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INDUSTRIAL AUTOMATION & PROCESS CONTROL

JUST HOW BRITTLE IS THE ECONOMY?

Consider the lowly shipping container. For decades, the shipping container has defined the transportation industry. The same container can go on shipboard, on trucks and on trains and even airplanes—therefore, intermodal.

Intermodal containers made it possible for goods to be shipped from one part of the world to another without transshipping and breaking shipments down into component parts and re-shipping. What this did is to make a circulatory system made of containers for the global economy. Each container is like a red blood cell for commerce.

Unfortunately, the global economy is like a body, and it is very stressed and not in the best of health. Since 1945 the global economy has been based on the widely held belief that commerce should not be highly regulated. Passage between countries ought to be free and untrammelled and tariffs, if any, should be relatively low. But this is just a commonly held belief. And the problem is that beliefs are not infrastructure.

We have discovered that issue about belief substituting for actual legislation before. The attempted authoritarian takeover of the United States on January 6, 2021, was an example. “Nobody would attempt a coup, it’s unthinkable!” just isn’t a substitute for structurally eliminating the possibility. Many countries from Brazil to Israel to Hungary, and always Russia and China, have shown that a willingness to explore the holes in “generally-agreed-upon” beliefs can be relatively easy.

For most of the last 100 years, the military of the United States, especially its Navy and Coast Guard, has backed up the commonly held beliefs about global commerce. This is not to say that the US has been alone in this. Many other countries have assisted the US in this goal. Basically, since the end of World War II, most nations have worked hard to eliminate piracy and see to it that global commerce is as untrammelled as possible. Recently, several Western leaders including US Secretary of Defense Lloyd Austin have been pointing to the rapid and extensive buildup of the Chinese naval forces as a seriously destabilizing move with reference

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to the global economy. The point, Austin indicated, was that a highly over-strength Chinese Navy could with near impunity interfere with commercial shipping in the South China Sea and elsewhere in Southeast

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Asia. A blockade of Taiwan or Japan, or both, comes to mind. And absent firm international treaties armed with sanctions as teeth, China can do this if they want to. The strength of the US military and its allies has been used to see to it that China does not want to.

This is just one of the major potential breakpoints for global commerce and the global economy. Increasing nationalism is another as extreme nationalist parties, such as in France, Hungary, Italy, and others have been elected to power. As the exit of Great Britain from the EC has shown, economic stability is only a brittle crust.

The elephant in the room is the invasion of Ukraine by Russia. This is not a “police action” or a small territorial expansion. Based on Russia’s attacks on civilians and civil infrastructure this is an outright attempt to eliminate Ukraine as a nation. This absolutely shows that the belief in a civil global polity is not even a pipedream. Any country at any time can destroy another, or even many others. The most current threat is Russia’s announcement that it will be moving tactical nuclear weapons into Belarus.

We have seen the global economy brought to its knees by pandemic. Now we are seeing the effects of warfare between two developed nations. We are seeing increased damage and destruction by weather events all over the world.

The global economy, and with it, global civilization as we know it, is extremely fragile and can clearly be destroyed in a few years. As a futurist, I can only point out what is going on and what the end result of this instability will be.

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It is becoming more difficult to attempt to be optimistic about the future.

O-PAS?

Years ago, I attended one of the earliest Ignition Conferences put on by Inductive Automation. Steve Hechtman, founder and first CEO of Inductive Automation, was talking about the Ignition software being modular and much like an Apple app.

I realized that Steve had foreseen the future of process automation software. Back in 2000 or so, automation software was either designed for proprietary PLCs using a form of ladder logic programming, or it was monolithic software which had its roots in proprietary minicomputers that was just after being ported to the relatively new Windows microcomputer platform.

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I started talking about this beginning with a board meeting of the Smart Manufacturing Leadership Coalition (later to be CESMII). I even wrote a book with Dr. Peter Martin, then of Invensys (later Schneider Electric) in which we described what future software for process or industrial control systems should be.

