

Making Finnish manufacturing industry more competitive with IoT, automation and modernization

This paper is written from a little different perspective than usual with focus on looking into competitiveness of the Finnish manufacturing industry from business point of view. It is very obvious that manufacturing industry can operate in Finland with good level of profitability if operations are well tuned and modernized. Too much of the focus in the past has been on salary levels only being the issue why manufacturing in Finland has not been attractive for companies.

1. CURRENT SITUATION & FOCUS ON LABOR COSTS ONLY

Finnish manufacturers have been too eager to move their production to China etc areas instead of looking at how to make manufacturing in Finland competitive instead. Main focus has been on the high salaries / labor cost, which has been used as the main reason behind the movement for offshore manufacturing. This narrow viewpoint has created a situation where other areas of importance have been overlooked in many cases and decisions been made without full picture & complete data, not to mention a focus on whole process efficiency and final unit prices.



Figure 1: Modern view of global manufacturing operations status

2. CHINA EFFECT, CURRENT REALITY AND OPPORTUNITIES & THREATS TO FINLAND

During a recent visit to China in January 2015 together with our finance minister, Mr. Antti Rinne I had a chance to meet several high ranking government, communist party and provincial officials. In these meetings at Chengdu area (Sichuan province) it became very obvious that labor costs at China have caught up with their manufacturing industry and they are facing what they called “the new normal” situation where they have to quickly accelerate their development and modernization of their manufacturing industry instead of just adding cheap labor to stay competitive. This feedback came from **Ma Hui**, Director General, Bureau for North America, Oceania & Nordic countries, International department, central committee, Communist party of China and **Zhong Mian**, Vice Governor, Sichuan Provincial People’s Government as well as **Li Chang Hong**, Deputy Director, Chengdu Municipal Economic & Informationization Committee. Li Chang Hong actually extended an invitation to Roima Intelligence Inc. to join them at their annual Chengdu region event for manufacturing companies and come & present to them how they should modernize their operations and what Roima could do for them.



This is both a threat and an opportunity for Finnish manufacturing industry. With this information we know China is looking to modernize their manufacturing capabilities in order to gain better competitive position. If countries like China gain effectiveness via modernization of their manufacturing capabilities before Finnish industry “wakes up”, this could be a huge threat. But on the other hand we are smaller, can be much more agile

and faster compared to Chinese industries. Once our manufacturing capabilities are modernized and we have gained better competitive position (which will lead to better financial results), number of manufacturing jobs in Finland will start rising again.

3. WHAT CAN BE GAINED BY MODERNIZING

It’s easy to talk about modern manufacturing, but what do we really mean by it? What can be gained by modernizing manufacturing operations? Let’s look at some high level key goals that are applicable for almost any manufacturer.

Boost productivity

Very obvious one to get started. More products equals more income and better bottom line. The answer for better productivity is a sum of many factors. Adding more people / labor is not an answer to this any more like China has learned with their rising labor costs.

Reduce scrap and waste

Too often overlooked to certain degree. Main reason for this lies within the old ways of running operations by “looking at rear view mirror”. What I mean by this is the common practice of looking at reports from the past, i.e. previous day, previous week etc. It is too late to do anything when looking at the facts after the incidents have already occurred.

Increase uptime

Today most manufacturing operations have too much machine / production line downtimes and same problems are solved over and over again. Best practices are often knowledge of the operators and systems are not in place to guarantee that those best practices are shared between operators, shifts and other similar manufacturing operations that can be in different locations and countries.

Reduce floating assets

Lack of proper systems and manually driven & planned operations (usually via Excel) cause a lot of human errors. Best example is ordering of raw materials and parts. It is human nature that everyone makes sure that their area is not causing any downtimes or production stoppages due to lack of raw materials. When operations are planned and managed manually this will create ever increasing buffers for various areas and boost the value of floating assets and the amount of money company has tied into them.

