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## **A Case Study on the Future of Humanity: AI and Robotics Worker Replacement**

*Open Access Teaching Case Developed for the Tech for Humanity Pathways Minor*

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### **Synopsis**

The following is a case study reviewing the current rapid pace of AI and robotics development. It asks students to start thinking about the future of humanity, should robots replace the human workforce in their lifetime. Robotics, automation, and AI have already replaced humans for specific tasks, and their capabilities are growing at an exponential rate. In 2025, we are in the 4<sup>th</sup> Industrial Revolution (also referred to as Industry 4.0), and much research is conducted to improve human safety in factories, but in some cases, replaces the human altogether. Students will be asked to consider key points in this technology and its benefits and potential pitfalls. Students will be asked to evaluate the benefits and the costs of this industrial revolution, and the future of humanity, often the topic of science fiction, coming to our reality now.

### **Background**

This section will explain the context for the issues that for the basis for the case study, and aid in **Understanding the Problem Space**. The foundational concepts of this case study are presented in a YouTube video created by The Tesla Space newsletter.<sup>1</sup> Students should watch this video<sup>2</sup> and refer to the transcript provided in The Case as they progress through this study.

### **Definitions**

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<sup>1</sup> <https://www.youtube.com/@TheTeslaSpace>

<sup>2</sup> <https://www.youtube.com/watch?v=yGD3I5thTS8> “How the Tesla Bot Will Break Reality”

**Artificial Intelligence (AI)** – NASA has several definitions for AI, but the most succinct for our needs is: “Any artificial system that performs tasks under varying and unpredictable circumstances without significant human oversight, or that can learn from experience and improve performance when exposed to data sets.”<sup>3</sup>

**Robot** – “...a machine that resembles a living creature in being capable of moving independently (as by walking or rolling on wheels) and performing complex actions (such as grasping and moving objects).”<sup>4</sup>

**Industrial Revolutions** – There have been three industrial revolutions in U.S. and other leading nations’ histories, a fourth revolution is currently underway, and some are already defining a fifth revolution centered on human-cyber-physical systems. An industrial revolution marks a significant change in how products are made and transforms society over a period of time.

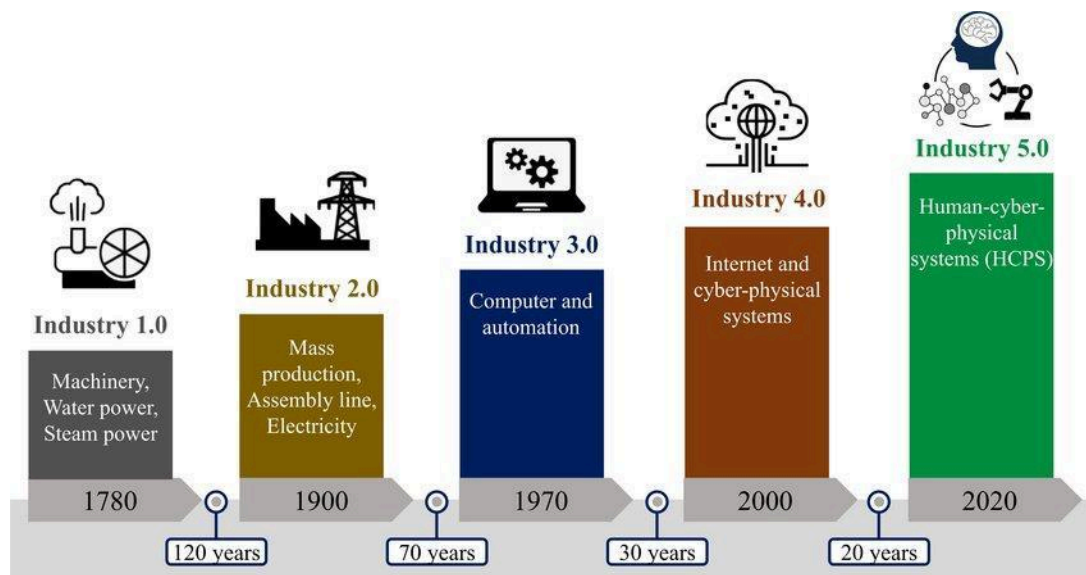


Figure 1-Industrial Revolutions (Chen et. al.)

**Industry 4.0** – The World Economic Forum defines “The Fourth Industrial Revolution, Industry 4.0, or 4IR as it is variously called, is the next phase in manufacturing. It will be characterized by

<sup>3</sup><https://www.nasa.gov/what-is-artificial-intelligence/>

<sup>4</sup><https://www.merriam-webster.com/dictionary/robot>

smart technologies and automation, which allow manufacturers to produce goods more efficiently, quickly, cheaply and/or sustainably.”<sup>5</sup>

### Discussion Questions

1. What books, movies, or other creative outlets have helped craft your view on a future where robots are on par, or nearly on par, with humans as far as capabilities are concerned? Did they portray a positive or negative outlook for humanity’s future? Can you define a ratio of positive-to-negative futures from your perspective?
2. Based on your answers from Q1, do you have any concerns about robots equipped with AI, learning through trial and error?

