

BEYOND FLEXIBILITY: THE AGILE ENTERPRISE AND MANAGEMENT

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INTRODUCTION

Things keep happening faster and faster. The technology alternatives we have for our products and our manufacturing processes continue to grow at an increasing rate. In some markets this already means a product bought six months ago costs more than a better featured product available today. Soon this will mean that a factory built last quarter cannot compete in cost and quality with a factory built next quarter.

Though market globalization is still in its infancy, we are moving rapidly from a barely industrialized world to one where an improved standard of living is becoming the focus in all countries. The Eastern Bloc and China offer two new and immense potential markets - but at the same time they are also adding significant competition into the global marketplace.

CHANGE IS HERE TO STAY

A rapid and continuously changing environment is the emerging competitive enterprise arena. The nature of eminent change in technology, markets, customer expectations, and competitors is quickly becoming impossible to predict.

Many companies will soon find themselves in a constant reaction state - buffeted by events they had not foreseen. They will be no match for the new competitor.

The new competitor will be the enterprise that thrives on continuous and rapid change. The principal characteristic of these successful enterprises will be agility - the ability to move fast in all ways. An agile company maintains leadership by constantly introducing improvements to its own markets, by instantly seizing unexpected opportunities, and by rapid and decisive response to unforeseen threats.

The principal impediments to change are structural in nature, and generally form the architecture of such "systems" as the organizational hierarchy, functional business unit interaction, corporate decision making process, customer/company relationship, MIS software, plant control software, process hardware flexibility, even business relationships and the process that develops them.

These systems must be restructured to allow decisions at the point of knowledge, to encourage the flow of information, and to foster concurrent cooperative activity.

Agile companies will be asking questions that illuminate the impediments to change: How fast can you restructure a plant for new product? Can you safely improve your process control software on a daily basis? How many signatures are required to approve a product idea? How long does it take from concept to product delivery? How often do you partner with others? How long does it take to hammer-out a partnership arrangement. How much is invested in employee asset development?

AGILITY DEFINED

An agile enterprise is one which can quickly change a broad range of operating characteristics in order to maintain its leadership position, take advantage of unanticipated market opportunities, and respond to unexpected competitive threats.

To be this nimble, it is free from structural impediments that would impede daily continuous change as well as major reconfigurations in operating plans, business relationships, organizational structure, enterprise information systems, production control, and product processing systems.

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- **Knowledgeable and empowered workforce.**
 - **Systems integration methodology that accommodates change.**
 - **Information infrastructure linking customers, marketers, designers, producers, and suppliers.**
 - **Visionary management focus.**
 - **Closely cooperative business relationships.**

IMPORTANT AGILITY ENABLERS

All this talk about agility doesn't grow from thin air. A large and rapidly growing number of organizations in the USA are engaged in a process that has pinpointed agility as the principal competitive enterprise strategy for the 21st century. This process began in the summer of 1991 at Lehigh University's Iacocca Institute with a core group of thirteen companies, and has grown to include over 150 at this writing in February 1992.

As this growing cooperative activity of defining, benchmarking, and building an infrastructure for agility continues, an Agile Manufacturing Forum is being established to facilitate the ongoing consensus-building process. As this discussion here can only scratch the surface, I encourage you to contact the Iacocca Institute to obtain copies of the two volume report entitled "21st Century Manufacturing Enterprise Strategy" and information on the Agile Manufacturing Forum.

KEY ELEMENTS

A key element of agility is this concept of the knowledgeable and empowered workforce. This is a major contributor to agility because it allows decisions to be made rapidly at the point of maximum knowledge. It also encompasses the concept of a fluid organizational structure free to reconfigure quickly as needed. Additionally, however, it must be noted that agility cannot exist without these very same fundamentals applied to the corporate computer support infrastructure - which already exists, is ubiquitous, and defines the corporate entity every bit as much as the human elements.

