

A Brief History of Kyield

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The intent of this paper is to share a brief history of Kyield from my personal view, including opinions on related events with omissions others may deem relevant, so I apologize in advance for this inevitability.

Unlike the vast majority of my colleagues, I am not a product of the academy, but rather a self-educated professional focused for much of the past fifteen years on applied knowledge systems research, so a bias towards real-world applications should be expected. Our work has been self-funded to date, which despite the obvious difficulties has allowed us to focus on the needs of customers and the market rather than the strategic interests of others.

Cornerstone 1: Learning at the Inn

While any exhaustive conscious history would begin much earlier, I will begin this story in the early 1980s when my wife Betsy and I converted an historic building in the village of Leavenworth, WA into a European-styled pension. This might seem like a strange starting point for a field heavily influenced by computer science, economics, and sociology, among others, yet hindsight reveals a cornerstone for Kyield that formed during that time period from knowledge exchange in an intimate social environment.

The relaxed environment of the inn proved effective for sharing information across cultures and disciplines in a format that was convertible to useful knowledge. One example of many was a professor who shared an impassioned dissertation about the potential of the human genome so convincing that I found myself sharing what I retained with others who could potentially impact the work. More common were groups of individuals from business, art, or law who would interact with engineers, scientists, or tradesmen where I observed the transference of techniques and processes, occasionally receiving confirmation during a subsequent visit about the usefulness of a particular kernel of expertise.

While the knowledge exchanges between individuals were more random than conferences, and not the priority of most guests, the cross discipline method often proved more valuable; an observation that would play a role in forming Kyield.

Cornerstone 2: Management Consulting

Over the course of the next decade another cornerstone for Kyield emerged from management consulting through a wide variety of assignments in the form of knowledge transfer from expert to client. This process included borrowing methods from many cases to be tailored for a specific situation. In the early 1990s we relocated from Washington State to Arizona and began developing management systems to meet the growing demand from remote small businesses that couldn't afford on-site specialists, or the technology of their major competitors, which were increasingly heavily capitalized public companies.¹ The interactive self-guided nature of the systems appeared to be well-matched for the newly commercialized Internet, so in 1995 I developed a plan to test the medium with a product offering.

¹ Marketing Wheel: M Montgomery - World's Eye View on Hospitality Trends, NAU, 1993

Virtual Franchise was conceived and planned in late 1995 with a small contract awarded to a local developer to build the Web site in early 1996.² During that period the Internet was growing exponentially, had not yet experienced the flood of speculative over-investment that caused the dotcom bubble, and so the macro supply and demand ratio was still healthy. The number of serious contenders during the first phase of e-commerce numbered in the dozens with a total investment typically in the low to mid six figures.³

We were able to attract a small yet critical mass of members relatively quickly with steady growth. The products and services with the greatest demand were all various forms of learning that improved the odds for entrepreneurs. We offered both free and premium subscription services, a popular newsletter, matchmaking for specialists, an online store, interactive communities, and e-publications, eventually testing every revenue model in use. The intention was to eventually provide as many of the technology-enhanced efficiencies as possible through a new Web-based ecosystem in an effort to help small businesses compete with global giants.

Conventional wisdom at the time claimed that the medium would level the playing field, and that the physical location for virtual businesses was irrelevant, provided that sufficient bandwidth and competent workers were available. In 1996 conventional wisdom in e-commerce was still sufficiently immature to be correct. We quickly discovered however that the low cost of entry was dangerously deceptive, particularly when combined with seemingly infinite capital in competitors within a medium that encouraged the copying of digitized work products.

Despite impressive growth in membership, the dynamic gap in the nascent medium between the economics of the technology, a deteriorating supply and demand equilibrium, and the business models allowed by the medium proved to be very complex. One of several challenges we faced was the extortionist-type culture we found in vendors that discouraged experimentation, which was essential to finding organic sustainability.

Cornerstone 3: Taking the Leap to the Lab

The only obvious potential solution to the technical challenge was to gain as much control as possible over the technology by bringing the hosting and development in-house. In order to keep costs low and continue with organic growth, hopefully on a trajectory towards eventual break-even, I made the decision to take the leap by converting the consultancy into an incubator. We remodeled a concrete block building on our mini ranch in northern Arizona into a fully functional computer lab and network operations center.

