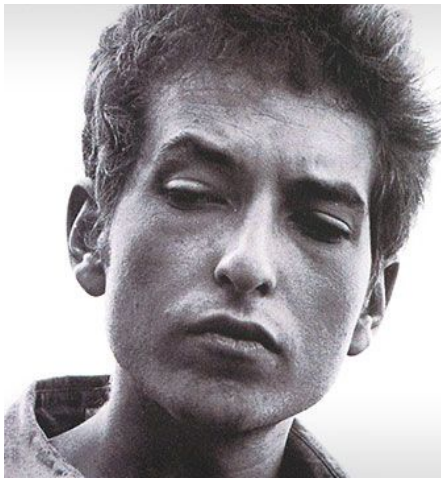
Questions to Consider

1. What will our future economy look like?
2. How will technology and demographic changes impact this?
3. What strategy or strategies will we need to develop and implement adopt to ensure future economic vitality?

What will happen if we do nothing?
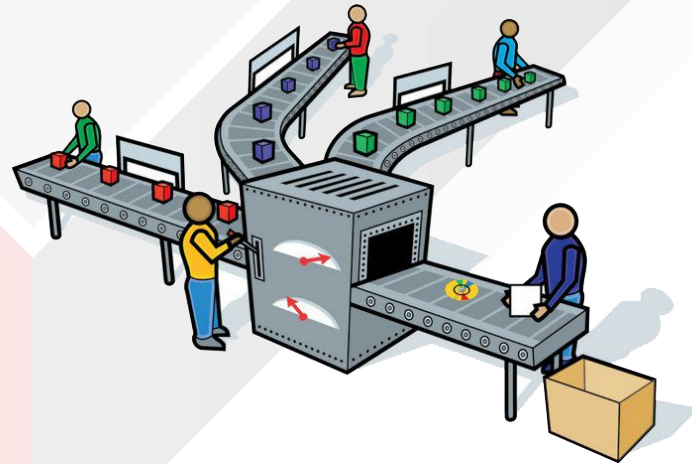
Quiz Show

Name the Philosopher

The times they are a-changing.

Bob Dylan

Our Area's Main Economic Drivers

Current Situation

The aftershocks of the pandemic and ongoing global skills shortage will continue to drive industrial automation investment in 2023, not only to supplement existing workers but also to unlock new business capabilities and insights.

Automation has been a driver of progress since the first industrial revolution, but the rise of robotics and artificial intelligence has amplified its impact. **The global industrial automation market size was estimated at USD $196.6 billion in 2021 and is set to surpass USD $412.8 billion by 2030, according to Precedence Research**.

This boom in automation adoption will come in part as organizations in all sectors hedge against future events which could once again impact the availability of their workforce, says **Forrester** analyst Leslie Joseph.

> "Automation has been a major force reshaping work since long before the pandemic; now, it's taking on a new urgency in the context of business risk and resiliency. As we emerge from the crisis, firms will look to automation as a way to mitigate the risks that future crises pose to the supply and productivity of human workers. They will invest more in cognitive capabilities and applied AI, industrial robotics, service robots, and robotic process automation."

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Average Decade-to-Decade % Change in Population Projections 2016 - 2050

-2.5% or more
-2.5% - 0%
0% - 2.5%
2.5% or more
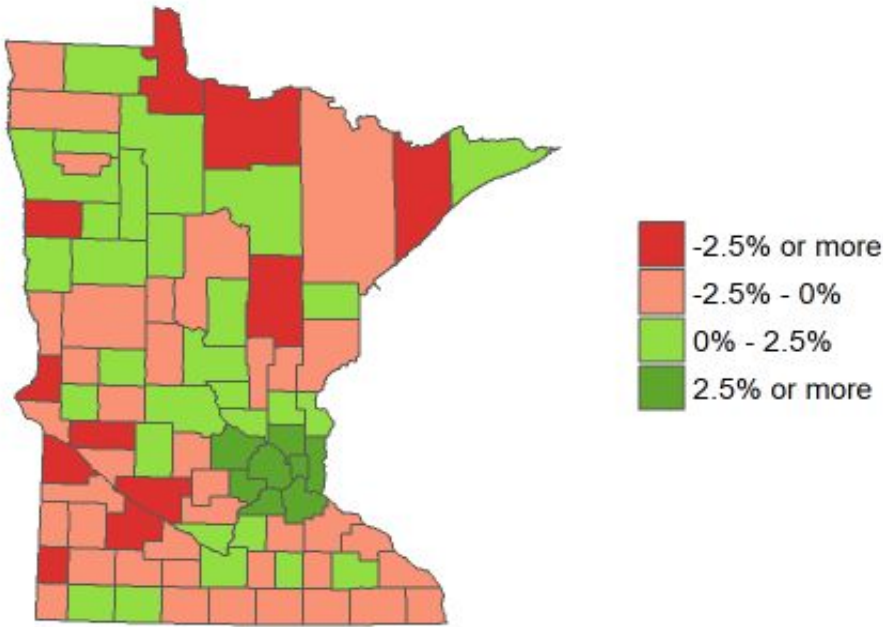
Source: State of Minnesota Demographer's Office

