

Do Machines Hold a Key to Business Success?¹

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Abstract

Artificial intelligence (AI) is here, but can we use it to improve project performance to meet deadlines and stay within budget? Every project manager knows the project team is the most valuable resource, but with technological advances the new project team may include an artificial intelligence resource such as R2-D2. Can we as humans work comfortably with Siri, Alexa, R2-D2, and Watson without feeling intimidated or threatened? Will you listen to your teammate, Deep Blue, or ignore his warnings as rubbish and trust yourself on your next approach? Project teams are currently working together internationally touching a variety of time zones and cultural differences. Imagine leading a project team with humans and artificial intelligence machines. Introducing the new human resource challenge, Man vs Machine!

It may seem intimidating or scary, although there are already many industries using artificial intelligence such as automotive, entertainment, manufacturing, and healthcare. We can learn from these industries, researchers, sci-fi movies and books. One known solution discussed in academia is having humans and AIs split tasks based on their individual strengths. Do not forget about the pitfalls of projects and upper management influences! Project managers must prepare to deal with bottlenecks from AIs and humans. Executives will lean more towards using artificial intelligence as a resource because of manageability and cost savings, but project managers must incorporate human guidance, creativity, intuition, judgement, and nuisance.

This paper seeks to explore human insecurities with machines, introduce our future co-workers, and identify ways the new team will work together to benefit the business.

Keywords: artificial intelligence, project management, robots, human resource, machines

¹ *Second Editions are previously published papers that have continued relevance in today's project management world, or which were originally published in conference proceedings or in a language other than English. Original publication acknowledged; authors retain copyright. This paper was originally presented at the [10th Annual UT Dallas Project Management Symposium in August 2016](#). It is republished here with the permission of the author and conference organizers.*

Do Machines Hold a Key to Business Success?

Technology is moving at a rapid speed and more and more businesses are embracing artificial intelligence with billions in investments. According to the Economist magazine (2016), “technology giants are speeding to increase their AI activities and spent \$8.5 billion dollars on research, deals, and jobs”. Businesses are working closely with artificial intelligence researchers to develop and build innovative smart machines of the future. Siri and Alexa are no longer foolish assistants running a few preprogrammed tasks. Now, you can have full conversations with Siri as if she is human. Even Microsoft announced their new product, Conversations as a platform, a host of bots for applications like Skype. Do machines hold a key to business success? If you consider recent business investments, then the answer is yes.

What is Artificial Intelligence?

Wikipedia (2016) defines artificial intelligence as “the intelligence exhibited by machines or software or the study and design of intelligent agents, in which an intelligent agent is a system that perceives its environment and takes action that maximizes its chance of success.” Ray Kurzweil (2000) in his book the *Age of Spiritual Machines* defines AI as “the field of research that attempts to emulate human intelligence in a machine. Fields within Artificial Intelligence include knowledge-based systems, expert systems, pattern recognition, automatic learning, natural language understanding, robotics and others.”

The field of AI was founded at a conference on the campus of Dartmouth College in the summer of 1956. Attendees were John McCarthy, Marvin Minsky, Allen Newell, Arthur Samuel, and Herbert Simon. Artificial Intelligence actually dates back to many early philosophers and to what most people call the father of Artificial Intelligence, an English mathematician named Alan Turing. Alan Turing wrote several papers and the most noteworthy papers were *Intelligent Machinery* and *Computing Machinery and Intelligence* where he describe his test to see if a machine had human capabilities, also known as the Turing Test (Wikipedia, 2016). Kurzweil explains in *How to Create a Mind*, “if passed a machine has the level of intelligence as a human” (Kurzweil, 2012).

Fear of Artificial Intelligence

When you do not understand something or someone there is a level of fear. We do not understand Artificial Intelligence nor do we comprehend the benefits that AI can bring to humanity. We fear the evil scientists building a band of evil robots because of movies and science fiction novels. In the numerous essays discussed in Brockman’s (2015), *What to Think About Machines that Think*, it talks about our imagination and how we imagine a mad scientist

building an army of machines seeking to destroy us all. This can play out in our minds, but we need to think about what it would take to accomplish this madness. Could someone really recruit and manage a team of tech savvy experts, pay their high salaries, and keep their loyalty? With our advancement in intelligence, could a mad scientist hide this from the FBI, CIA, or other foreign intelligence communities? This is a highly unlikely scenario, but it makes for a great movie.