Recognizing that I needed assistance unavailable locally, I asked my old friend Russell Borland to become a partner in my efforts. Russell had been working at Microsoft since the early 1980s, authoring books for MS Press for the previous decade. When Microsoft finally approved his involvement, Russell sent me the entire package of MS Press training materials for their enterprise networks, which was an enormous volume of books and CDs on Microsoft enterprise applications, covering servers, communications, security, and their ubiquitous productivity programs.

The learning curve continued to steepen as I completed the initial phase of back office technical training. I then ordered and installed many tens of thousands of dollars worth of software and hardware necessary to begin the process of transitioning to a fully functional computer lab. Commencing from a reasonably sound business platform, the technical education continues until this day, representing the third cornerstone for what would eventually become Kyield; technical expertise in the digital work environment.

² Virtual Franchise was sold later to be used for a completely different purpose.

³ Phases of Internet Commerce: M Montgomery - IJHIT, 1999 ISBN 0-9624990-8-0

The experiential education revealed a great deal, including the depth of my own credulity regarding the IT industry cluster's strategy and tactics in both proprietary and open source cultures. The software culture in particular seemed cult-like at either extreme, forcing their personal philosophies on others through manipulation of code. One of the more interesting communications on this topic during this period was an exchange of letters with Lou Gerstner who was in the process of turning around IBM. We shared a similar view on the computer industry at the time through the eyes of consultants, even if at the opposite ends of the food chain.

The second major challenge we faced with the lab was related to the first. While our manageable costs were now as low as possible with space, utilities, and technical labor contributed to the venture, other costs were high, including bandwidth that amortized at a rate substantially higher than the cost of the property, international customer fraud, software, and hardware. Even with the subsidies of space and engineering, the break-even point for Virtual Franchise was unknowable, although obviously very high, which raised serious questions about the popularized myths of a level playing field, location, and regional support for such ventures.

By 1997 institutional capital began to flood the Internet in all forms; venture capital, strategic corporate investment, government, universities, and nonprofits were all entering what was quickly becoming a hypercompetitive, heavily subsidized race to give services away for free, and this was within a U.S. economy that had become largely service-oriented. The price war to end all price wars had begun.

We had established one of the leading small business networks, but were located in a state that lacked either the institutional will to engage in strategic price wars or the sophistication to envision extremely high scale break-even points. So we reluctantly abandoned the small business market with this model, leaving it primarily to those who receive the majority of their revenue from the competitors of small business; a negative for the broader economy in the long-term.

During the same period we were operating Virtual Franchise, we launched the original 'Shop the Web' campaign and portal, which became an impressively successful global viral campaign to help jump-start online shopping for remote small businesses. Much of the content in the portal revolved around myths and truths in e-commerce for small business and their customers, with a revenue model similar to that of the small business services offered by the leading portals today.

The campaign resulted in over a thousand emails per day from every corner of the world, completely overwhelming our ability to respond. This experience initiated a serious exploration of email methods; a key part of Kyield's eventual design. The corporate world quickly took notice of the campaign, ramping up their own effort with a similar name in an industry non-profit, slanting mass media away from our grass roots 'commercial' effort to their 'not-for-profit' effort; representing yet another hard lesson learned in small and emerging business.⁴

Cornerstone 4: Learning Network of Thought Leaders

In 1997 Russell Borland and I began working together to design a more advanced learning network with a strong team of remote programmers that pushed the limits of the Web's technical limitations at the time. We renamed the incubator GWIN (Global Web Interactive Network), and the new venture was simply named GWIN Pro, which became the fourth cornerstone of Kyield; advanced knowledge systems.

4 I am limiting this discussion of the incubator to those activities related to knowledge systems.

GWIN Pro intended to serve thought leaders and knowledge workers with a combination that might be described today as roughly equal parts of intelligence gathering, social networking, personalized learning, and moderated forums, all of which were integrated with Cold Fusion in a complex combination of off the shelf programs and proprietary programming, resulting in a seamless personalized experience.

The scale and complexity of GWIN Pro was similar to a high-end corporate network with thousands of members using the service daily, state of the art technology complete with fault tolerance, security, redundancy, back-ups, communications, and programming. The network was global and 24x7, so as the only technician on site in this free remote network I didn't sleep much. The performance of the network surpassed any of the corporate member networks we were communicating with, as evidenced by constant bounced messaging and a steady stream of incoming viruses, all but one of which were blocked in 31 months of operation.