Together, these two areas are the principal cornerstones of agility: human interaction structures and computerized support structures. If either cannot be changed continuously or reconfigured quickly, agility cannot exist. These two areas are also today's biggest impediments to agility - both have an established and traditional structural approach that is extremely difficult to change.

For instance: A company with little or no concurrent engineering may look upon a computerized information link between engineering and manufacturing as a major improvement. However, it is a mistake to think that this information link contributes to agility. Implemented with today's standard

approaches this will lock in (for all of time thereafter) a well-defined but limited information exchange that will be the antithesis of agility. In other words, if the link is done wrong, the company is more agile without it. Those companies that have already provided such links will be even more difficult to make agile - today's integration methodologies erect a great deal of inertia to change.

ON TECHNOLOGY-BASHING

Software has become an integral part of the enterprise operating characteristics. It is playing a real role in running our factories, controlling our processes, supporting our decision makers, measuring our performance, connecting us to our customers and suppliers, and augmenting our product designers. Software systems and integration technology is at the very core of the corporate architecture.

Today it is unpopular to offer technology as a solution to our competitiveness problems. Popular thought is focused on people and organization and method. For sure, we have much to do here - however, when it's done it will still be glued together with software and integration technology.

Unfortunately, too many of today's top managers are computer illiterate - even phobic. They do not realize how pervasive the computing infrastructure is in their own companies. Nor do they realize how inadequate it is.

We have too many managers focused solely on learning the lessons the Japanese wrestled with last decade. We do have to learn these lessons - but we don't need to stop advancement while we do so. Some companies have allowed themselves to be side-tracked while they "go back to school".

AND NOW JAPAN'S IMS INITIATIVE

In the meantime, with their Intelligent Manufacturing Systems initiative, the Japanese are now focused on integration technology as the next area for major advancement. They think that a completely different approach to integrated systems architecture is required - one they refer to as "holonic". Holonic systems are basically composed of autonomous modules that are self scheduling, yet cooperate to achieve the common goal. In the USA we often refer

to these structures as "object oriented".

Systems structured this way allow modules to be improved, modified, or even replaced with little risk of hurting the overall system. They exhibit a great deal of robustness when certain parts of the systems environment do not perform as desired or expected. They can be restructured quickly. They can accommodate increased capacity requirements easily. In short - they exhibit all the characteristics of agility.

CONCLUSION

I am concerned when I see key managers in some of our major corporations turn their back on hard technology. Technology alone is clearly not the path to competitiveness - but neither are human factors, reorganization, and new methods.

What is clear is that things continue to change. If we fail to keep up with technology changes while we catch-up in the other areas, we will find ourselves playing catch-up on all fronts.

The key point about agility is its range and rate of change accommodation. This is what distinguishes it from mere flexibility.

Our international competitors have developed a reasonably agile human-factors approach and are now focusing on some of the technology issues. Here in the USA we appear advantageously positioned to take advantage of this new paradigm more so than others. Provided, of course, that we consciously decide to do so. To find out why and how I must refer you to the reports referenced below.

REFERENCES

- [1] "21st Century Manufacturing Enterprise Strategy, Volume 1, An Industry-Led View", Iacocca Institute, Lehigh University, 200 Packer Avenue, Bethlehem, Pennsylvania, 18015, 215-758-5510.
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ABOUT THE AUTHOR

Rick Dove co-chairs, along with Dr. Roger Nagel, Operations Director of the Iacocca Institute, the industry-led 21st Century Manufacturing Enterprise Strategy project. The project is facilitated by Lehigh University's Iacocca Institute and has developed a vision for competitive enterprise, defined an infrastructure to support the vision, and is building a national consensus for action. Rick is also Chairman of Paradigm Shift International, a consulting firm established to facilitate the process of vision-based internal corporate change. He has been a founder and top executive in various start-up and turn-around operations, and recently was CEO of Savoir, the software company that introduced distributed-control factory CASE tools. He has also been Chairman of the National Center for Manufacturing Science's Technology Review Board.