GLOBAL BIRTH RATE DECLINE

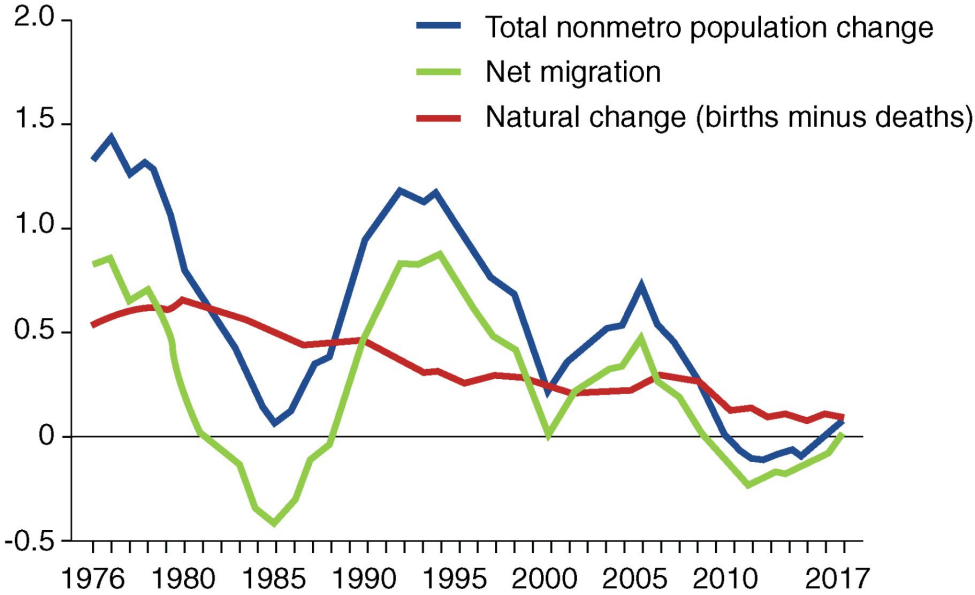**DESSUMATION OF RURAL MANUFACTURING**

RURAL BIRTH RATE DECLINE
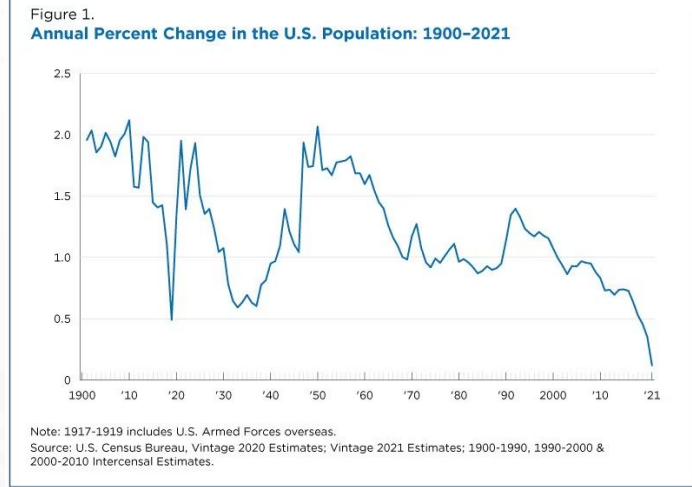
RURAL POPULATION MIGRATION

Net migration has driven growth in the rural (nonmetro) population since 2011-12

Percent change from previous year

Legend:
- Total nonmetro population change
- Net migration
- Natural change (births minus deaths)

Note: Nonmetro is determined by the Office of Management and Budget, 2013 metro/nonmetro area definitions. Nonmetro status changed for some countries in 1980, 1990, 2000, and 2010.

Source: USDA, Economic Research Service using data from the U.S. Census Bureau.

Figure 1.
Annual Percent Change in the U.S. Population: 1900–2021

Note: 1917-1919 includes U.S. Armed Forces overseas.
Source: U.S. Census Bureau, Vintage 2020 Estimates; Vintage 2021 Estimates; 1900-1990, 1990-2000 & 2000-2010 Intercensal Estimates.

