Flow Production: a target for today's Manufacturing Industry

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By Carlo Scodanibbio

Imagine going to a restaurant for dinner, not knowing that this particular restaurant is geared for "batch production", in other words that the kitchen is organised to prepare food "by the lot".
What would happen is something as follows:
Waiter (after you have been snooping through the Menu for 5 minutes): ".....Well, have you decided, Sir?"
Customer: "Yes, I fancy your Tortellini Alfredo as a starter, and then...."
Waiter (interrupting): "I am sorry, Sir, but tonight we do not have Tortellini, we only have Spaghetti ready - however, if you are prepared to wait for a while, until some other customers pop in and order Tortellini, than may be our Chef will cook them as well..."
Customer (rather surprised): "What do you mean? If you have Tortellini in your Menu, I don't quite see why your Chef should wait for other orders to come before he cooks Tortellini...."
Waiter (very professional): "Sir, let me explain to you: our Owner is a very cost conscious person. He likes efficiency throughout, of which we are very proud. Surely, you will realise that approximately the same amount of time and water and gas is needed to cook Tortellini for one or Tortellini for six. Well, we have decided long time ago that we would go for a minimum batch of six in all our Pasta dishes, in order to achieve optimum efficiency. Besides, in this way, we can afford to have only one person in the kitchen, so the saving in manpower is tremendous. Should we go for individual orders, we would need at least another cook, and possibly also a junior to help out.... You see, we do not like to pass extra costs onto our Customers, that's our principle, and that's why tonight there are Spaghetti ready in our kitchen store. Can I get you some lovely Spaghetti Bolognese warmed up in our microwave oven?"
Customer (ready to blow up): "But, wait a moment, assuming your cost saving issue is right, why do you have to warm up my Spaghetti in your micro ?
Waiter (a bit annoyed, but still professional): "Sir, more than half an hour ago, a few customers came in, and the three of them agreed to have Spaghetti Bolognese. Our Chef had gone for the usual batch of six, so now there are three portions of Spaghetti in the store, ready 'off the shelf', but obviously you won't like cold spaghetti, will you? - and it only takes one minute and thirty seconds to warm them up, how is that for speedy service?....."
Customer (boiling): NO, thank you, I don't like cold nor warm Spaghetti, in fact I don't like Spaghetti at all, I hate Spaghetti..... in fact I don't even want Tortellini anymore, I'll rather go next door for a Pizza...."
Waiter (paternalistic, but still professional): "As you like, Sir, good evening, Sir, hope to see you some other time...."

Amazing, isn't it? But something very similar has been going on during the past few decades in many sectors of the Manufacturing Industry.
Many Manufacturers have adopted a simple philosophy, in production:

- Manufacturing is the business of producing goods
- Products must be good, cheap and delivery must be reasonably fast
- Efficiency can be achieved through "large lots" production, which brings considerable cost savings
- Factory Management determines Production capacity and Production Schedules, according to estimates
- Profit is something that comes "naturally" out of the manufacturing and marketing process

This philosophy has been well rewarded for long time, and well accepted by the market.
In the past 2 decades, and specifically in the past few years, something has been changing in the market, a sort of silent revolution has taken place. Customers are not the same anymore, they have become "strange". For many reasons, most of which very difficult to understand, they seem to adopt more and more a different approach: they want the goods they need, in the quantity they want, with the quality they want, in the time they want, and at the price they are prepared to pay.

How have many Manufacturers reacted to this revolution? Simply taking the immediate measures they considered adequate:

- They have increased their efficiency investing in sophisticated technology: huge, expensive machines able to turn out products faster and in larger lots
- They have coped with the higher demand for quality introducing a squad of Quality Inspectors and sophisticated Quality Control Systems, with the aim of stopping defective goods from being passed to clients
- They have reacted to faster deliveries demand making their finished products warehouses larger and larger, trying to offer "off the shelf" goods availability and speedy service

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But also these measures now seem outdated. What many Manufacturers have not realised is that the overall market cake has not grown much larger, while the variety of product has.

Due to hot competition, due to higher quality awareness, but mainly due to everybody's different and subjective interpretation of the "quality-of-life" concept, the market is now flooded by a tremendous variety of products, with an enormous range of optionals and personalised accessories - and still clients want "what they want and how they want it".

In this tricky chicken-and-egg situation, many manufacturers have been caught in badly.

Their technology seems more and more unable to cope with such a diversified demand, and those bulky, expensive machines do not seem to be the best to run fast smaller batches of diversified products.

Besides, overall efficiency has in fact decreased due to more sophisticated waste proliferating in each corner of their factory, often very close to the expensive, sophisticated machines.

Their quality Control system has, in many instances, just managed to reduce the number of defects passed onto clients, but at the expenses of a "black" store in which defective goods, rejects, second class products and degraded components stockpile to the ceiling.

And the large warehouse, designed to despatch products faster to the market, has not only started to grow a new breed of unusable products called "obsoletes", but has also become a thicker wall between the manufacturer and customers' needs.

In conclusion, many Manufacturers who, like our Restaurant's Owner, have become more concerned about their internal efficiency, with the best utilisation of their sophisticated equipment and with their production planning schedules than with real Customers' explicit or implied expectations, are now having rough times.

The answer to the problem exists, and is called **Flow Manufacturing**, the heart of Lean Manufacturing.

Flow Manufacturing, as the name suggests, is a way of producing goods in a "stream" fashion, with materials and work-pieces "flowing" smoothly, regularly, inside the factory while becoming finished products in the productive process, and flowing again, without interruption, to the natural outlet, the market.