Some fear machines will surpass human understanding. This is very likely, but we can build in mechanisms that would require machines to explain in human terminology how they came up with a solution. We are facing more and more complex problems from world hungry to scarce resources. We need intelligent machines to work with us to solve the complex problems of today and tomorrow.

Others fear losing their jobs and this is truly a reality. However, if we continue to train and increase our knowledge then we can find a different job if our job is eliminated. We can join a new industry using our talents and skills. With new technological advances comes new job opportunities and new industries.

Then there is the fear of corruption, violence and destruction. Brockman (2015) explains, “There is no need to fear Artificial Intelligence because Steven Pinker has established as technological civilization advances, the level of violence decreases. The danger of AI is not inherent to AI, but rest on our over reliance on it.”

Instead of fearing Artificial Intelligence, we should think of ways to eliminate or reduce the fear. For the evil scientist, we can assess the risk and come up with a way to eliminate the risk using a project management knowledge area known as risk management. We can ensure our secret agencies have evil scientists on their radar. As for machines becoming smarter than us, we can ensure each new technology includes an explanation feature similar to the current knowledge bases found with new software packages. Job elimination is inevitable. James Canton (2015) provides several scenarios where this has happened such as Fox Comm (Apple iPhone producer) ordered 1000 robots to replace human workers who were protesting. Many people believe modernization will wipe out jobs and create unemployment, but every technical advance has created more jobs than it has eliminated. They are different jobs in different industries that require different skills and abilities. It may require more training and learning, but a project manager’s skill set of organization and management are transferrable from one industry to the next, so the opportunities are all around us.

As project managers, we can create lessons learned for artificial intelligence and ensure new technologies include filters, user studies, ON/OFF switch, kill switch, limited lifecycles, morals and values. The engineers, developers, and technicians who design and build artificial intelligence have the power to reshape society and project managers should facilitate the way.

Strengths

Humans have strengths that exceed machine strengths and vice versa. To name a few, humans have visual, sensory, mobility, innovative, experience, creativity, intuition, judgement, pattern recognition and nuisance strengths. Machines are good at calculations, repetitive tasks, connect easily to the internet, don't get tired, follow rules, and have quick reaction times. Most important, Buonomano (2011) explains, machines can erase and delete memory very easily, but humans cannot.

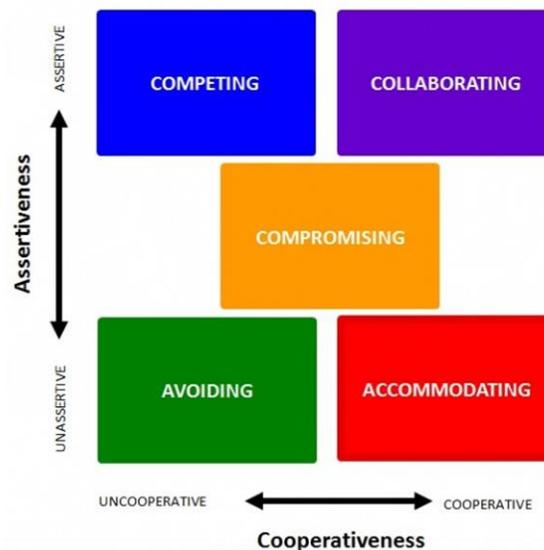
When you have a team of AI and humans it is best to identify each team member's strengths. A good way to identify human strengths is using *Strength Finder 2.0* (2007). *Strength Finder* is based on Gallup's 40 year study of human strengths and they created a language of the 34 most common talents and developed an online assessment to help people identify their strengths. The first book was written in 2001, called *Now Discover Your Strengths*. Both books and the online assessment help you find your top 5 themes of talents and provides you an Action Planning guide based on your assessment results. *Strength Finder 2.0* focuses on your raw talent and how it serves as a multiplier. "Talent is a natural way of thinking, feeling or behaving multiplied by Investment which is the time spent practicing and developing your skills equals your strength which is the ability to provide consistently near perfect performance." *Strength Finder* also suggest partnering with someone who has more talent in areas in which you are lacking and who might that be? A Machine! Using team member strengths will improve quality and time, two knowledge areas of project management.

