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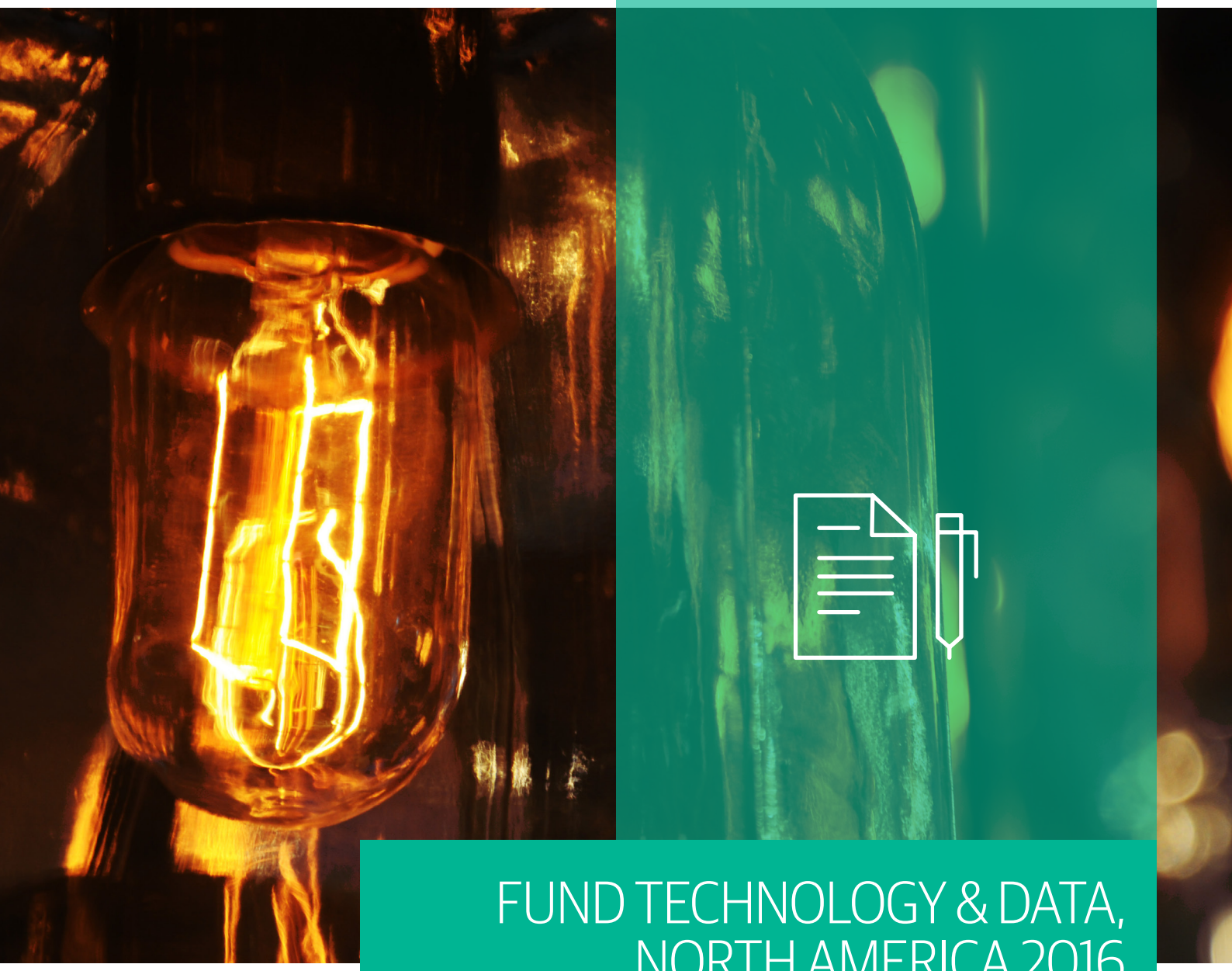

FUND TECHNOLOGY & DATA, NORTH AMERICA 2016

Exploring the latest innovations in technology solutions and application of data processes to manage your investment business through volatile and uncertain times

