InImpact: The Journal of Innovation Impact : ISSN 2051-6002 : http://inimpact.innovationkt.org
Special Edition on Innovation through Knowledge Transfer : Vol. 5 No.1 : pp.130 - 135 : inkt13-016

Selectamark: The Development of a Global IT Platform

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This paper describes the unification and redevelopment of a company's entire web-infrastructure. The project has been carried out through a KTP partnership between Kingston University and Selectamark Security Systems plc (Selectamark), based in Locksbottom, Kent.

1. Introduction to Selectamark & the project

Selectamark Security Systems plc ('Selectamark') is a family-owned company based in Locksbottom, Kent. The Company has specialised in property marking and theft-prevention for more than 25 years, having developed a portfolio of world-leading security products, which are sold across five continents.

The Selectamark product range includes SelectaMARK visible marking system, BikeRegister cycle security, SelectaLabel asset protection and SelectaDNA forensic marking solutions. To maintain its leading position within a competitive market in the UK, the Company is accredited to both ISO9001:2008 and two BRE Loss Prevention Standards including LPS1224:Issue3 [1] to achieve *Secured by Design* status. The Company are also active members of the two main Trade Associations: The British Security Industry Association (BSIA) and The Aerospace Defence & Security Organisation (ADS).

2. Global IT Platform

Prior to the project, Selectamark was running several web-based systems, which had been developed in isolation over a number of years and which were hosted by a number of third parties. Some of these systems were no longer supported and contained bugs, which were causing day-to-day issues in the workplace. Major issues with this fragmented setup included high hosting and support costs, which had a negative reputational impact on the business. This put the Company at a perceived disadvantage when bidding for major contracts.

Having identified the issues, Selectamark approached Kingston University about the possibility of working together in a Knowledge Transfer Partnership (KTP). A project plan was quickly developed that unified the existing web infrastructure into one, modern, secure platform, redeveloped the aging IT systems and prepared the infrastructure for projected growth in both sales and international partners.

2.1 Interim measures: Providing a sticking plaster to an old system

The project originated from the challenges that Selectamark were facing in terms of developing the BikeRegister website to be fit for purpose due to the increasing requirements that the Police and its partners were seeking to impose on suppliers. The publication of two key documents by Transport for London (TfL) "The Cycling

Revolution LONDON", initially in draft form back in 2010, which was followed by the "Cycle Security Plan" [2], convinced Selectamark of the urgent need to update the BikeRegister site if it was to remain a key supplier to the Police and TfL.

At this point, Selectamark identified the need to improve their web-architecture and approached Kingston to discuss the idea of applying for a KTP. Given the complexity of the work and the uncertainty over the base web site, Kingston suggested that Selectamark started with a short-term Innovation Associates Programme (IAP) which gave them an in-house resource to maintain and "plug the gaps" in the current system whilst planning for a more long-term solution. It would also give Kingston a chance to learn about Selectamark and the two organisations to develop a common understanding of the full project.

With this in mind, funding was secured for the 3-month IAP project to maintain the old BikeRegister system whilst implementing necessary new functionality. This allowed Selectamark to demonstrate that changes were taking place to give confidence to the Police that the planned functionality would in fact be developed into a new online resource.

When TfL proceeded to issue a tender for a single London-wide bicycle registration and marking scheme in 2010, Selectamark had finalised the KTP application which included significant improvements above the base level requirement of the tender document. The tender document highlighted a number of requirements that the successful candidate would need to meet which without the KTP the company could not have achieved as at the time it was a challenge for BikeRegister to meet the requirements. But the experience gained from Selectamark and Kingston having now worked together meant they were confident of making the changes which ultimately culminated in the Company winning the TfL tender.