China's population is likely to fall below a billion people before 2100

Number of people, by variant

- 1.426 billion
- High — 1.153 billion
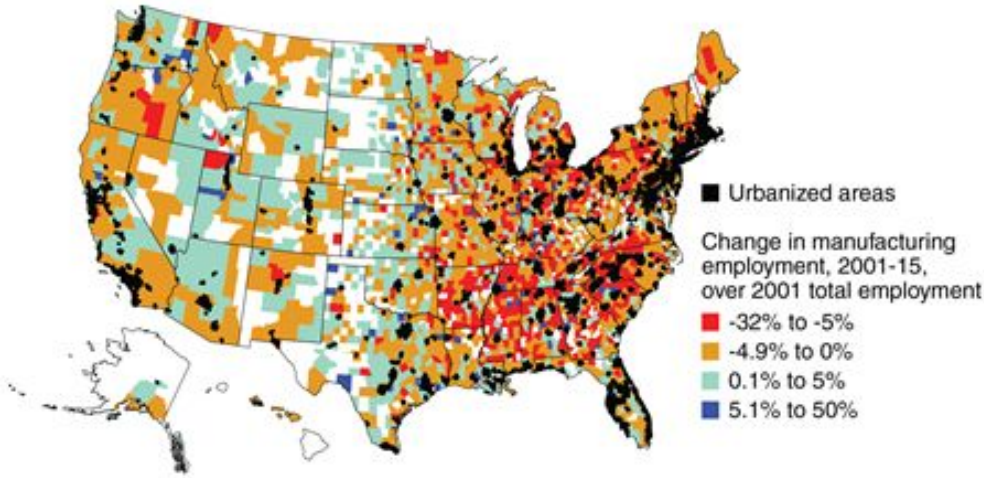- Medium variant — 767 million
- Low — 488 million
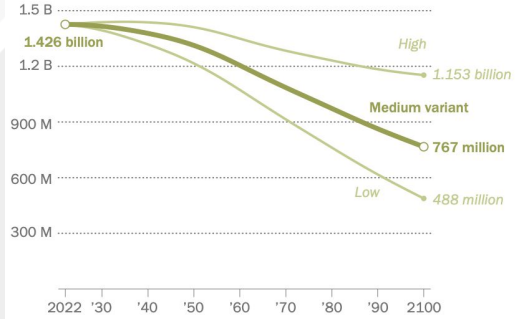
Note: May differ from national census figures. The medium variant is the middle-of-the-road estimate provided by the UN; high and low variant scenarios involve total fertility being 0.5 births above or below the medium scenario, respectively.
Source: UN Population Division's World Population Prospects: The 2022 Revision.

PEW RESEARCH CENTER

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Manufacturing employment declines were highest in the Eastern United States between 2001 and 2015

■ Urbanized areas

Change in manufacturing employment, 2001-15, over 2001 total employment
- 🟥 -32% to -5%
- 🟧 -4.9% to 0%
- 🟩 0.1% to 5%
- 🟦 5.1% to 50%

Note: Counties in white have either missing or undisclosed data for either 2001 or 2015. Alaska and Hawaii not geographically representative.
Source: USDA, Economic Research Service analysis using data from the U.S. Bureau of Economic Analysis, Regional Economic Information System.

Rural manufacturing is no longer the driver of economic growth that it once was:

71 percent of U.S. counties experienced a decline in manufacturing employment between 2001 and 2015.

Manufacturing Economic Benefits

- In the U.S. today, manufacturing represents just 11% of U.S. gross domestic product, yet it accounts for 35% of American productivity growth and 60% of our exports

- U.S. manufacturing is the main engine of innovation in the U.S., responsible for 55% of all patents and 70% of all research and development spending

- Today, manufacturing employs over 12.5 million people and provides rewarding, living-wage jobs

- Every manufacturing job spurs 7 to 12 new jobs in other related industries, helping to build and sustain our economy
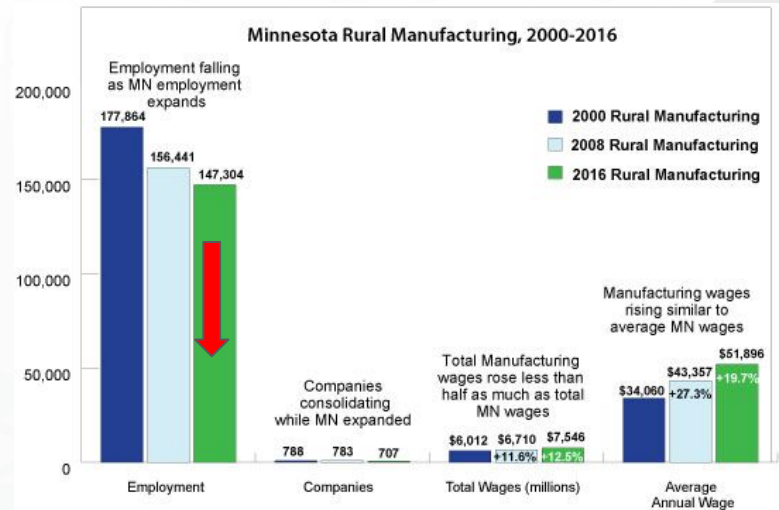
PROJECT
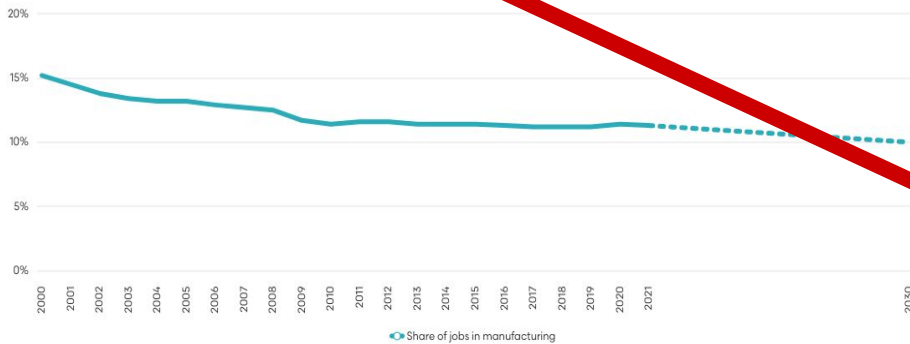SPARK