Here's the high points the process control software of the future requires:

The architecture of the software should be modular.

Software from the major automation vendors was monolithic in nature. If you wanted one part of the program, you got to buy all of it. This, of course, was a sales and marketing decision on the part of the larger vendors which was intended to capture a customer and hold that customer captive for a very long time, or maybe forever. This caused the creation of unwilling and unhappy customers. As patches became more and more common and necessary, the unhappy customers got even more unhappy as patching one set of code in the monolith often caused other parts of the huge programs to break. Since each version of software was proprietary, there were no

Applications:

- **Modular**
- **Common substrate or platform**
- **Self-contained and discrete**
- **Intrinsically cyber-secure**
- **Anyone can make one**

common application program interfaces (APIs) to make it easy to re-write a section of code without problems with adjacent code, or even far distant code.

The architecture needs a common substrate or platform.

The automation and control software of the future needs to be built on a common platform. Very much like an operating system, this substrate should be able to provide all the required connectivity and services to any and all applications. When the substrate requires updating or upgrading, it should be compatible with all applications that are running above it. The common substrate must not be controlled by any of the major software vendors.

Applications must be self-contained and discrete.

The functions of the old-fashioned monolithic software systems can be broken into self-contained application modules. Each of them can be individually written, updated, and used. If a module isn't needed, it needn't be installed. It can always be installed when needed. Not only process control or discrete control applications can be done this way, but also applications like

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CMMS and work orders and calibration can be added on to the same substrate. So too, as Dr. Martin and I pointed out, should financial control software at the process level. Only then will plants have all the tools they need to become agile.

Applications need to be intrinsically cyber secure.

Because applications are entirely self-contained, it will be easier to make them cyber secure. Also, breaking into one application should not permit breaking into others like a daisy chain.

Applications should be designed to be produced by anyone.

The applications should be based on a generally available API and a public SDK. Anybody who wants to create an automation or process control application should be able to do so. This means, of course that there needs to be a testing and validation process and a marketplace for users to acquire applications.

For a decade, Exxon/Mobil and some others have been working toward what they call O-PAS, an open process automation system. It surely seems that O-PAS could be used, or modified to be used, as just this radical new software architecture for both process control and discrete control in automation. We will have to see what O-PAS becomes.

INDUSTRIAL STORYTELLING, PART SIX

Famed late Nineteenth and early Twentieth Century retailing mogul John Wanamaker once remarked, “Half the money I spend on advertising is wasted. The trouble is that I don’t know which half.” This is getting harder and harder to agree with now that there are many tools for determining ROI from marketing.

We can track individual buyers and specifiers. We can track open rates for emails. We can personalize and customize our offers and website pages for the person viewing them. We can, with the assistance of qualitative marketing research, even discover the deeply felt “why” people purchase specific items. And we can calculate return on investment accurately and scientifically.

So why is it that company leadership continues to insist that when a turndown happens in the marketplace, the first thing to cut is marketing?

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In 1929, the McGraw-Hill Company did a survey that showed that companies that did not cut advertising and marketing in a recessionary economy rebounded from the recession or depression almost twice as fast as those that cut marketing to “reduce costs.” The survey showed that not only did those companies rebound faster, but they also achieved more growth by nearly half.

So, we have known since 1929 that marketing is essential to growth and since about 2000, we’ve been able to count that growth. Except that companies don’t seem to see that. When the word “recession” is spoken, companies panic and start chopping heads without clearly understanding that those heads have a long-term cost that far outweighs the immediate short-term savings in salaries and benefits.

Now, companies are so spooked by talk of a recession following the Great Pandemic that they are letting thousands of people go. While a few *might* be deadwood, the majority of them are high functioning contributors to creating value. There may be places to cut the budget in any company, but marketing is one place where management should tread very carefully.

After all, Wannamaker said half of his marketing worked, but he didn’t know which half. If you cut marketing today, you may be cutting the half that worked.



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