### The Case, Part 1

**Transcript of video (see footnote 2): “How the Tesla Bot Will Break Reality” 00:00 – 02:42**

In October 2024, Tesla brought us all one step closer to the cyberpunk universe of Blade Runner with their We Robot event, a tech giant creating machines that blur the line between human and robot. More human than human. That was the promise of the fictional Tyrell Corporation Company that built artificial people, replicants to exist alongside the rest of us, blurring the line between machine and man, they weren't just laborers. They were companions, caregivers, builders, performers, whatever their owners needed them to be. Not quite human, but close enough to make the distinction uncomfortable.

Now Tesla is building its own replicants, not in fiction, but in factories. Optimus is real, and it is being prepared for deployment inside Tesla's own production lines, where it will soon begin moving materials and performing monotonous, repetitive tasks. **But unlike traditional industrial robots, Optimus is not built for a single purpose. It is built to learn, and that learning process is already happening.**

Not just with Optimus, but across Tesla's entire AI platform. The company's real-world AI is advancing exponentially, and the clearest proof of that is in full self-driving. For years, skeptics dismissed FSD as a fantasy, but now Tesla's autonomous fleet is driving billions of miles improving with every journey.

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<sup>5</sup> <https://www.weforum.org/stories/2024/01/industry-4-fourth-industrial-revolution-workers/>

**Every time an FSD-enabled Tesla encounters an unexpected situation, road construction, a sudden detour, an aggressive driver, it doesn't just adjust, it learns. And that knowledge is shared across the fleet, making every other Tesla vehicle smarter overnight.** The system is advancing so rapidly that at Tesla's 2024 earnings call, Musk made an announcement: "Tesla will launch fully unsupervised robo taxis in the city of Austin by June."

This year, no human in the driver's seat, no test mode, just autonomous vehicles operating in the real world. During that earnings call, Musk brought up a classic fable he's mentioned before. "I know people have said Elon is the boy who cried wolf several times, but I'm telling you, there's a damn wolf this time, and you can drive it. In fact, it can drive you and the same AI system that allows Tesla's cars to drive themselves will soon power Optimus. If your last experience with FSD was a year or two ago," Musk said, "That's like meeting someone when they're a toddler and thinking they're going to be a toddler forever." Now, Optimus is still young, but it won't stay that way for long. Optimist isn't just another industrial robot. **It is the first machine designed to replace human labor on a massive scale.**

### Discussion Questions

3. What implications for humanity do you think are reasonable to consider when robots can replace human labor on a massive scale? Didn't the industrial revolutions of our past already do this to some degree? Do you see less workers at the checkout counters now that self-checkout has become normalized? What are the pros and cons of your own examples?
4. How do you feel about self-driving, electric taxis? What pros and cons influence your opinion?

### The Case, Part 2

**Transcript: "How the Tesla Bot Will Break Reality" 02:42 – 04:31**

During Tesla's latest earnings call, Musk laid out his most aggressive timeline yet. In 2025, 10,000 units will be deployed inside Tesla's own factories. By 2026, Optimus will be sold to outside companies and starting sometime in 2027, Musk plans to ramp up mass production with the goal to eventually build millions and

even billions of humanoid robots. As Musk explained, it doesn't take very many years before we're making 100 million of these things a year.

If Tesla succeeds, this won't be just another step in automation. It will be a fundamental change in our own reality. **What happens when a machine can do everything a human can do, but better, faster, and without pay?** This is where some long-standing pillars of society begin to break down.

Musk himself has hinted at the economic implications at 1,000,000 units per year. The cost to manufacture and Optimus is expected to drop below \$20,000, but cost and prices aren't the same thing. The price of Optimus will be set by the market, Musk said. And that's the question that will define our next decade. Who controls the robots and who benefits?

Science fiction has warned us about the AI taking over for centuries, technology has replaced human labor, but always in narrow ways. The steam engine replaced horses, the assembly line replaced artisans, computers replaced clerks, but Optimus is different. This isn't about automating one task; it's about automating all tasks. A machine that can clean, cook, carry, repair, build and assist **isn't just a tool, it's a worker**. And when it arrives by the millions, **it will challenge the most fundamental concept of modern civilization: work. If robots can do everything, what do people do?**

### Discussion Question

5. Self-checkout counters have replaced or reduced workers' hours for several reasons, but there is a new trend reversing this, citing customer feedback and stores' loss of product. This might be a short lived "win" for cashiers if robots evolve and can do everything. **What do people do if robotics and AI are successful in replacing labor as we know it?** There is plenty of content in the video and the movie industry on how this could go wrong, but are there scenarios you can think of where this is a good thing?