Share of jobs in manufacturing
Minnesota counties, 2021
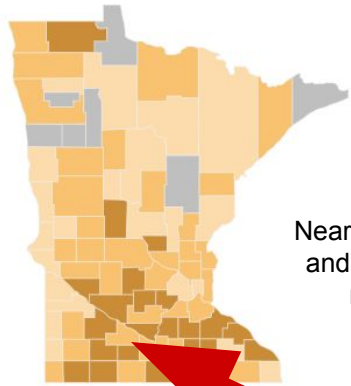
N/A
Less than 10.0%
10.0 to 19.9%
20.0% or more

Nearly 20% of all jobs in Brown and surrounding counties are manufacturing related

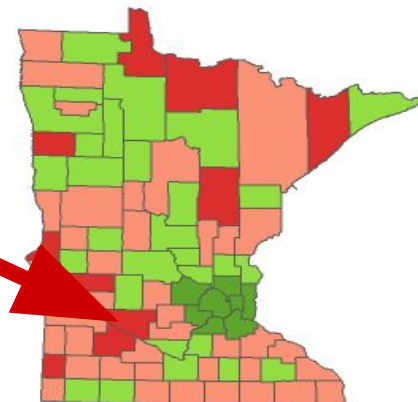## Share of jobs in manufacturing
Minnesota, 2000-2030

20%
15%
10%
5%
0%

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2030

Share of jobs in manufacturing

COMPILED by COMPASS

Minnesota Rural Manufacturing, 2000-2016

200,000
150,000
100,000
50,000
0

2000 Rural Manufacturing
2008 Rural Manufacturing
2016 Rural Manufacturing

Employment falling as MN employment expands

177,864   156,441   147,304

Companies consolidating while MN expanded

788   783   707

Total Manufacturing wages rose less than half as much as total MN wages

$6,012 $6,710 $7,546
+11.6%   -12.5%

Manufacturing wages rising similar to average MN wages

$34,060 $43,357 $51,896
+27.3%   +19.7%

Employment   Companies   Total Wages (millions)   Average Annual Wage

Average Decade-to-Decade % Change in Population Projections 2016 - 2050

-2.5% or more
-2.5% - 0%
0% - 2.5%
2.5% or more

Source: State of Minnesota Demogr. Office

The Four Industrial Revolutions

Industry 1.0

Mechanization and the introduction of steam and water power

Industry 2.0

Mass production assembly lines using electrical power

Industry 3.0

Automated production, computers, IT-systems and robotics

Industry 4.0

The Smart Factory. Autonomous systems, IoT, machine learning

Industry 4.0 2023 Top 8 Trends	PRIMARY DEVELOPMENT EFFORT	SECONDARY DEVELOPMENT EFFORT	TERTIARY DEVELOPMENT EFFORT
ARTIFICIAL INTELLIGENCE	SOFTWARE		
ADVANCED ROBOTICS	SOFTWARE	HARDWARE	
IIOT (INDUSTRIAL INTERNET OF THINGS)	SOFTWARE	HARDWARE	
EDGE AND CLOUD COMPUTING	SOFTWARE		
ADDITIVE MANUFACTURING	SOFTWARE		
CYBERSECURITY	SOFTWARE		
BLOCKCHAIN	SOFTWARE		
WEARABLES	HARDWARE	EMBEDDED SOFTWARE	WIRELESS

StartUs insights

DIGITAL FARMING

Harvest Storage

Pig Farming

Biogas Plant

Crop Farming

Management & Finances

Fleet Management

Cattle Farming

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DATA DRIVEN FARMING

Data, including agronomic (crop management) **data** and machine operation data (e.g., fuel level, location, machine hours, engine RPM) is collected primarily from sensors embedded both in the machines and in the field (soil), but also pulls from external **data** (e.g., weather prediction data, commodity pricing).[1] Through JDLink™ Connect telematics, the **data** is automatically uploaded onto the cloud via cellular network, Wifi, or Bluetooth. Farmers access and manage the **data** through the MyJohnDeere.com portal of the cloud software platform. Through the Operation Center app on this platform, farmers can monitor activity in real-time, analyze performance, determine how best to utilize equipment, and collaborate with partners for insights and "prescriptions" using algorithms that help the farmer decide what to plant, where and when with optimized conditions.