The intel gathering program called 'Lookout!' filtered every major business, economics, and scientific publication worldwide as it came online, with email delivered briefs covering dozens of topics, 12 industry clusters, and every region of the world. An optional moderated discussion list accompanied each topic, all of which were managed with a single screen requiring only mouse clicks and a few seconds to update.

Among the dozens of topics we maintained in the Lookout! service, the most popular were e-commerce, technology, global economics, and knowledge management, collectively representing the deepest bench of experts assembled online between 1997 and 2000. The combination of global filtering by topic, region, and industry with exchanges between experts in companion forums provided an unusually powerful platform for the purpose of learning and forecasting complex events, including the potential to prevent crises, which has been a personal priority and motivation for my work. Unfortunately, Lookout! also produced a great deal of information overload, which would prove to be one of the key challenges that led to the holistic semantic design of Kyield.

The social networking (SN) function was visually less appealing than today's refined networks, but provided much of the same usefulness, including the ability for the members to manage easily, add searchable tags, photos, and expertise, so the SN function provided value for matchmaking expertise. Today we take all of these functions for granted, but in 1997 we were pioneering a lot of new ground.

We also published a magazine called *Convergence Zone*, which was very popular despite my neglected writing and editing skills. The content was among the most popular subscriptions in the network, covering the intersection of economics and technology, standards, software testing in the lab, and product reviews.

The network attracted a very high quality membership rather quickly, including competitive intelligence professionals in dozens of global companies, government intelligence professionals in several countries, complete boards of major financial institutions, CEOs of global companies, institutional investors, NGO executives, editors of most major business and economic publications, and professors from universities worldwide. All industry clusters were represented at the board level with multiple complete boards engaged.

The majority of members never revealed their identities to anyone but myself, almost all of whom subscribed to many topics, raising serious issues with respect to inequality in such an interactive environment. The ease of copying ideas with no compensation or even acknowledgement provided strong disincentives for thought leaders to engage as very few organizations were in a position to profit from the bulk of expertise; another significant obstacle that Kyield would need to overcome. It was a humbling experience for an exhausted entrepreneur / consultant / engineer working from a self-funded lab in rural

northern Arizona. Air Force One even popped up on the Web logs, although none of the members knew who it was, speaking to the problem of identity and transparency.

While it's understandable that some individuals may want to remain anonymous in such a quasi-public network, I had been able to confirm that many members were using false names, some of whom were obviously high level experts in their fields. The vast majority of members were not falsifying their identity, but how could members have trust in the information without verification? What would prevent manipulation efforts on the Internet, regardless of the agenda? Just how broad was conspiracy on the Web?

In flash backs to the previous decade, I compared the exchange of information at our inn through body language, personality, and conversations that established identity and built trust. The parties understood that the innkeepers and community share a strong interest in creating a trustworthy environment, with rapid law enforcement response if needed. Building trust in the physical world, while imperfect, was a well established process developed over time with human interaction, social networks, trade, governance, and enforcement of the rule of law by an independent judiciary.

In contrast, the Internet emerged from a sub-culture of academic and government computer labs that enjoyed known identities within a small technical community funded by government. While competition and conflicting interests no doubt existed at times, the simple numeric architecture and hypertext format were not designed to prevent the manipulation of complex agendas of every nation, corporation, and special interest group worldwide. I shared the basic vision of Tim Berners-Lee that would emerge for the Semantic Web; we needed a much smarter medium.

Several members in large organizations were interested in the software for internal use, so I began working on an enterprise version in stealth mode when the dotcom bubble burst in 2000, and our bandwidth partner pulled the plug. One of my friends and supporters, Vint Cerf, attempted to intervene, but it was too late; GWIN Pro became a casualty of the largest price war in history.

Substantial value was created in GWIN Pro that affected large numbers of people through many of the world's largest organizations. One of the reasons I worked long hours and kept the service operating longer than we could rationally afford was due to the positive power of the network. Examples were a daily occurrence, including providing subject matter for many leading journals, major products that were born from the forums, public policy development, and crisis prevention, among others.

A Theorem Emerges: Yield Management of Knowledge

In looking back over the incredible decade that was the 1990s, I began to consolidate the important lessons we learned in applied knowledge systems research. One morning when I was particularly focused on my work, I received a phone call from my late father, who was a retired USAF pilot, informing me about the initial attack on the World Trade Center.