Capture cost more precisely

Its amazing how often manufacturers really don't have precise information on the cost of manufacturing their various products. Without this data and systems that support it companies often plan their production incorrectly so that certain products can be even manufactured at loss or very small margins. This precise data is also needed by company management so that pricing, sales etc. areas can be planned properly.

Avoid “fire drill” costs

This is one of the most expensive areas in manufacturing. The more often factory has to do fire drills to catch up with production to meet certain orders / demand, the less will it's profit margins be. Once again this is matter of having proper systems in place.

4. HUMAN RESOURCES, BURDEN OR ASSET

This is one of the key trends today. With rising salary levels all over the place nobody can stay competitive just by adding more people to the process. It may give a temporary boost if labor costs are real low, but eventually salary levels do even out to a degree.

In Finland salary levels are fairly high, but this is not **the** issue for our manufacturing industry. As I pointed out in previous section # 3, there are so many areas that need to be looked over and optimized that cost of human labor is not the deciding factor in most of the cases.

Mr. Matti Alahuhta, new Chairman of the Confederation of Finnish Industries made some good remarks in his first interview in this new position in November 2014: “For the next decades

digitalization will change our world, and robotics will bring a lot of opportunities. Labor costs between continents will even. All this progress offers us a lot of opportunities as long as we are willing to change!” In the same speech Mr. Alahuhta also noted that Finland does not necessarily need to lose industrial jobs. He sees that digitalization provides us one of the biggest opportunities.



Figure 2: Robotics and automation are must for Finnish manufacturing industry in order to be competitive while labor costs between continents are evening out.

What Mr. Alahuhta says in his statement has already started to happen in some areas. For example U.S. manufacturing companies have started to bring operations back to U.S. according to Boston Consulting Group. (<http://news.yahoo.com/manufacturing-moving-china-us-survey-065217238--finance.html>)

So Mr. Alahuhta is very right with his statements! What does all that mean for our manufacturing industry? Here's the main lesson:

USE HUMAN LABOR FOR VALUE ADDED EFFORTS ONLY!

This means that we should only use people for the tasks where every time they touch products they add value to them. Everything else can and should be automated in order to be competitive. Does this mean reduction of manufacturing jobs in Finland? Yes and no, depends on how we execute things. Lets look at both answers a bit closer:

YES, we will have less jobs if we just automate things and replace humans with machines without further planning and modernization of our plants and

operations.

Absolutely NOT! If we modernize our manufacturing capabilities and address all areas mentioned in section # 3, we will become much more competitive. This means better sales, more export and bigger demand for the goods we can manufacture. All this will add on as more manufacturing jobs.

Lets look at an example to close this chapter. Valmet Automotive (Uusikaupunki) has modernized their manufacturing capabilities, built full MES (Manufacturing Execution System) and eliminated “Excel driven” execution. On top of that they have built a 200 robot “army” to handle automated parts of their car manufacturing operations. Has this resulted in reduction of workforce or

manufacturing jobs? Absolutely not! Valmet Automotive is making more cars today than ever before due to their modern, very competitive and quality focused capabilities. They have added 600 more jobs right to the production floor despite all robotics and modern systems they have. This is due to work being done these days in 3 shifts in order to meet their customer's demands. In the past they had 1 shift with 300 production floor workers. Now Valmet Automotive runs Mercedes Benz A class production in 3 shifts with 300 people working on each one of them.

More competitive you make your operations, the more jobs you will create!

5. ACT IMMEDIATELY – LEARN CONTINUOUSLY

In this chapter we will drill a bit deeper into the act immediately attitude vs. rear view mirror approach mentioned in chapter # 3.