[2] Because MyJohnDeere.com is an open **data** platform, the latter can be accomplished by farmers opting to share their **data** with apps created by third party Ag software providers leveraging the Deere APIs.

The more **data** that is collected, the more valuable it becomes to all stakeholders – farmers benefit from analyzing **data** collected over time and from other farmers' **data** to inform decisions and Deere and software developers glean more insights paving the way for development of new value-added products and services.[3] Farmers can also share the **data** with input suppliers (seeds, fertilizer, chemical) to trigger automatic ordering for JIT delivery reducing downtime.

Case Study: Combine Advisor™
Making Every Grain Count

Grain Quality Camera
Active Yield
Grain loss sensor
Gen4 Display
Ops Center Remote View & Adjust
Intelligent Combine Adjust

Customer Value: Automated machine settings, more consistent harvest quality, reduced need for skilled labor

AGRICULTURAL AUTOMATION AND ROBOTICS

Figure 3
Percent of total farms and total farm/ranch acres using GPS for on-farm production activities, 2013 and 2019
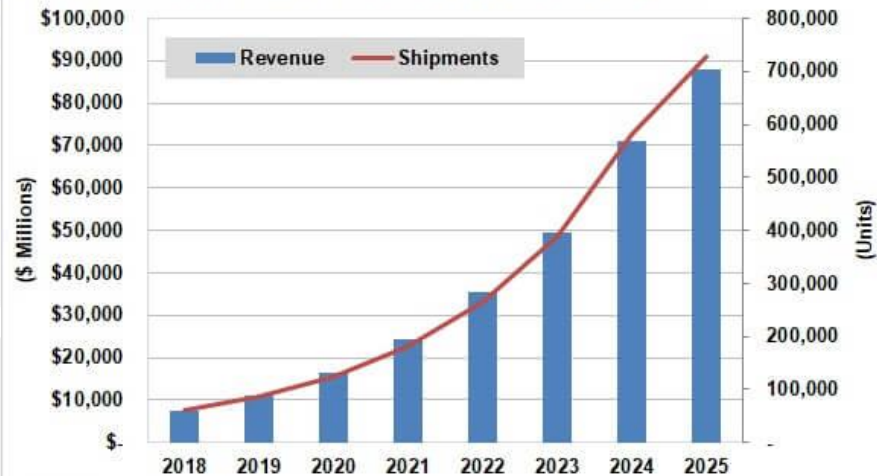
Source: Tractica

| Digital Agriculture Top 8 Trends	PRIMARY DEVELOPMENT EFFORT	SECONDARY DEVELOPMENT EFFORT	TERTIARY DEVELOPMENT EFFORT
ARTIFICIAL INTELLIGENCE	SOFTWARE		
ROBOTICS	HARDWARE	SOFTWARE	
IIOT (INDUSTRIAL INTERNET OF THINGS)	SENSOR	HARDWARE	SOFTWARE
EDGE AND CLOUD COMPUTING (DATA ANALYTICS)	SOFTWARE		
DRONES	SOFTWARE		
CYBERSECURITY	SOFTWARE		
PRECISION AGRICULTURE	SOFTWARE		
REGENERATIVE AGRICULTURE	HARDWARE	EMBEDDED SOFTWARE	WIRELESS

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IT'S ALL ABOUT THE DATA

Do you see the similarities in future manufacturing and agriculture trends ?

WHEN IT BECOMES ALL ABOUT THE DATA - SOFTWARE DEVELOPMENT IS REQUIRED

Artificial Intelligence

AI Accelerates Software Development
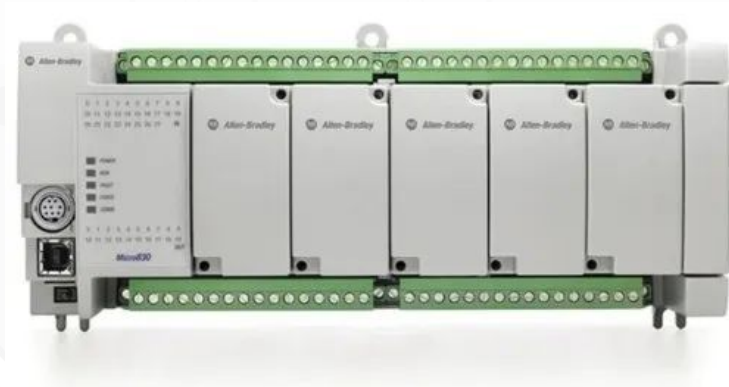
SUMMARY

- Industry 4.0 and Digital Agriculture **will require additional software and hardware development**, from which new jobs, industries, and economies will emerge.