SEPTMEBER 2016

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2.1 WHITEPAPER

The potential of new technologies to ensure they meet business expectations and satisfy regulatory realities

Lisa Shea,
Senior Product Manager,
Northern Trust

SUMMARY

- *Business, compliance and technology partners need to work closely when formulating solutions*
- *Automated solutions require oversight and input from business and compliance experts*
- *Disconnects between business and IT can result in sizeable fines and can be avoided*
- *Truly successful innovation and change requires a focus on the future and not just the here and now need*
- *Data business owners can drive efficiency by understanding the points of intersection*

The investments industry is changing rapidly. The regulatory landscape is shifting. Distribution practices are evolving. Technology is advancing, and innovative solutions are being developed to address intricate problems. What, then, is the potential of these new technologies to meet the needs of the business, but also satisfy regulatory requirements? Are these two separate ideas, or should they be developed together?

The key to success is collaboration. In order to ensure that technology solutions meet business expectations and satisfy regulatory needs, it is imperative that business, compliance, and technology partners work together to define the needs, understand the impacts, and anticipate the future direction when formulating solutions.

Consider the March 2016 Financial Industry Regulatory Authority (FINRA) report on digital investment advice. The emergence of robo-advisers has been a hot topic in the industry, and the ability to provide technology-based solutions to end investors allows for lower cost, lower touch options for investment advisers serving a broad client base. The concept is simple – investors input information into their tools, algorithms use data to provide either a sample portfolio or, in some cases, recommend specific investments.

The FINRA report reminds us that behind technology, there must be sound business logic and context as well as an understanding of the regulatory requirements. Regardless of whether or not a human being makes the recommendation, an investment adviser must satisfy its fiduciary obligation, and a broker must satisfy its suitability obligation to the client when making investment recommendations. The regulators simply don't allow a "set it and forget it" approach to investment advice; instead, advisers and brokers must continually monitor every client's financial circumstances, risk preferences, and personal circumstances. Because of the fiduciary/suitability obligation, someone with the right business expertise needs to be engaged with the development, implementation, and ongoing support of the technology. The report notes that firms should be able to explain to regulators "how the tool works and how it complies with regulatory requirements."

This illustrates the intersection of technology, business logic, and compliance oversight. Without all three working together, the tools can quickly lose their usefulness, or worse, can create regulatory issues.

The consequences of non-compliance with regulatory rules can be significant. Cipperman Compliance Services wrote in their July 11, 2016 blog about an enforcement action that was taken against a large investment bank "because programming errors resulted in the provision of inaccurate data to regulators over an 8-year period." The resulting fine: $6 million. Cipperman further notes that "a disconnect between the IT folks and the compli-pros can create serious weakness." This situation further reinforces the very real need to involve the right experts in all phases when developing solutions – from concept to design to testing to implementation.

A Catalyst for Change

Rather than viewing regulation as a burden, we should view it as an opportunity to rethink our approach to change.

Flexibility for the future should be evaluated when formulating any solution. If you select solutions for "now" but don't think about later on, you could find yourself spending more, doing rework, or having to start over again when things change. Things will change. The regulators will continually enhance rules and adopt new investor protections that will impact operations. Markets will evolve and new technologies will become available. Whether you are an asset manager, compliance professional, asset servicer, or a technology provider, it's important to look beyond the immediate need. The challenge: to build something that meets the needs of today, without creating limitations for the future.

"The challenge now is to ensure the correct data governance is in place with our clients to ensure the central database carries reliable and accurate data directly from the "owner" of the specific data points."

Let's consider the wave of regulatory proposals that have swept the U.S. industry as an example. It's easy to make the assumption that each proposal needs to be dissected in detail by people with specific expertise in order to understand the impacts and the requirements. The derivatives experts may not be the same people who know financial reporting, for example. While it is important to have subject matter expertise in the discussions, it is also crucial to include those who understand the overarching landscape and have a holistic view of the business.