Leading a Team with Artificial Intelligence Resources

Difficulties lie ahead when leading a team with a mixture of human and artificial intelligence resources, but there are ways to build a high performing project team. First of all, make your environment fun! Assign tasks based on individual and machines strengths. Understand and prepare yourself for conflict because it is inevitable whether with ourselves or machines. It is important to understand communication is key and can be accomplished through status reports, weekly meetings, issues and risk logs, collaboration tools, etc. Communication is a very important project management knowledge area.

Also, understanding one another and individual personalities, as well as, being culturally aware and having machine awareness. Teach employees about the machine, how it operates, and how it was built to think or work. Ensure roles are clarified and prioritize task so everyone is on the same page and there is no difference in prioritization. If your project teams work in silos make sure there is constant communication. Make sure you keep a clear line of communication with all project members. Task dependencies can play a major role in conflicts so make sure all team members understand the dependencies. This will help alleviate most conflicts, but not all. For other solutions, you will need to pull out Thomas-Kilmann (1974) conflict mode instrument as shown below:

Thomas-Kilmann Conflict Mode Instrument



Thomas-Kilmann (1974) explains each mode and what it entails, such as **Competing** is assertive and uncooperative. It is standing up for your right. **Accommodating** is unassertive and cooperative. It is neglecting one own concerns to satisfy the concerns of the other person. **Avoiding** is unassertive and uncooperative. It is diplomatically sidestepping an issue until a better time or simply withdrawing from a situation. **Collaborating** is both assertive and cooperative. Collaborating involves an attempt to work with others to find some solution that fully satisfies their concerns and learn from each other to find a solution. **Compromising** is moderate in both assertiveness and cooperativeness. It is a solution that partially satisfies both parties. Some people are better at one mode versus the other and some are better in certain situations. You should use the method best for your project team or situation.

Team Building Activities

Team building activities are ways to build a high performing project team. It is hard to find activities that will work for machines and humans, but there are options. Here are a few team building activities:

- Computer Games
- Mind mapping - feelings
- Word association
- Strengths Finder
- Interview each other (20 questions)
- Scavenger Hunt
- Robot building

Games were played by Big Blue and the chess champion, Garry Kasparov, in 1996. Watson and Kenn Jennings played Jeopardy in 2011. Your project team could mind map feelings toward Artificial Intelligence, play a game of word association, do a Strengths Finder assessment, interview each other, and have a scavenger hunt where humans ask their personal assistants such as Siri to give directions to the next location to find an item in the hunt.