### The Case, Part 3

Transcript: "How the Tesla Bot Will Break Reality" 04:32 – 10:40

Musk has said the future is going to be incredibly different from the past, that's for sure. But are we heading toward a dystopian nightmare? Or are utopian dreams?

That moment has not arrived yet. Humanity still holds the wheel for now, but if Tesla's plan succeeds, it will no longer be our decision to make, and that change might be coming sooner than anyone expects. To understand just how we got to this moment, we have to look back at the origins of Optimus at Tesla's obsession with AI and robotics, and at the long road that led us to the age of humanoid machines.

Tesla isn't just a car company. It never was. For years they were building something much bigger, something most people missed, because while the world was watching Tesla's self-driving cars, Tesla was actually building robots. It began with the car, not just any car, but a car that could see. In 2014, Tesla rolled out Autopilot one, it could keep you in your lane, adjust speed and avoid collisions. It was futuristic, impressive and dumb. Autopilot 1.0 didn't understand why it was doing anything. It just followed orders. But Tesla needed real intelligence.

In 2016, they launched Autopilot 2.0 more cameras, more data, but it still wasn't learning. So, in 2019, Tesla built its own AI chip, a neural processor designed to process real world data in real time. This was Autopilot 3.0 the moment Tesla stopped being just a car company and became an AI company. Tesla's AI wasn't just reacting anymore, it was predicting. Then in 2021, Tesla made its boldest move yet. They killed radar. No more sensors, no more crutches. Just cameras.

Critics called it reckless. Tesla called it Tesla vision, a car that saw and responded the way humans did. This was the moment Tesla's AI truly became something different, no longer a set of programmed rules, but an intelligence that learned from experience. 400,000 Teslas running FSD beta, billions of miles of real-world driving data and a new supercomputer, Dojo, designed to process it all faster than any system in history. **For years self-driving software was just that software. Engineers wrote the code, updated the system, tested it and repeated the process. Then in 2023, Tesla stopped writing the code altogether.** FSD beta 12 changed everything. Tesla wasn't just programming self-driving cars, **they were teaching AI how to think.** For the first time, the AI trained itself. It wasn't following instructions, it was learning from real world

experience. FSD Beta 13 pushed even further. Tesla's AI wasn't just reacting, it was anticipating adapting, improving on its own. This was no longer just a self-driving system, it was something else. And if Tesla can train AI to drive, why can't they train it to walk?

August 19, 2021, Tesla AI day: Elon Musk walked on stage and announced Tesla's next product. Not a car, not a battery, a robot. At first, people laughed. Tesla even brought out a human dancer in a bodysuit to pretend to be a robot. Then Musk said something that made them stop. "If you think about what we're doing with cars, Tesla is arguably already the biggest robotics company," and suddenly it made sense. Tesla's cars weren't just cars anymore, **they were robots on wheels**. Now Tesla was putting that robot brain inside a humanoid body.

At first, Optimus was just an idea but then, in late 2022, Tesla's first real prototype stood up and moved. By early 2023, it was walking by mid-year, it could grip objects, balance and sort materials. Then, in December 2023, Tesla unveiled Optimus Gen. 2. Lighter, faster, more human. Like it could pick up an egg without breaking it. Then in 2024, Optimus started working in Tesla's factories, loading parts, carrying materials, all while learning and observing. Throughout the process. Tesla didn't set out to build humanoid robots, but they built an AI that could see. Then they taught it to understand, and then to drive, then to train itself, and now it can move like a human. And now that AI can walk, build, and think. What happens next? For centuries, work wasn't just what people did, it was who we were. Farmers, builders, shopkeepers, drivers, the kind of work changed, but the rules stayed the same. You don't work, you don't eat. Tesla is about to break that rule. If Elon Musk is right, 100 million humanoid robots could be rolling off of production lines every year. Machines that can build, clean, cook, repair, and even replace entire industries overnight. This isn't automation like anything we've seen before. It's not a steam engine, factory robot, or a self-checkout machine. This is the replacement of human labor itself. **Every automation revolution has followed a pattern. Some jobs disappear, but new ones emerge. Factories wiped out blacksmiths but created**

**industrial workers. Computers killed typewriters but made software engineers. What happens when there's no new job left to fill?**

Right now, robots do specific jobs. An industrial arm welds, a Roomba vacuums, a chat bot answers basic questions. But Optimus isn't like that. It's not just one tool, it's every tool. Musk claims Optimus **will** cost less than \$20,000 to produce; a single robot at that price could replace a human worker permanently for less than a year's salary. And when businesses realize this, why hire people at all? At first, it will be predictable, warehouses, factories, logistics, but then the floodgates open. Retail clerks-gone, hotel staff-automated, construction crews-smaller, faster, cheaper and then nurses, assistants, drivers, mechanics. The cost of human labor collapses, but so does everything built around it. **If work disappears, what happens next?**

**Discussion Questions**

6. The difference between programming algorithms and AI is the point in which AI starts thinking and learning for itself. When robots stop being programmed by humans and are being taught using the same techniques used to teach children or newly hired workers, AI is coming to maturity. What concerns do you have about AI and robots when programmers stop writing code and providing updates that way?
7. Now that you have seen or read more from the source material, does your answer to Q5 change at all? Do you have new ideas?