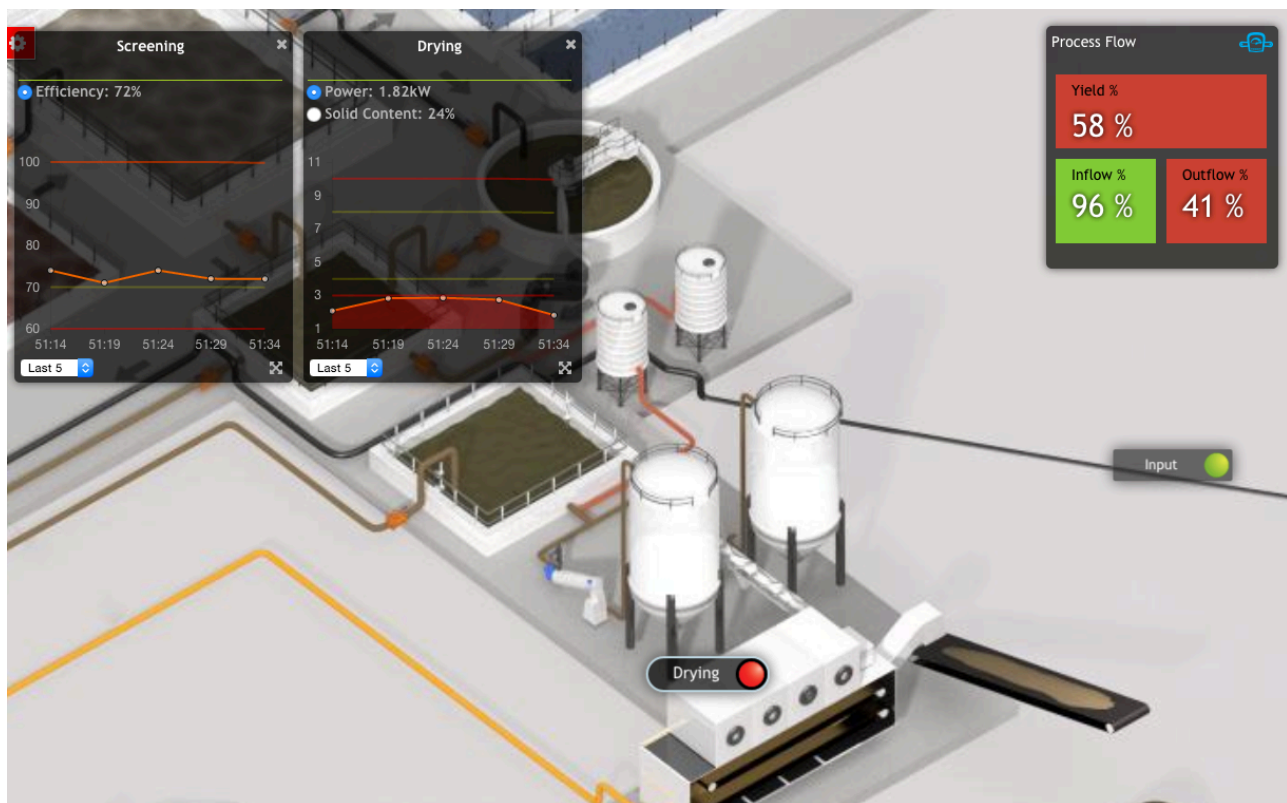


Figure 3: Example of clear indicators when process is out of it's parameters and needs immediate action

Before we can change an operation to act immediately mode there needs to be a structure in place that will support that approach. Lets look at a few key components of that needed structure:

- ✓ Data/Information – Decisions need to be data/information driven. This is not a problem in todays manufacturing industry as almost all needed information is available readily and in most cases also automatically. Data can be extracted via system from metal cutting robot cells or any other robotics or equipment that are integrated into MES. Some data also needs to be

keyed into the system by operators, but in order to be effective this should be limited to the areas where it is not possible to do this automatically.

