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The Engineering City Journal

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The purpose of the Journal is to disseminate knowledge, experience, and best practice in engineering & manufacturing.
The articles are written by practicing professionals in the Engineering City (EC). They cover issues relevant to their projects, operations, and organizations.
The articles address the challenges of the time. As such, the Journal is also a chronicle of the evolution of the EC, its companies, and its individuals.
It is the aim of the Journal to advance the engineering & manufacturing practice, to enrich the engineering & manufacturing community, and to contribute to the worldwide discourse in engineering & manufacturing.

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Editorial

Three articles in this edition start a discussion on AI in organizational management.

It is time to start discussing AI in both product development and organizational management.

Would be good to create an AI discussion club at the EC. We will need someone to own this.

AI is moving fast, and we must get in front of it. Otherwise, we will stay behind and lose our competitiveness.

Engineering Management Corner

. Artificial Intelligence - Automating Decision Making

by Rama, EA

When reflecting on the practice of engineering, we could perhaps say that engineering is all about creating technical devices that do the work for us.

This is the same as to say – engineering is about creating devices that automate human activity.

More laconically – engineering is about automation.

Philosophically – engineering is about subduing the forces of nature to humanity.

The history of automation could be perhaps told in the following way:

1. Automation of Manual Work – Production conveyor, CNC machines, robots, …
2. Automation of Transportation – Autonomous Vehicles, Unmanned Aerial Vehicles (UAVs)
3. Automation of Office Work
    a. Office support Work – MS Office, Open Project, Runn.io, …
    b. Administrative support work – File Maker, Oracle, Office Automation Software, …
    c. Design support work – Computer Aided Design software (SolidWorks, Altium Design, LabVIEW, …)

With artificial intelligence, a new type of work is being automated – "Decision Making" work.

Now we have these levels of automation:

1. Automation of Manual Work – Production conveyor, CNC machines, robots, …
2. Automation of Transportation – Autonomous Vehicles, Unmanned Aerial Vehicles (UAVs)
3. Automation of Office Work
    a. Office support Work – MS Office, Open Project, Runn.io, …
    b. Administrative support work – File Maker, Oracle, Office Automation Software, …
    c. Design support work – Computer Aided Design software (SolidWorks, Altium Design, LabVIEW, …)
    d. Decision Making

Simple examples of management decisions that could be automated with AI:

- Imagine that you don't have to wait for management to approve a procurement request; AI will do the approval.
- Imagine that you don't have to wait for management for travel approval; AI will do the approval.
- Imagine that you don't have to wait for management approval for trade show participation; AI will do the approval.
- Imagine that you don't have to wait for management approval to accept a project; AI will do the approval.
- …

These are things that AI can automate and the function of management may, with time, disappear.

The following question, then, arises - if all work will be automated, then what is there left for people to do?

At first sight, we may think that humanity is being pushed out more and more.

But this is may not be correct. What is happening is that humanity is being pushed more and more into creative work. In this sense, humanity is getting rid of all repetitive and manual work. And at the end, mankind really reaches its real calling – pure creation. And it is here that we truly become what the bible calls the image of God – pure acts of creating.

Thus the only work that will remain is the "creative work".

1. Manual Work
2. Office Work
3. Creative Work

And engineers finally get into a state where they can fully and totally engage in what they want to do – pure creative work. And here the engineer becomes also the artist, and the artist becomes the engineer.

Some people may say that AI has already started doing creative work as well. Yes, this might be true. Hence, even in the act of creation we will be pushed into higher and higher levels of creation. And some people may also say that AI cannot make all the decisions. Yes, this might be also true. Hence, in the decision making we will be pushed into ever more complex decision making that AI can still not do.

Warning:

If at the end, humanity will be totally engaed in only creativity, then there must be a full overhaul of the education approach in both school and university. The skills must be that of creation, the mindset must be that of creativity.

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. Artificial Intelligence as a Competitive Necessity

by Rama, EA

Imagine a company that uses regular post office to send a letter, and another company uses email.

Imaging a company that uses a calculator to calculate their financials, and another company uses Excel.

Imagine a company that uses pen and paper to write reports, and another company uses MS Word.

Imagine a company that uses pencil and ruler for their mechanical design , the other uses Solidworks.

Imagine a company that uses paper drawing for electronics design, the other uses Altium Design.

Imagine a company that uses text programming, the other uses LabVIEW.