As the shock of the terrorist attacks began to dissipate, the potential value of applied knowledge systems research for prevention of such crises became more obvious than ever; for both specific events as well as broader reduction of forces driving such acts. I contacted a senior DoD strategist I knew who sponsored related research to explore the possibilities of a more advanced version of GWIN Pro. After discussing with his colleagues, his response was that the inability to confirm identities in a Web-based system would prevent them from considering such an option.

While I fully understood their position, it seemed counter to the wisdom of making the best use of the readily available tools. It also revealed the potentially severe costs of unresolved technical issues with the global medium.

Over the next several months of deep concentration, the missing pieces of the architecture that would become Kyield began to come together.⁵ Expressing the broad vision was relatively simple, even if few were in a position to understand it. I wanted to create the ability for individuals and organizations to manage the yield curve of their work in the digital environment tailored for their specific mission.

In order to accomplish this highly complex goal, I discovered that a holistic semantic system would be necessary that bridged communications and work flow. Due to the number of different proprietary applications installed in the digital work environment, and the difficulty with integrating each program, we would employ intelligent semantic wrappers rather than attempting to alter proprietary files. The specific elements of the embedded intelligence are adaptable to the needs of organizations, including regulatory and security issues, but suffice to say that sufficient information is embedded to execute the functions in each module of Kyield. In public network transactions we've embraced the W3C standards to ensure interoperability.

The important issue for non-technical managers to understand is that in order to resolve the most pressing problems in the digital work environment, the underlying technical architecture of a holistic semantic system was the only viable path available. By employing a systemic approach we are able to deal with the underlying systemic problems, not just treating the symptoms, which can be done in such a way that doesn't employ extortion-like tactics.

The result is a low cost system with the ability to overcome very serious problems that manifest in the digital work environment, including removing structural barriers to innovation, improving worker productivity, and realigning the interests of the worker with the organization, which also improves morale and increases the quality of original work products. In essence, from the perspective of a management consultant, Kyield achieves the intent of the learning organization within the digital workplace environment.⁶

Of course developing the specific modules for Kyield that could execute the intent of the theorem took considerable time, and is to some extent never ending. By 2006 I had finally formalized the system design sufficiently to begin the patent application process, which was filed on April 13, 2007: [Modular system for optimizing knowledge yield in the digital workplace.](#)⁷

Throughout 2007 our technical advisory board assisted in refining the modules, leading to the development of a [Flash demonstration](#) that can be found on our Web site. Originally intending to build out Kyield as a new company, we initiated discussions with leading venture firms in Silicon Valley, generating substantial interest, but in the end we reached a consensus with advisors that everyone's interests would best be served with a [licensing model](#), rather than speculation. After a year in the Bay area, my wife and I relocated to Santa Fe, NM where talks continue with prospective customers and partners.

The Macro Economic Affects on Innovation

One benefit of shuttering GWIN Pro was that I finally had time to reflect on the experiences we had endured in the 1990s. We were up against the most difficult economic challenge I had ever experienced, and this is coming from a consultant who was previously expert in turn-arounds and defending against predatory tactics. By the late 1990s, subsidies from IPOs and venture firms had acclimatized users of the Internet to services that cost far more to deliver than incoming revenue could sustain, AKA predatory pricing.

5 Montgomery, M., *Navigating the Obstacles to Knowledge Yield*, 2002

6 Pedler *et al*: "an organization that facilitates the learning of all its members and continuously transforms itself" - http://en.wikipedia.org/wiki/Learning_organization

7 Application number: 11/735,329, Publication number: US 2007/0250539 A1

A disequilibrium of large proportions with potentially serious long-term consequences for the knowledge economy was emerging. When the Internet doors were opened to the rest of the world, a series of interconnected network effects occurred that were very positive for the computer industry cluster, which ramped up an impressive evangelism machine that completely obscured the negative network externalities for others.

We were personally subsidizing the network with my wife working in a traditional job to help pay the bills. Russell Borland had retired to Northern California in 1997. Adding to the stress, my brother was dying from ALS during an almost identical time period, so vacations were spent visiting family under very difficult circumstances. These issues affected my own decision making, as did long work hours with little sleep. Our willingness to be guinea pigs was costly on multiple levels.