- AI (Artificial Intelligence) **will rapidly** accelerate many software development efforts.
  - Data Analytics
  - Predictable Maintenance Analytics and Automatic Supply Chain Management
  - Cyber Security
  - GPS Guidance
  - PLC Programming
  - Artificial Intelligence
  - Wireless Communications
  - Intelligent Sensor Development

- AI will expand the number of people developing new software solutions

- Project Spark and CORI Partnership
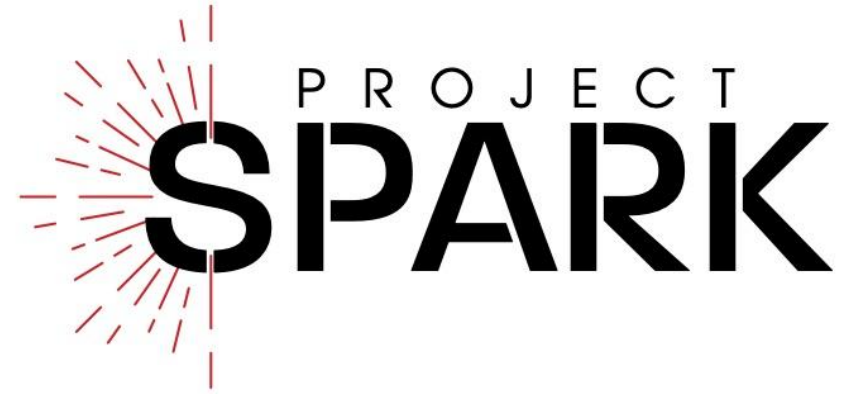
Vision and Strategy

"Skate to where the puck is going, not where it has been."

— Wayne Gretzky

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Our Digital Revolution has Already Begun

- New Ulm (Nuvera) has already laid the foundation for a technology renaissance to occur in New Ulm and the surrounding area by installing high speed internet fiber in all their service areas.
- New Ulm operates an **independent electrical grid** that significantly reduces the risk of brownouts or blackouts.
  - Critical requirement for Cloud-based software services or high levels of factory automation.
- Over the past 18 months New Ulm area schools have begun implementing Project Lead the Way, a K-12 STEM Curriculum to help ready our students for future workforce requirements.
- NUBRIC/Project Spark has formed a partnership with the Center on Rural Innovation to develop a technology hub / business incubator in New Ulm.
- Two of New Ulm's motor manufacturers, Windings and Parker Hannifin, will continue to benefit from future automation initiatives.

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Progress To Date

Established Partnerships

Project Lead the Way

Region 9 and Federal EDA

The Center on Rural Innovation

Results

Project Lead the Way Adoption
- Martin Luther College
- St. Paul's Elementary School
- MInnesota Valley Lutheran High School
- New Ulm Cathedral High School
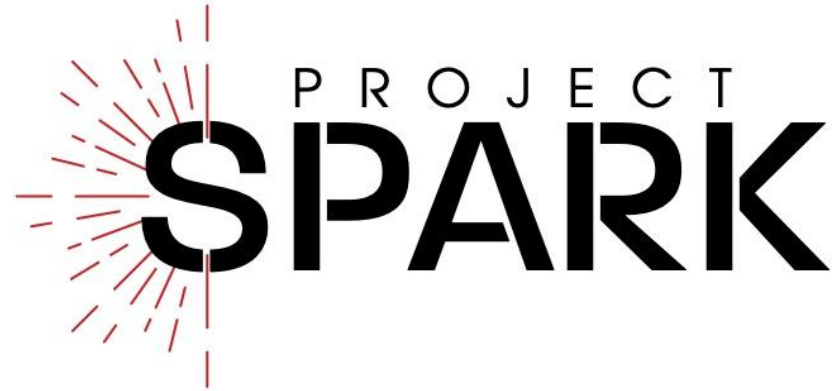- New Ulm Public Middle School (under evaluation)

