Understanding the Future of Information

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Most of us have a feel for what information is, how it has become critical in directing our lives, how we are challenged in working with it and mostly how to manage it so we are able make sound judgements. We are unlikely to think of information as an obstacle to progress, that the very future of it might even reach an overwhelming level and require elements of social change to deal with the growth, complexity and management of it. I want to share my ideas about information, how it has reached critical mass and what are the necessary changes; which while based in the past and even present, provide the clues that are the key to imagining what the future could be.

How does one define information?

We are told we are living in ***The Information Age***, or lately, ***The New Media[1] Age*** which has gained favor as a result of technological advances; especially the Internet. So perhaps more appropriately we live in the ***Digital Information Age*** since we have developed our thinking to have more of a global view through communication methods, especially social media. One could also conclude that we are really only at the beginnings of this age and certainly as we gather and absorb information, our need for more, even our demand for more continues to rise disproportionately to our ability to absorb it.

With technology we continue to answer the demand for growth, yet we are in turn faced with complex problems in how we deal with storage, delivery and even reliability of digital information. Is it too early to think beyond just accepting or coping with the complex issues?

As is always the case in any choices we might make, there are overriding technological and economic considerations that significantly affect our ability to answer complex issues without a better understanding of what is ahead. I would like to discuss and suggest ways to address both the problems and possible solutions as we start to imagine the future of digital information.

The growth of information, what is it?

First, we need to understand the effects of information growth. All of us sense the huge impact information makes in our lives and we can easily see how fast it is growing and the dramatic increases that are occurring. We need only look at the impact of social media; even the devices we carry on our person indicate rapidly increasing demand for more. We are prepared to make instant decisions based on real-time input of new information. What is driving our lives and our need to control so many aspects of it is a desire to experience information immediately and to react upon it. Even within industries we not only want to evaluate the information we have previously acquired, but we now expect to update our analysis capabilities by adding newly acquired or even real-time information into those processes.

[1] New media. (2015, September 16). In *Wikipedia, the Free Encyclopedia*. Retrieved 17:08, November 3, 2015, from https://en.wikipedia.org/w/index.php?title=New_media&oldid=681317111

Let me give you a hypothetical example of what I mean using the oil and gas industry. Since 1858; 23 million wells have been drilled worldwide. If we were to take just 100 million pieces of information from those wells, and process them, let us assume it will take us "one year". But, during that "one year period", another "one billion" pieces will be created from that processing. This will occur through other processes and through new data gathering; and, with the number of new wells that are anticipated in the very near future, several trillion pieces of additional information could easily be created.

While I use this example of the continuing increase in information, the numbers provide just a small perception of growth. In fact, given the rise in global acquisition techniques, increasing demand for more information and the yields that are possible in derived information, the reality more closely resembles an information tsunami rather than any predictable realizations. As the present day growth continues, we can also expect complexities to arise accordingly.

With growth we have to anticipate complexity.

Those complexities start with getting reliable and usable information into our information management systems. We recognize with massive amounts of data, individual industries, and businesses within each industry; and, even at the user level, we face daunting tasks to properly disseminate information. Within the diverse amount of information, what we individually need must be accessible, what others need must also be accessible and nothing can be lost or discarded because it cannot be easily recognized or delivered to the right parties.

The oil and gas example indicates how quickly information can exceed our ability to address it in a timely manner. Even as we try and cope with information we realize we are in competition, not only between businesses within an industry, but also with other industries that are also vying for critical resources; limited workforces, competing solutions, and especially the revenues with which to advance solution methods to tackle the growth.

Beyond complexity, the most difficult aspect of digital information growth for all industries is economics.

Coping with growth and complexity is enabled or suppressed by economic factors.

Consider what happens with competing industries like the Medical, Entertainment and Oil and Gas Industries. All three have immense investments in acquiring information, processing what is being gathered and acting upon the results in order to conduct their primary business models. However all three perform redundant work, develop duplicate solutions, and compete for the same talent and expertise to address them. This is true for all industries not just the three referenced. What happens when the economy of any industry fluctuates? A crisis is encountered and whatever gains and expertise have been created often crosses over to other industries or are completely lost.