- ✓ System – As mentioned earlier modern manufacturing needs system to orchestrate the whole operation instead of humans planning and managing processes with Excel.
- ✓ Processes – Now that we have data and system to support operations we need to define the processes and their parameters.
- ✓ Operating procedures – This last step defines what will happen when any process is outside of acceptable defined parameters. There needs to be an indication by the system that calls for immediate action and also gives digital documentation for the best practices in each of the cases / incidents. System will also clock the time needed for solving each one of the issues and forces operators to indicate how the issue was solved. This gives company a great asset when comparing similar problem situations between different shifts or facilities. Digital documentation and system allows best practices to be kept up to date at all time and organization is in continuous improvement & learning mode.

6. AT “IOT MAP” IT’S A LEVEL PLAYING FIELD FOR OUR COMPANIES

Industrial internet offers our manufacturing industry huge opportunities and takes away a lot of our distant location disadvantages.

The more value added and expensive products company makes, the less the location matters. Via IoT integration almost any manufacturing operations in Finland can be tightly integrated to the operations anywhere in the world.

As an example Valmet Automotive operations have been integrated via IoT solution to Daimler so that customer sees the manufacturing status of all car bodies at Uusikaupunki from 5 selected stages of the process in almost real time. This makes operations real transparent and builds trust between the factory and its customer.

Our remote location has made it quite expensive to support our products at various parts of the world, but IoT has leveled the playing field in this area too. Actually we should say that it is giving Finnish high-tech companies competitive advantage as now our high level of technology and capabilities to utilize it is opening several new opportunities. We are constantly building smarter systems with remote data collection and remote services. It does not matter where our equipment and headquarters are as long as we can connect them via IoT and provide our customers more intelligent solutions that provide them better ROI (Return On Investment).

However this change to create additional service businesses based on the data collected via IoT solutions requires some changes in our Finnish attitudes. In the past we have been so focused on selling just our equipment’s, machines etc. that everything else has been created to support those sales. Now these new services are also real products that have great value to the customers. We have to understand that business structures are changing and as an example when we sold machinery in the past, we did not see much more revenue for years to come than just spare parts. Now we can sell

the same machinery and good ongoing support, optimization etc. business for years to come. These revenues will be significant to keep our industries competitive and manufacturing jobs in Finland!

7. MODERN FACTORY VS. EXCEL DRIVEN OPERATIONS

I wanted to quickly touch base on this topic as well as it is a major trend today. Majority of our manufacturing industry is still running their operations with manual processes based on plans on Excel spreadsheets.

During the past year I have seen several examples of this type operations all the way to plants with +300 production floor employees performing their tasks based on Excel plans. This particular company even had a department where 3 people were dedicated in excel creations for various needs of their manufacturing operations.

Imagine the room for human error etc. and wasted time, efficiency, scrap, fire drills etc.

Today's modern factories take their data and recipes from company's ERP, forecasting / demand planning system and it goes directly to their MES that controls all of the functions at the production floor, automated and manual steps. Once production is done, MES will push the ready made products to company's warehouse etc. logistics system.

MES the system will tell operator immediately what is the optimal production schedule, what can be done, what does not make sense due to the lack of raw materials etc. Basically the system will optimize the utilization of the production, minimize any downtimes etc.



Figure 4: Data driven operation where immediate action is based on real time facts resulting in efficiency

8. “TRAFFIC LIGHTS” TO GUIDE ACTIONS

Last main point addresses the issue of visualizing the system and its guidance. If people have to read long spreadsheets and analyze those themselves, results will be all over the map. Modern factory will have well defined processes and parameters. With those in place we can make operations management real clear to any level all the way from the individual machine operator to production manager of a plant or global production manager looking over several operations around the world.

This will be achieved via clear traffic light type signals. If you process is out of its parameters and requires attention, red light will be on and forces you to action. Red indicator will be on until the issue has been solved and data supports it.

Then on the hand when everything is working within the parameters of the processes, all indicators will be on green and all parties know that operations are running as they should.

This approach helps to drive immediate actions and instead of seeing from the report that there was a lot of waste in production the previous day or week, operator can and will now take immediate action and minimize than waste before more has been produced / caused. Naturally the same goes for production speed, efficiency, quality etc...