To perfect the similitude, rather than visualising a stream, or a river, in which the flow of water is driven by gravity, one should try to visualise a pipeline with a pump positioned at the pipeline outlet, sucking water out of the pipeline: this meaning that it is the market (our pump) that determines how the flow (the production style and capacity) should be in the pipeline (our Factory).

What does this approach imply? A few revolutionary consequences:

- Production (with its rhythm, style and capacity) is not anymore "pushed" by Management through the Factory and to the Client, but rather pulled out of the Factory by Clients' needs, like at a (good) Restaurant table
- Seller's Market time is over - today it is a "Buyer's" Market
- Profit is no longer a conventional benefit, attached to manufacturing: profit is to be earned through hard, intelligent work
- Products must be exactly what Customers want, and they must be delivered as they want, with the quality they expect, when and in the quantity they want - Manufacturing is no longer the business of producing goods: Manufacturing is a Client-Oriented, Service Industry
- Production is to be considered more and more "wide-variety, small-and-frequent-lots" type, as Clients wish
- Manufacturing Time should become closer and closer to Selling Time
- Nowadays' Customers are prepared to pay only an amount corresponding to the right "value" of the goods supplied, and therefore the Manufacturer's Selling Price must be very close to that "value"
- This dictates that true efficiency must take place in the Production Process, as Customers are less and less prepared to subsidise Manufacturers' internal waste

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The waste issue fits the missing piece in this puzzle.

In any production process there is waste.
Any useful component and material add value to a product, as any useful productive operation does. Unnecessary components, that do not serve any purpose in the finished product, do not add any further value to it. And the same applies to any wasteful operation.

Where does waste hide in a Factory?
Waste is found in any operation that disrupts the normal, regular, smooth flow of materials through the Factory, thus causing turbulence, back-flow and stoppages to the flow itself. And those same wasteful operations do not add any real value to the product/s being manufactured. Examples?
Storing, piling up, picking up, laying down, counting, checking, moving, handling, positioning, idling, waiting, transporting, conveying, inspecting, degrading, declassing, repairing defects, re-working, changing production, setting up machines for production, plant break-downs, plant working at reduced speed, searching for tools, dealing with accidents, duplicating efforts, passing the buck..... and dozens more.

Flow Production is the Discipline that deals with waste and fights it to death.

In fact, if production can be transformed into an easy flowing process, without any interruption between value-adding operations, most definitely the bulk of the waste would be eliminated.

Quality should be "built-in" the productive process by multi-skilled workers, capable of handling reliably multi-process operations.

And Manufacturing time would be so close to Selling Time that no finished product warehouse would be necessary. Products would be produced so fast that Clients would be really pulling them out of the Factory's final assembly lines. And those lines would pull components and sub-assemblies out of upstream processing lines, and so on.

This is Flow Production, a manufacturing "style" and "mentality" aimed at reducing internal waste to such a bare minimum that the resulting productive process becomes so "slender" (Lean Manufacturing), so "flexible", so receptive to Clients' needs that it really flows like water in a pipe.

The target is both very challenging and very difficult, to say the least. Still, many Manufacturers, and not only in Japan, have succeeded in getting very close to Flow Production.

What does their experience say? Implementing Flow Production requires time, guts, techniques, efforts, and a tremendous amount of creativity.
But the main obstacle to overcome is and always will be "resistance" from people to the change in mentality that such a project dictates.

Because Flow Production is made, like anything else, by men.

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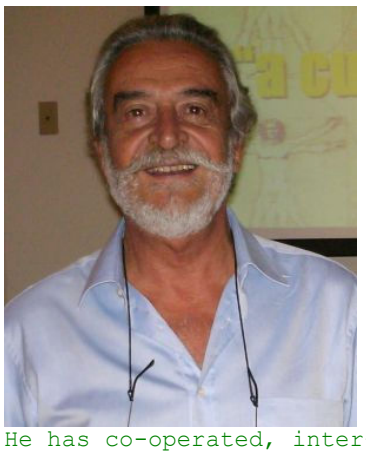

Carlo Scodanibbio, born in Macerata (Italy) in 1944, holds an Italian doctor degree in Electrical Engineering (Politecnico di Milano - 1970).
He has over 38 years of experience in Plant Engineering, Project Engineering and Project Management, as well as Industrial Engineering and Operations Management.
Free-lance Consultant since 1979, he has worked in a wide spectrum of companies and industries in many countries (Southern Africa - Italy - Cape Verde - Romania - Malta - Cyprus - Lebanon - Mauritius - Malaysia - Kenya - India - Saudi Arabia), and operates as an Independent Professional Consultant and Human Resources Trainer to industry.
His area of intervention is: World Class Performance for Small and Medium Enterprises in the Project, Manufacturing, and Service sectors.
His favourite area of action is: the "lean" area.
He has co-operated, inter-alia, with the Cyprus Chamber of Commerce, the Cyprus Productivity Centre, the Malta Federation of Industry, the Mauritius Employers' Federation, the Romanian Paper Industry Association, the United Nations Industrial Development Organisation and the University of Cape Town.
His courses and seminars, conducted in English, Italian and French, have been attended by well over 13.000 Entrepreneurs, Managers, Supervisors and Workers. They feature a very high level of interaction, and are rich in simulations, exercising and real case studies. The approach is invariably "hands-on" and addressed to immediate, practical application.