Region 9 and Federal EDA
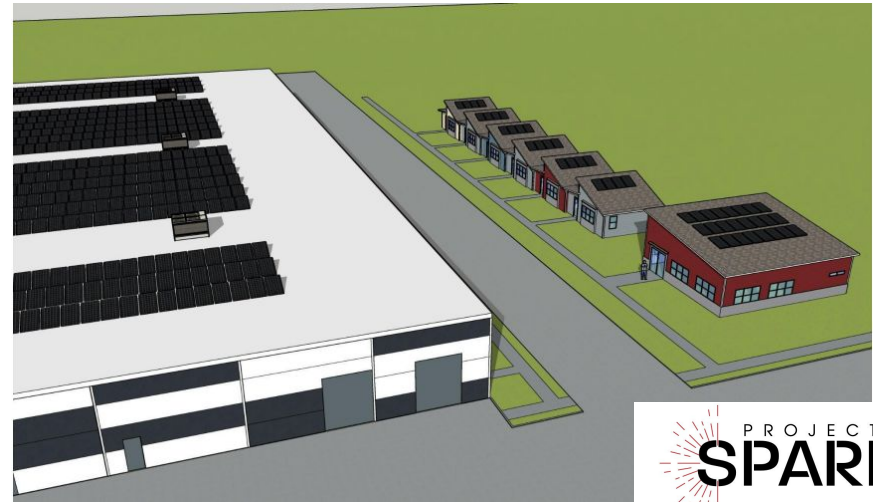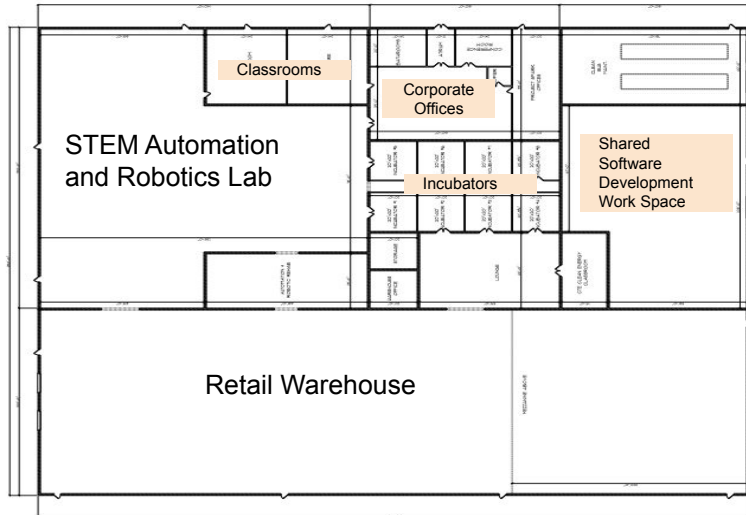- Awaiting award for $130,000 EDA Planning Grant for NURAP *New Ulm Robotics and Automation Program*.

The Center on Rural Innovation
- In early 2024 we will be applying for a $750,000 EDA **Build** Grant.

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Education - Automation - Incubation - Commercialization

Floor plan labels:
- Classrooms
- Corporate Offices
- STEM Automation and Robotics Lab
- Incubators
- Shared Software Development Work Space
- Retail Warehouse

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Technology and Business Incubator Campus

- State of the Art STEM Robotics and Automation Lab
- College Level Classroom Instruction
- Shared Software Development Suites
- 8 Business Incubator / Accelerator Spaces
- Commercial Warehouse Rental Space
- 5 Acre Solar Farm
- NUBRIC and Project Spark Corporate Offices
- 3 - 1 acre lots for new business expansion

Estimated Cost = $6 - $8M

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SO - How do we get there?

Grant Funding

- Federal EDA Grants
  - Construction
  - Build to Scale
  - TECH Hubs Grant Program
- Federal USDA Grants
  - Rural Business Development Grants
  - RISE - Rural Innovation Stronger Economy
  - REAP- Rural Energy Assistance Program
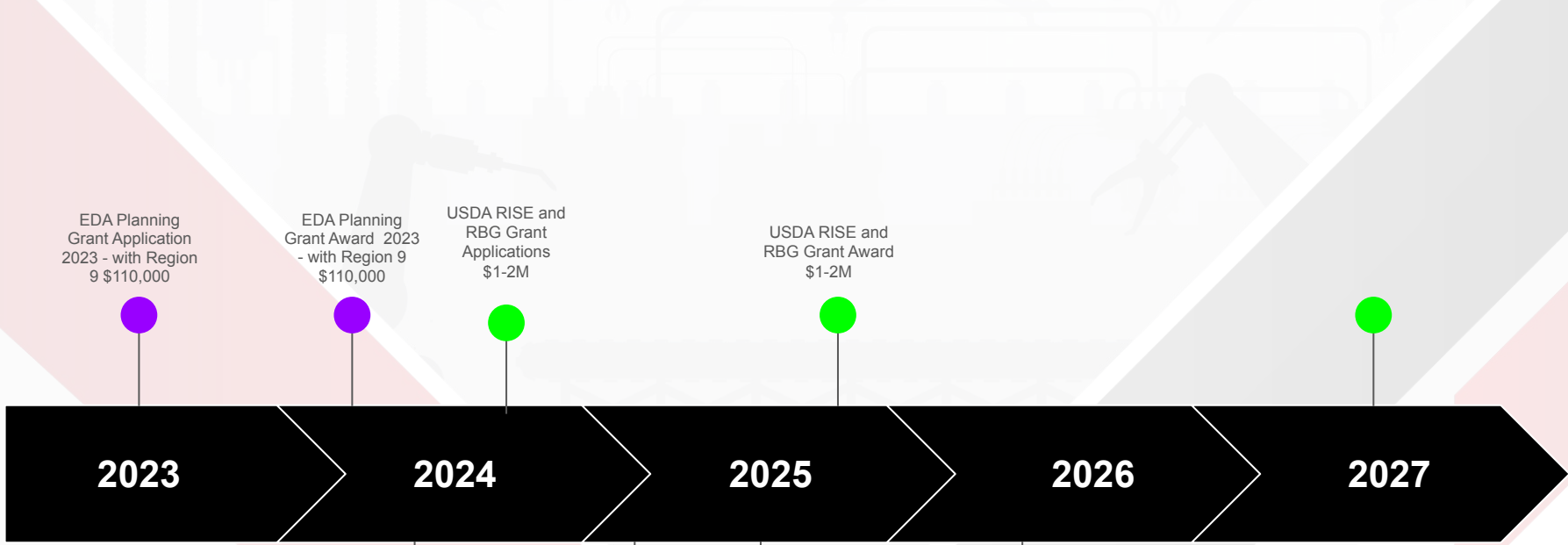- Minnesota DEED Funding
- Private Foundation Funding