Those of us in 'fly over' states and countries faced a very difficult situation. We were losing money primarily because of the price war caused by over-investment in other markets, so we could either raise a large fund like others and attempt to compete with predatory pricing, or attempt to outlast the deep pockets and bubble cycle by sheer will. We attracted unsolicited interest from institutional investors for an internal VC fund at precisely the wrong time during the peak of the dotcom bubble, and one global bank was interested in underwriting an IPO for the incubator, but we did not want to relocate as they required nor frankly did I believe that the entity approached the valuations they were discussing at the time.

The metrics used for company valuation in the dotcom bubble years were in my view a form of systemic fraud, and the predatory pricing little different than below cost pricing tactics employed by traditional industries in an attempt to destroy competitors, after which time of course prices tend to rise. Flyover states paid a serious price for not participating in the destructive systemic bubble and historic price war.

The dynamics between global economics and technology, particularly with the Internet, is extremely complex; sufficiently so that I am currently writing a book dedicated to the the topic. Suffice to say for this brief history that the U.S. can no longer afford the systemic fraud and abuse surrounding bubble economics. Nor can the global economy afford the negative affects on innovation and sustainable business creation with unnatural or financially engineered price wars caused by over-investment, regardless of the source, agenda, or intent. Predatory practices, over-centralization, and over-investment prevents the very processes essential to building valuable innovative products and growing a strong, sustainable economy.

Technology and Standards

During the past fifteen years I invested a great deal of time reading academic papers in related disciplines, often exchanging thoughts privately with researchers in e-commerce, business, economics, knowledge management, computer science, and social sciences, among others. It was common for acquisition editors to ask me to review text books in related areas and universities to review doctoral thesis, all of which helped me understand and contribute to the direction of basic research.⁸

While operating the incubator, I was constantly looking for improved tools to deal with the exponential growth of data, including but not limited to search engines. One example in the late 1990s was a search engine emerging from the dorm at Stanford called "BackRub", created by Larry Page and Sergey Bin.⁹ I reviewed their published papers and tested the early beta, which employed a populist linking model that raised concerns, but proved to be the best at the time. Since Google was at Stanford in the heart of Silicon Valley, we had

8 An Example: The knowledge management toolkit, A Tiwana - 2000 - Prentice Hall PTR Upper Saddle River, NJ, USA

9 BackRub FAQs: <http://web.archive.org/web/19971210065437/backrub.stanford.edu/FAQ.html>

little chance of attracting them to our small independent lab in the wilds of Northern Arizona, which to my knowledge had yet to receive investment from a venture firm, so I shared our results with the network members and emailed venture partners I knew in Silicon Valley, including the two that eventually funded Google. As is often the case, venture firms were slow to see the potential.

A couple of years later I found another interesting dissertation by Tina Eliassi-Rad at University of Wisconsin that took a much different approach to search.¹⁰ By the time we grew serious about licensing the IP, however, Tina had joined Lawrence Livermore National Lab. The tech transfer folks at the University of Wisconsin were unresponsive to our interest, and their program is considered by many to be among the best, which highlights the broader problems we all face in tech transfer.

While the science for attacking the symptoms of information overload and related productivity had improved greatly, the components of the disease prevailed unabated: the challenges in security, trust, scale, and adaptability have only marginally improved. These are technical issues involving either integration of pre-existing platforms or adoption of universal standards, which was a process frankly dominated by entrenched companies. Standards bodies like the W3C appear to have the best intentions at times, working to build a more functional and intelligent Web, but they are financially supported by those with conflicts, and compliance is voluntary. Issuing standards developed by researchers has proven to be a simple task when compared to achieving adoption by industry.

An incremental standards system that depends upon entrenched vendors agreeing to cannibalize some of the most profitable products in history has never seemed a terribly progressive adoption model to me, nor one that favors innovation. Indeed, it has been surprising to me at times that companies with dominant market share would adopt new innovation at all. Despite wide-spread confusion, innovation is normally deployed by disruptive newcomers to a market segment, not entrenched companies where deploying innovation often conflicts directly with management's fiduciary responsibilities.

So the lesson is that technology is inexorably interconnected to economics with powerful impacts that are difficult to accurately forecast. In an increasingly networked economy, sustainability depends largely on a combination of highly informed and sophisticated customers, wise oversight of the technology standardization process, and prevention of predatory practices, to include manipulation of technical standards and financial markets. Anything less should not be met with expectations of a vibrant, innovative ecosystem that meets the needs of customers and the global economy.

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¹⁰ Eliassi-Rad, T., *Building Intelligent Agents that Learn to Retrieve and Extract Information*, Ph.D. dissertation, CS, UW, '01