The best solutions will look at not only specifics of a single rule, but the overall themes and trends, and how the rules may connect or intersect. Investor protection and risk mitigation will continue to drive regulatory change for the foreseeable future, and will continue to drive the need for transparency of data and the ability to retrieve and report data from disparate systems for reporting. Understanding the points of alignment in the rules can help identify common data elements, and result in more efficient technology solutions.

Increasingly, we see componentized "tool kits" in the marketplace, designed to fit together to meet multiple needs. Integration between tools that are supported by the same technology firm facilitates ease of deployment, and in many cases can leverage the same set of data. To do this most effectively, providers need to go beyond niche expertise and look at the business holistically, including an understanding of both the business and compliance realities.

The concept crosses the U.S. border. If we look globally, the same regulatory trends are prevalent, and the same need for future flexibility exists when assessing solutions for business and regulatory challenges.

Lee Godfrey, Deputy CEO at KNEIP, a leading provider of reporting and data solutions, agrees. "KNEIP had found itself in a situation where we had several legacy systems running in parallel with synchronization between them to ensure data consistency. It meant, however, that whenever new requirements were needed, we either had to start from scratch, resulting in further synchronization, or worse, adapt multiple systems in parallel.

Hence, we embarked on an IT Transformation program towards an SOA architecture. We can now ensure data unicity for multiple outputs, and if new requirements are needed, we only need develop the "service" linked to the change. For Packaged Retail and Insurance-Based Products Key Information Documents (PRIIPs KID), which is a new UK regulation as of January 2017, we were able to use existing technology and only develop new features linked to the new regulation.

The challenge now is to ensure the correct data governance is in place with our clients to ensure the central database carries reliable and accurate data directly from the "owner" of the specific data points."

Mr. Godfrey raises a critical point that brings us back to the business. Data governance in itself is an aspect that is not to be underestimated. To ensure that tools meet the needs of the business, the business owners of the data have to ensure that it is either input at the source in the most accurate and clean way possible, or in the case of data points that are unique to the source systems, that all is mapped and interpreted correctly for classification and presentation in a usable way. Data stewards, then, have an even bigger remit – to understand what will be used where, what can be used in its original form and what needs to be normalized or translated, and what the ultimate use of the data will be.

Asset servicers have also focused heavily on the provision of data to their clients, as a logical evolution of their services. "Ideally, solutions would leverage a single stored copy of core data points, and allow for multiple views of that data so that it can be used for applicable business and regulatory reporting purposes" said Barb O'Malley, Senior Vice President of Institutional Technology at Northern Trust. "This approach helps to ensure consistency of results."

Technology providers will continue to bring innovative solutions to the marketplace. Asset management and asset servicing providers will build or buy technology to keep current with the evolution of the marketplace, and to provide cost effective solutions to their clients. As distribution and regulation evolve, collaboration among business, compliance and technology partners is crucial to delivering successful and compliant solutions.

Keys to success: collaboration, communication, and innovation. Working together, business, compliance, and technology experts can craft solutions that meet the evolving needs of the industry.

4.1 ROUNDTABLE DEBATE

Exploring planning processes in preparation for technological upheavals

Moderator

Noel Hillmann,
Managing Director,
Clear Path Analysis

Panelists

Denis Gonzalez,
Senior Consultant,
Platform Re-engineering,
Deutsche Asset & Wealth Management

Barb O'Malley,
Senior Vice President,
Northern Trust

POINTS OF DISCUSSION

- *Experienced teams who understand the needs of both IT and the business is key to a successful project*
- *Management are increasing technology literate and understand the importance of IT to the execution of successful strategic plans*
- *Adapting off-the-shelf technology to suit individual business needs, is key to create operational out-performance*
- *Agreeing a Doomsday scenario of failure to integrate technology with senior management must be discussed right at the start of a development project*
- *Considering technology re-use plans helps to control costs and ensure unused components in one project can be employed elsewhere*

Noel Hillmann: How does a company identify the 'gaps' that require the application of technological innovation?

Barb O'Malley: Frequently the business brings a problem to IT and tell us what the problem consists of. Hopefully we have been looking at the technology landscape and are aware of new technologies that could potentially be applied to solve that problem.