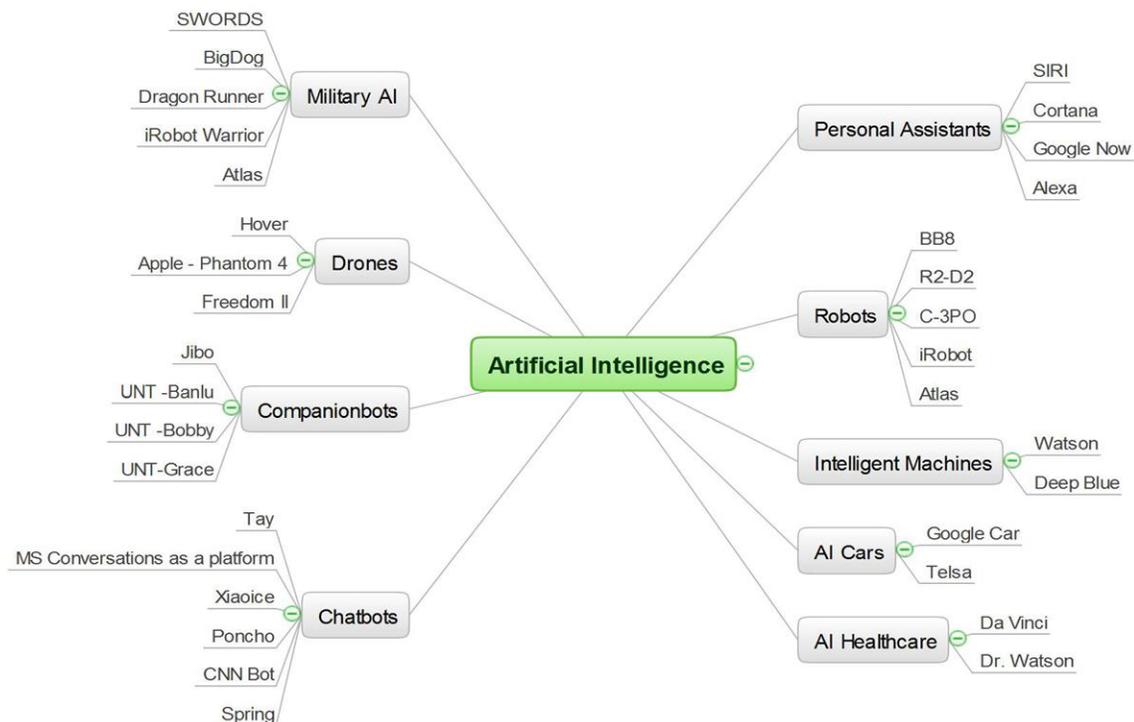
Project Management

Project managers are organizers, facilitators, coaches, cheerleaders, and managers. Their skills and abilities to grasp rapid changing technology and manage projects to success is known throughout all industries. Project managers have a toolbox of skills and using their known tools and techniques to help manage artificial intelligence projects is a key to business success.

Throughout this paper basic project management knowledge areas were presented. First of all, Risk Management was addressed with fears and identify associated risks with our fears. Identifying ways to improve communication through weekly reports, issues logs, collaboration tools, etc. is communication management knowledge area. Dealing with conflict resolution and helping teams with communication issues is Human Resource Management.

Artificial Intelligence Current Use

Today we use artificial intelligence in many ways and in different industries as shown in the following diagram. This includes military uses, healthcare, personal use and entertainment.



At the University of North Texas we have a lab dedicated to Companionbots, called HiLT (Human Intelligence Language Technology) Lab UNT. Banlu, Bobby, and Grace provide a glimpse of our future for our elderly. There are chatbots emerging from various sources including major corporations and news outlets. Chatbots hold conversations with you and you cannot tell they are machines. Artificial Intelligence is all around us and according to Kurzweil (2012),”The average household has more than a hundred computers, most are embedded in appliances and built in communication systems.”

Artificial Intelligence Future Capabilities

Future capabilities of artificial intelligence are limitless. Opportunities are numerous with the rapid growth in technological advances. Research is under way and orders have been placed for some of these future capabilities. We will soon have wearable technology where it looks like a tiny fit bit, but the screen is displayed on your arm. You will evolve from using a phone to a watch to a bracelet that projects on your arm. Then there are nanobot implants and smart drugs that will revolutionize our healthcare system. Soon our shortage of doctors will no longer concern us with doctorless clinics and hospitals using IBM’s Watson technology. Dr. Watson will diagnosis your problem and give you a prescription. Ray Kurzweil (2000) made several

predictions in his book *The Age of Intelligent Machines* and they are coming true. To learn more about upcoming technological advances visit www.kurzweilAI.net or www.singularityu.org.

Conclusion: Embrace the Future

Do machines hold a key to business success? Yes, artificial intelligence is a key component to business success especially with technology advancing at an exponential rate and the increase in its investment by businesses. Artificial Intelligence can be scary because it is unknown and holds so much potential for humanity. Steve Chase says “we should fear the future and seize its promise otherwise we jeopardize our future if we do not anticipate how it will change.” We need to keep our finger on the pulse of technology and take stock of trends so we can shape and be an architect of our future. As project managers we have so many vital skills and strengths, therefore we should volunteer for new innovative tech projects and ask to be a part of any specialized team using or building artificial intelligence. The keys to business success are in our eyesight and project managers should take hold of the key and facilitate an amazing future with machines.

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