Self Sustaining Revenue

- 5 Acre Solar Farm
- Commercial Warehouse Lease Space
- Ownership stake in incubated businesses

Donor Support

- Project Spark is a 501 3 C organization.
- Favorably positions the organization for grant and donor funding.

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EDA Planning Grant Application 2023 - with Region 9 $110,000

EDA Planning Grant Award 2023 - with Region 9 $110,000

USDA RISE and RBG Grant Applications $1-2M

USDA RISE and RBG Grant Award $1-2M

2023

2024

2025

2026

2027

CORI EDA Build to Scale Grant Application $1.75M

CORI EDA Build to Scale Grant Award $1.75M

EDA Construction Grant Application $2.0M

EDA Construction Grant Award $2.0M

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The Data Suggests……….

The manufacturing industry in our smaller rural towns will face extraordinary challenges in the near future.

- Continued population decline and migration
- An eroding tax base for community and schools
- Increased competition for qualified workers
- Increased price competition by competitors implementing higher levels of automation.

Digital agriculture, **especially autonomous farming**, will shift the need for human capital in the rural areas to **hardware and software development** in other locations. In short, it has the potential to accelerate rural population decline.

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Technology and Manufacturing Entrepreneurs with a New Ulm Connection

James J. Seifert
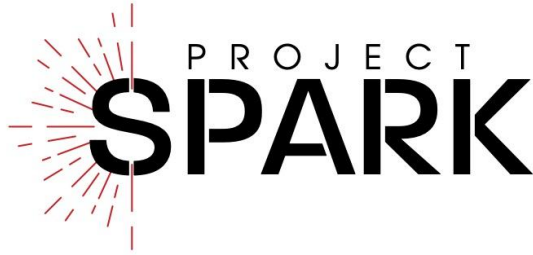
Tim Anderson

Todd Tyler

And we are going to get a bit of help !

Jay Johnson

Tom Kuckhahn

1. Is bold and courageous initiative
2. It's an expensive initiative
3. It's a regional initiative\
4. It's an **achievable** initiative
5. It incorporates offensive and defensive business strategies that will benefit New Ulm and our surrounding communities.
   a. **Offensive**
      i. It has the potential to create new high paying jobs and businesses.
      ii. It can retain talent by providing college level degrees and certifications locally.
   b. **Defensive**
      i. It helps keep current manufacturers here by providing a well-educated and trained workforce that can work with tomorrow's technologies.
      ii. It provides a safe-haven for those manufacturer that can no longer survive in small rural towns.
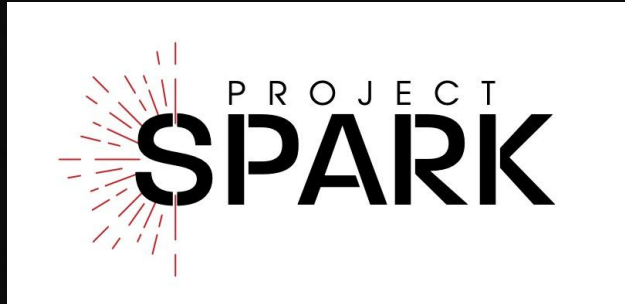
Call to Action

This MUST be a coordinated, regional effort !

We need representatives from city and county governments, school board members, teachers, and business leaders to join and lead this initiative.

paul@nubric.orbg

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Far better is it to dare mighty things, to win glorious triumphs, even though checkered by failure... than to rank with those poor spirits who neither enjoy nor suffer much, because they live in a gray twilight that knows not victory nor defeat.

Roosevelt

Thank You

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QTES