However, what we have also been doing more of late, is that when we have become aware of new technologies, we present them back to the business to show what these new technologies are and how they might help us with the business. This reverses the normal flow of how developments occur.

These are the two methods we use and both require a tight interaction between IT and the business.

Dennis Gonzalez: It is certainly more rewarding when it's possible to provide innovative ideas to the business on a proactive basis rather than reacting to gaps or new requirements.

As Barb mentioned, having that tight integration is key to gap identification, but in my experience there often exists another key element that is often missing. This would be a highly experienced team that straddles both sides with a senior mandate to work closely with users in the trenches and dig deep into the complexities of all gaps. Having these teams with near constant interaction with business and IT, leads to good rapport and an ability to provide bad news as easily as good news.

Noel: What combination of personnel are involved in the analysis of business problems?

Dennis: Whenever I have run projects I like to get the business involved as soon as possible to zero in on the nuances and constraints before getting underway. I recommend requiring small combinations of experienced IT and business process owners to overcome initial reluctance and get to the real problems. Having a business sponsor that can communicate the importance, the vision and the analysis needed to work towards the vision makes a difference.

We have found over the years, that it has become easier to get the key people from the various parts of the business involved. Management teams have evolved in their technical competence or realized that a solid grasp of technology is key to the best strategic plans.

We have learned the hard way that if they are not involved, then projects can go on and either miss spending limits or have other negative ramifications. Everyone has learned that being part of the technology transformation is a better win for everyone.

Barb: It is definitely a combination of IT and the business. Sometimes our business partners come across a technology that they really like and they want us to find a way to implement it. We have to do a thorough review because that technology isn't always the best one to meet all of our needs. We work with business partners to understand the business problem so we can be sure we find the right solution.

You have to find that balance where you focus on what you need to do and then talk about how.

We have a business architecture group which sits outside of IT and a lot of times they will do what I call 'think tank'. This means, they play with some new technologies and try to figure out how to apply them but generally neither IT nor the business do it alone.

Noel: The length of time between identification of a technology that is required along with full implementation of that technology can vary depending on its complexity and upheaval. Can you give an example of a technology that proved time consuming to implement, giving reasons why?

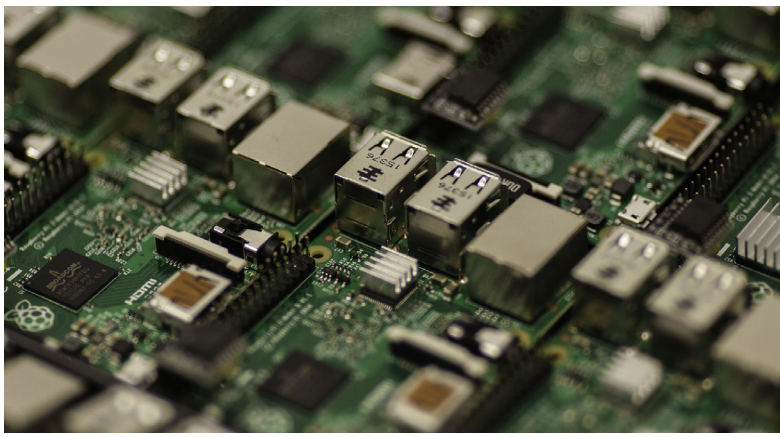
Barb: Generally, implementing a new piece of technology is not the hardest bit. Rather it is the amount of integration that you have to do with either existing platforms or data sources, that tends to drive up the time it takes to complete.

For example, a regulatory project that we are currently working on started with four data sources. We had a timeline of six months but the business did more work and came up with 12 more data sources and were shocked when the timeline more than doubled.

The amount of integration is a huge driver from our point of view.

Dennis: I agree, as once you go through all of your various phases of planning and design and get to the actual implementation, both you and the business can suddenly realize that there are all these other items under the rug. Alternatively, you realize that there are gaps in the documentation that IT and the business missed. Much of this is to be expected and I firmly believe that these "misses" should actually be planned for.