A perfect example is the oil and gas industries' current situation. Oil prices are low and projections seem to indicate a continuing slump. Cash favored companies will soon be acquiring companies with attractive assets and cash concerns. Following this will be reductions in workforce which, in turn, results in transfer to other industries and loss of knowledge in our own. Information duplication will occur and

those issues will need to be addressed along with the assimilation of new data. Methods currently in place to deal with the new data have to be created and the remaining workforce has to find ways to cope. As this is occurring, competing industries benefit, absorb ideas and talent and move ahead until they too experience a slump and the process repeats.

I believe what we are observing today is an indicator of what we must do in the future to deal with the growth, complexity and even the economics of information. I also believe there is a way to achieve this and address those issues.

So how do we answer such overwhelming challenges?

I would like to share how I go about imagining the future and how some ideas work or can be adapted to counter complex issues and growing demand for increasing information.

I have been successful at using a "simple process" to help me think of how digital information will be handled. First, I apply what I know about my industry, how we have implemented technology, grown technologically and how we have adjusted our business models to be successful. Secondly, I review my observations about methods and ideas and how they work and have been successful.

Let me use the following to demonstrate how this type of process works.

There is ample evidence that entire industries have been created by observing current needs, recognizing pending demand and implementing diverse solutions to answer both. In the 1950's freight consolidation was a wide open business. DHL was just experimenting with smaller packages internationally. Out of this, FedEx recognized the immediate need and created a new business model and a new small package industry to address the future. Amazon recognized similar demands and matched technology with a new business model to create a whole new industry. This new industry has allowed point-of-purchase to be revolutionized by creating one-click shopping from anywhere.

To see how this is working today, we can use the cellphone as an example. Just think about how information is streamed into our phone. Somewhere there is a collection center or clearinghouse, if you will, which organizes information from many sources and determines the user and initiates delivery. When the information gets to the user, it is first screened and classified as a call, text, email, or something the user invoked to stream to it, such as a song or movie. Typically at the user level we identify the type of information, its importance and how we choose to react; first by caller ID, call blocking and then by ringtones. I find this remarkable; as we not only get information shipped to us easily, but it is quickly categorized and we get to prioritize it to fit our own immediate need. This to me is an observation of the present and how we might think about the future.

Now I consider the most significant part of the "simple process" I use is in understanding both what I know and what I have observed. Some call this "vision" but that makes me feel uneasy because I consider Steve Jobs & Jeff Bezos as visionaries.

Solutions are based in sharing.

Another way we can observe a way forward is to look at sharing ideas and solutions. This seems obvious; however, we have to recognize that businesses and even industries place high value on ideas and solutions, so the idea of sharing may again seem complex. But it is possible to find great examples of sharing. Researchers share information which supports the advancement of ideas. Academia encourages the publication of ideas to promote the advancement of scientific theory. Industry creates organizations and societies to accomplish the same through the creation of operating standards. The key to sharing solutions and methods relating to information is to recognize the common need. First there is a common need to manage the growth of information and second to address the complexity of gathering and disseminating that information.

Knowing there are industry ideas and solutions that put value in the information, we might expect that sharing would strive to address only those tasks which are common across industry boundaries. Much like the cell phone, information might arrive at a central clearinghouse, then be organized to make it deliverable and then delivered to an end user in an acceptable form with which to make decisions. Perhaps it cascades down to be processed and classified further by industry specific businesses. Thus information comes from differing sources and contains information which might not relate in any way with the other information, yet it is handled and passed down for more refinement until it is ready for the end user.

We focus solutions through bundling.

For me, the way to create this would be a kind of "Bundling" of ideas and methodology into a whole new industry. This new bundling industry would be formed by experts and technology from all the other industries they would support. The result of bundling would create universal solutions and products for those areas of common need and demand that cross multiple industry boundaries. This would reduce cost, cover economic fluctuation and stabilize the workforces needed to support cross-industry demand.

The principal benefit of a bundling industry would be to enable companies to concentrate on enhancing their business models and focus their attention and direction at core business needs and demands.

In looking at the present technology and imagining the future of those technologies, I have used my simple process to look at one of the challenges within the oil and gas industry. I pointed out earlier that 23 million wells have been drilled and that even the interim future indicates that more will be drilled. Events like what we are seeing in the auto industry with air bags and massive recalls happen in every industry and create new challenges which require reactionary change. In the oil and gas industry the blowout of the Macondo well in the Gulf-of-Mexico created a massive reaction with respect to drilling safety, processes to recognize potential risks and procedures for negating such risks. Uncertainty in well locations, especially wells that have already been drilled, provides potential risk and the impact is increased cost in determining risk at a time when workforce and cost reduction is also occurring.