Email, Excel, MS Word, Internet are productivity tools that increase our productivity by 10x.

The same will happen with AI. AI may be looked at as one more productivity tool that will allow for another round of 10x improvement.

The qualitative difference of AI compared to the other tools is that AI will start making decisions on our behalf.

Now imagine a company that uses AI in organizational management, and the other does not.

The time will come soon when not having AI will be as disastrous as not using Emails, Excel, Word, Internet.

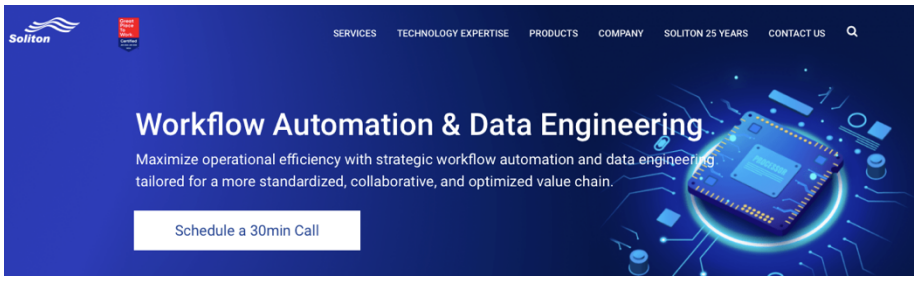
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. Preparing the Organization for AI

by Rama, EA

How to get into AI on an organizational level?

There are already software packages that introduce AI into organizational management. Here is one such software created by Soliton. It is worth giving them a call.



Link

How do these software packages work?

You teach the software on how your organization makes decisions. As such, the software starts taking on the personality of your organization.

As I understand it, it will not make better decisions, nor worse decisions than you used to make. If you were making bad decisions, then it will continue making bad decisions. The only difference is that it will make the decisions on your behalf. Unless, of course, if you had an internal correction process, on which you have also trained the software.

But to implement such platforms into the company, the company must be ready for it.

Preparing the Organization for AI

There are two habits that I believe that must be introduced to the organization to get ready for an AI application.

1. **Real-time documenting all decisions that we make – including technical decisions, procurement decisions, project decisions, travel decisions, marketing decisions, financial decisions, …**

2. **Data collection of anything that we do.**

Only then, can the software learn and become us.

This is not unlike being a mentor to a student. Here the mentorship is towards the software, not the student, and the communication is not verbal but documental.

So, the suggestion is to start introducing these two habits to the company.

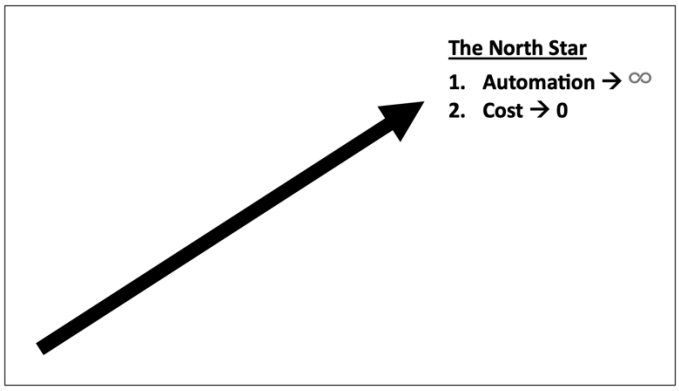
Once we have these documents and the data, we can start training the software which eventually will express the collective intelligence of the company. And this would be a company managed by artificial intelligence.

And good luck to you.

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. Engineering Guiding Principles

by Rama, EA



Probably it could be said that there are two main guiding principles in engineering:

1. **Automation → ∞**
2. **Cost → 0**

In other words – increasing automation of everything and reducing the cost on everything.

And this - for both our organizations and the customers' organizations.

From a day-to-day perspective, the following four questions could be always asked:

1. What can we automate in our work?

2. What can we automate in customers' work?

3. How can we reduce the cost of what we are doing in our organizations?
4. How can we reduce the cost of what the customers are doing in their organizations?

If we develop this mindset and make it a habit, then a whole set of new product, technology, and process ideas will come to mind – for both customers and us.

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Announcements Corner

. Supercomputer Opening Ceremony – May 31, 2024

The opening ceremony of the supercompute will take place on Friday, May 31, at the Engineering City.

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