For example, I have experienced situations where despite ensuring the vendor contract takes into account every contingency, the vendor suddenly realizes that they have a gap against one of our requirements. Even vendors whose business depends on knowing their integration points, even they have episodes where their business



implementation teams are not fully aligned with their IT teams. So at this point you can suddenly find yourself taking on contractual risk.

We are now very careful. Even though a vendor may have worked with similar clients, every client that they land at has their own complexities. We do not want to end up in an unplanned joint venture arrangement, where both sides are taking on undue risk. This can derail the most solid of plans.

Noel: In terms of complexity, when you are looking at what a client is seeking to achieve, do you often find that the initial idea they communicate looks nothing like the actual solution?

Barb: We joke here at Northern Trust that we have never met software that we didn't want to customize. Although we are trying hard not to do that anymore, there is still that natural problem that the software is an 85% fit. How you solve that 15% delta is usually where you spend all your time and energy.

How you solve the 15% gap between what you have to what you require, is really a big driver on how successful the project overall turns out to be.

Noel: In broad terms, can you describe the main stages of a typical planning process timeline?

Barb: The normal plan of design, test, implement and migrate are the main stages that we go through. When you are looking for a solution or technology that is outside of that, where the planning process can

involve the whole vendor search evaluation, the planning stage can take a lot longer.

Noel: Which of these stages (in your personal experience) would you consider to be the most crucial?

Barb: The planning and design are the most crucial. There is frequently a rush to code or to get into implementation. If you don't put enough front planning into the project structure and design – 'design' including the testing phases and contingencies – you will be struggling at the end.

Noel: Dennis, what are the main stages of a typical planning process timeline? How do they differ in how much you customize the process?

Dennis: As a general rule, I am in the camp that sees an inevitable trend to move much of the back office work to vendor platforms which means we are always looking to standardize existing processes, as it makes the offload easier when the time comes.

The main stages of our typical planning probably does not differ from almost any other firm, ensuring meaningful analysis, design, and so forth.

I find that the business stakeholders, the vendors, IT and all of your support functions tend to get more invested as implementation gets closer and the risk of impacts to the business become clearer. Knowing ahead of time that you are going to find errors and issues close to and during implementation and having a plan for how you'll address them, in some ways becomes a critical stage of a successful project.

As a large organization it is very difficult to roll up any agile plan in terms of budgeting. However, informally on the re-engineering team we have a lot of fluidity to allow teams to self-organize around where they feel they are going to see the most risk during an implementation.

This is where we are able to get these teams to go in and fix issues and from the issues that I have been dealing with, it is about large implementation versus large coding efforts. The only coding that I help with is that of integration and ensuring that goes well. My speciality has always been with the implementation of large systems where these skills make a difference.

Barb: This doesn't happen all the time but something that is frequently overlooked is what the transition to Business as Usual ("BAU") looks like, especially when there is a new work construct that is required.

If you have a new large implementation or function that doesn't have a natural home, it can also be a place where people focus so much on the implementation that they forget about the operating model and what this could look like in BAU.

> "Knowing ahead of time that you are going to find errors and issues close to and during implementation and having a plan for how you'll address them, in some ways becomes a critical stage of a successful project."

Noel: What process of risk management and risk assessment do you go through?

Dennis: In large firms, all the documentation regarding fall back plans, and contingencies for areas of high risk are outlined, approved and signed off as a standard part of the change management process.

There is a large psychological component to all this change management. You have to have your eyes wide open and ensure other stakeholders truly appreciate the risks they have signed off on. It is also about how much credibility your team has to point out true risks.

I have worked with organizations where IT is not willing to put forth a Doomsday scenario because they are afraid of the push back or how the business would react to talking about failure ahead of implementation.

I have also worked with teams where they put the Doomsday scenario at the front of their organization. They show what could really fail and ask if a Doomsday scenario were to happen, what lights would the business want to keep on.

This helps you prioritize your own team, as sometimes IT will look to keep on the lights that they would like to have stay on, without checking in with the business. Getting in front of the key heads and talking about what they want to have happen if something bad did occur and what they would prioritize, enables you to then work with your own teams and figure out a contingency plan that makes the most sense.