**The Case, Part 4**

**Transcript: "How the Tesla Bot Will Break Reality" 10:41 – end**

Enter Universal Basic Income. Here's the idea. If robots take the jobs, people still need money. They get a monthly stipend provided for them, no strings attached. It's actually not some radical fringe concept either. In 1970, Richard Nixon almost passed a version of it in Congress. In 2019, Andrew Yang ran for president. On it, Jack Dorsey, Mark Zuckerberg, even Jeff Bezos have hinted that automation may force UBI into reality. Because if there are no jobs left to earn wages, the entire system breaks down. Mortgages, health insurance, retirement savings, everything collapses when work is no longer a path to survival.

The alternative: mass homelessness, deepening economic divides and a labor force with nothing left to offer but desperation. So how do we get to a place where everyone is provided a basic income to meet their daily needs, and what happens to society without the human drive to survive?

Who pays for it? The government? Corporations? Does a Tesla optimized economy mean that its growing fortunes are taxed at a high rate enough to support the rest of the nation? And if corporations don't want to share what happens when people with nothing left to lose start demanding it? The real question isn't whether robots will replace human labor. That's inevitable. The real question is, who controls them? Because someone will own the robots and that means someone will own the workforce in one future. Robots will serve everyone. They provide abundance, food, shelter, medical care, all without the need for traditional jobs. In another future, robots belong to the few, they work, generate wealth and concentrate. Power in a handful of corporations that control the entire labor.

A world where the rich own the means of production and the rest of society owns nothing. In today's economy, the wealthy own capital, and the poor sell their time. In a world where machines do all the work, what happens to the people with nothing left to sell? Science fiction imagined robots rising up against their creators, but what if they don't need to? What if they simply replace us quietly, efficiently and completely?

A machine that can mend a beating heart, a machine that can write its own code. A machine that will soon step into the world and never step back. In Blade Runner replicants weren't just workers, they were builders, caretakers, performers, an artificial labor force that blurred the line between machine and man. Optimus won't demand freedom. It won't stage an uprising. But it won't have to. **The most disruptive technologies don't overthrow the world, they reshape it so completely that the old world simply fades away.** A world where Optimus succeeds is one where work as we know it ceases to be a necessity. That could be the beginning of something truly remarkable, a future where survival isn't tied to labor, where people are free to create, explore and

invent in ways never before possible. Or it could be the start of something else entirely. The society where wealth and control concentrate in the hands of those who own the machines, while the rest watch the future unfold on the sidelines.

One way or another, the shift has already begun. Not with a bang, not with a war, but with a quiet trade. A slow, seamless handoff from human to machine, and by the time we recognize what we've built, we may find ourselves living in a world that no longer needs us, or one where we've never been freer.

### Discussion Questions

8. How much do you understand about Universal Basic Income, UBI, and what are your thoughts on implementation? In what scenarios does this work and is equitable for all people?
9. What does a utopian society look like to you should the dangers we've seen in science fiction, and our own history, not come true?

### Activity (Solo or small group)

In the U.S., the government does not generate income; it only has what it taxes from its citizens or other countries (such as tariffs). As the video we watched describes, this means that the government won't be able to tax its citizens' income if they aren't working anymore. Will it get all of its income from the producers of the robots? Won't it be difficult to regulate robot manufacturers/operators if they represent nearly 100% of their income? The government will be completely dependent upon robot manufacturers; congressional representatives will surely be influenced. In the 1800s it was the railroad companies, and today it is pharmaceutical and oil industries, but never in our history has one industry gotten complete control of government.

**Devise a few alternative scenarios for a future where robots represent nearly 100% of the workforce where it seems a government can act "fairly" and ensure its population is not being taken advantage of by those who create, update, and maintain those robots.**

### Conclusion

This case study examines the rapid development of AI and robotics and its potential to replace human labor, prompting discussions about the future of humanity in a world increasingly dominated by machines. Upon conclusion of the study, participants should have a better

understanding of the Impact of AI and Robotics, Industry 4.0, Learning AI, Economic Implications, Historical Context of Automation, Ethical Considerations, and Future Scenarios.

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