However, I see the idea of bundling, combined with existing and emerging technology, as a way to offer a solution to both. We have seen two technologies advancing rapidly in the past decades. The Global

Positioning System or GPS satellite constellation was developed to provide high level accuracy with which to precisely track objects on the surface or in the air. The adoption of GPS into every facet of our lives has been astounding and far greater than most of us could have imagined. What we see currently is how satellite and aerial imagery are being advanced to identify visually where things are and how they relate to the information we are trying to evaluate. Google Earth currently shows us a world view, which can be zoomed in; to observe the areas we are interested in and even guide us through imagery and integration with GPS technology to specific places we might want to visit. That is a commercial example.

In other industries like military defense; homeland security and even infrastructure work, professional grade visualization is used to obtain highly accurate close in viewing at the asset level. Oil and Gas wells and other assets are examples in my industry that now require professional grade visualization. There is an emerging desire across many industries to fully integrate Earth observation with precise positioning. This change will be moving us from just observation to precise Earth visualization and in the future present, this will evolve to real-time information and true asset tracking; and, yes, this is just another example of pending growth in digital information.

With oil and gas we have an immediate need to classify the currently drilled wells, all 23 million, so that the actual uncertainty in location can be quantified and resolved to mitigate risk and lower costs. So how does bundling come into play here? Obviously there is the bundling of visualization and positioning technologies, not only current but past methods, with a focus in resolving location uncertainty. However, there is also the need to bundle the sources of the well location information into a clearinghouse that concentrates on resolving the location aspects of all the information associated with it; and, provides a deliverable back to industry. Given how the global industry is evolving toward more visualization, the deliverable should obviously be aimed at fitting into that future model. Yet we are not quite at the future, only observing it, so how does one move forward toward the future, but still cope with the complexities of the present?

In my observation, the answer is not to start resolving individual well uncertainty one at a time, but look at how industry is evaluating current information. Where are the existing exploration and development efforts focused? Regional plays give us the answer. Our present capabilities allow us to examine information not for a few thousand wells but from hundreds of thousands of wells.

In my own work, I am addressing location uncertainty by looking at regional plays as the stepping stones to getting to the future of classifying and resolving location uncertainty for all 23 million wells. I am bundling such diverse technologies as document management from the medical and legal industries, historical archives from the oil and gas industry, historical imagery from federal, state, defense and academia, satellite imagery from the global Earth observation industries, aerial imagery and sensor information from the aircraft and emerging drone industry. All these industries, along with my knowledge of location needs, have allowed me to see a way forward in creating a solution to the digital information problem by sharing ideas and bundling them with technology.

Challenge is answered through entrepreneurship.

The next aspect of envisioning the future is to add the enabling component of entrepreneurship. This is how the bundling process begins. The vision becomes a concept and an individual, a company, or a group of companies act upon the concept to identify the market or markets, the target industry or industries and how to enable the funding to create the solution. These principles are already in place and have been proven to work ranging from regional needs to global requirements. As we all think about the future of information, we see ample evidence of growth beyond our ability to handle it, we see an ever increasing advancement in technology to satisfy the demand for such growth and we have proven methods for creating opportunity in business to address the complexity based on entrepreneurial leadership and development.

So what is the future of information?

As we move beyond the present and even interim future to the imagined future of information, there is one alarming problem which remains to be faced and is critical to our ability to realize a solution. We know that in order to compete at a continuing high level, to be able to keep pace with the growth and technological advances, our educational system has to keep pace with qualified workforce demands.

Our teachers and educational institutions have to be able to address the types of advances we are forecasting, not only with information, but in all aspects of all industries. The graduates at every level have to be positioned to be able to enter into our workforces with a better understanding of the technological changes that are happening. A balance of education must exist so that we draw upon all the talent that is available in order that the workforce is growing to match the increase in demands. Current studies show an alarming decline in qualified workforce and the impact that it has on gross national product is equally alarming.

I have presented my understanding about the future of information and a possible way to allow sharing, bundling and even a new industry driven by continuing entrepreneurial spirit to be a way to address that growth. However, we must realize that in order to achieve any successful result, we must provide ample and well educated people to carry out the concepts, ideas and solutions required. How we think about the future of information is closely bound to how we think about empowering everyone to be able to participate in enabling the future.