Noel: Do you create check lists of all the different factors that need to be considered from the start?

Dennis: Yes, formally and informally. There is a lot of understanding of the stakeholder's psychology at the start of the project and making sure that you understand pain points. It's about building the level of trust the business has in you as the IT expert and ensuring stakeholders can have full levels of confidence in your team's capabilities, so that if something goes wrong they can tell you what they would want to have happen.

Noel: What are your thoughts, Barb, on risk assessment and risk management in ensuring BAU is achieved as quickly as possible?

Barb: On any well run project there is generally a risk section, where you evaluate risks and what the path to green is.

There is a natural tendency to think that once a project is approved for funding you must soldier on at all costs.

It is much harder to get people to call a time out and perhaps admit that, although being 50% through a project, they may have to cancel it.

Having check points at the most senior level to be able to say, 'we are a go' or 'we are a no go' and being able to admit that something may no longer be worth it if it won't deliver the desired goals, is hard to do.

We are getting better at this but that is a hard concept for people to wrap their heads around.

Noel: How important is the development of a data strategy and who in the organization should lead this strategy?

Barb: Data strategy is a broad term, so in IT we think of it as data architecture. We do also have a Chief Data Officer who is responsible for the business data strategy.

Again, the lines between business and IT do get blurry but I feel that business should initially state what their overall strategy is and then IT should create a data strategy to support that. This is the way it should work but it doesn't always happen this way.

Dennis: I see data strategy as the key to all businesses and while IT is ultimately responsible for the data architecture, the data strategy governance must be driven by the business to be successful. Ultimately, if the business has to pivot for business reasons or to meet regulatory demands, it's much more effective if they have owned the strategy and have been part of the architecture conversations.

Another advantage of having the business heavily involved presents itself when assembling budgets, the business can appreciate the complexities involved.

Noel: To what extent are strategies considered within the planning period in case the worst should happen, and the technology ultimately proves unworkable within company processes?

Dennis: There are many companies who are going to be experiencing this in 12-18months. Companies who are currently pursuing Blockchain evaluation projects that will lead to bona fide transformation programs. Some companies are going to implement well on a viable long term vendor platform. Some will not execute efficiently and/or end up on a high Total Cost of Ownership ("TCO") platform.

However, in terms of mitigating the project risk of the technology up front, realistically it's not possible but we do adhere to best practices.

"I SEE DATA STRATEGY AS THE KEY TO ALL BUSINESSES AND WHILE IT IS ULTIMATELY RESPONSIBLE FOR THE DATA ARCHITECTURE, THE DATA STRATEGY GOVERNANCE MUST BE DRIVEN BY THE BUSINESS TO BE SUCCESSFUL."

Typically, it's about identifying project risks, forecasting the impact, acting on and monitoring the risk areas.

While nothing is fool proof, I believe that working cyclically and thoughtfully through these steps during the project increases the probability of catching a technical showstopper as early as possible.

If you were to get halfway to completion and through these steps the feedback is indicating that your Blockchain technology isn't going to cut it, you need to quickly back your views so that a recommendation to cut the losses is clearly stated. Often this requires tapping those same senior leaders who approved the program, but ironically this is when IT builds credibility.

Barb: Blockchain is certainly one of the more extreme examples where we don't know which technology is ultimately going to be the winner. You might do some hedging and some work with two providers on the assumption that one of them is likely to emerge the winner.

We had similar conversations when we were trying to figure out which data provider we wanted to use. There were two major players in this space and neither emerged as a clear winner. We decided to go with one provider and built into our implementation the ability to switch easily at a later date.

This flexibility is important. You need to think about what is reusable, i.e. if you go down two paths initially with the intention to just go forward with one, you need to ensure whichever choice proves workable there will be pieces that are reusable.

Sometimes it is best to start small with initial beta, one that is low risk and allows you to kick the tires for something that you may not fully understand.

These are techniques you can try to do to hedge your bets but you must have check points throughout the process. If the technology proves unworkable, at some point you have to be willing to call it and say, 'it isn't going to work' and then you stop.

Noel: Thank you both for sharing your views on this subject.

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