2.2 Unified platform: Working towards a single, optimised infrastructure

The primary goal of the KTP was to create a unified platform for Selectamark's entire web infrastructure to be built and located within the business. The original plan was to research secure coding frameworks and IT hardware before any development work was started. However, at the beginning of the project priorities immediately shifted: Winning the TfL contract meant that the BikeRegister website had to be completely redeveloped in a short timescale in order to meet the expectations of the Chief of the Metropolitan Police, a key partner in London Mayor Boris Johnson's overall cycle strategy.

To meet this objective the KTP management team transitioned from the original "waterfall" project plan, which was front-loaded with research and analysis, adopted a more "agile" approach and re-shuffled priorities: Research into a new hardware platform was moved down the project timeline and priority was given to researching the correct development framework, since the hardware could be chosen around the framework and meeting the new development timescales would be much harder the other way around.

The framework would need to be flexible and extensible so it could be used for all of the upcoming Selectamark redevelopments, including requirements for internationalisation, hardware platform flexibility and extensibility, and suitability for a range of standard websites, ecommerce sites and web applications. After trialling

several different options, ExpressionEngine [3] was identified as providing the best mix of pedigree, security, flexibility and built-in features, as well as matching the in-house preference for open source software and development environment.

The Company's marketing agency was tasked with the design of the new website. They created three concepts from scratch, which were discussed and tweaked with one eventually being chosen and signed-off. To speed up development these designs were sent to a service provider specialising in the conversion of Photoshop "comps" into modern HTML5 web page templates (PSD2HTML [4]). With the time pressures on the project, the KTP management team came to the decision that the benefit of speed outweighed the cost of getting the work commissioned.

BikeRegister was the ideal candidate to begin the redevelopment cycle as it included an e-commerce website and web application, which were the main features that the unified platform needed to support to encompass Selectamark's other web sites and applications.

Although the BikeRegister project was launched faster than originally planned, the system was still user-tested utilising resources at Kingston University, which were made available through the KTP. A small-scale usability test, using undergraduate students as test subjects, allowed us to identify some major usability issues, and a preliminary penetration test on the website by a cyber security masters student ensured we took a risk based approach before launch of the new site. These additional university resources allowed us to meet the re-launch deadline whilst still ensuring we had a reliable, usable and secure application for our customers. For BRE LPS1224 [1] accreditation purposes, a full-scale penetration test and audit by an independent and accredited external auditor was still required. Normally this would be done before launching a secure website but the combination of ExpressionEngine's security pedigree and the preliminary pen-test gave the management team the confidence to launch the site and meet TfL's expectations. A decision was made to move back the full pen test until after the next critical phase of work for Selectamark. This was the redevelopment of the SelectaDNA brand and associated website, discussion of which follows in section (2.4) below.

Agile rescheduling of the KTP plan also permitted research into the hardware platform to be put back; the software platform's open source nature meant it could be deployed on almost any platform, and again, like the delayed security pen test, hardware research and benchmarking were performed after the website's re-launch, since the website's new performance was positive in the eyes of the TfL and the Metropolitan Police. Again, mixing expertise from the KTP Associate, Kingston University and a third party service, bottlenecks in the interim hardware platform were identified. Desk research was conducted on suitable hosting platforms and a well-respected and accredited "cloud" hosting provider selected (Rackspace [5]). Hosting of the new infrastructure continues to be provided (and monitored) there to the current day.

The new platform and partnership with Kingston University continues to have synergies and when the next part of Selectamark's infrastructure needed to be upgraded, another university student was employed to develop new functionality to accompany the move to the new e-commerce platform. The SelectaLabel "Label Maker" was created [6] to use modern web standards, including HTML5, with the labels designed online (represented in the browser as *Scalable Vector Graphics* [SVG] or *Vector Mark-up Language* [VML], depending on the capabilities of the

user's browser software), proofed and purchased before being semi-automatically transferred for manufacturing. This replaced a labour-intensive manual process that, while effective, was an expensive bottleneck with limited online advertising potential. To date, after the launch of the new website (on the unified infrastructure) 25,000 labels have been purchased online, generating £10,000 worth of new business whilst at the same time, increasing efficiency, saving over 100 hours of work by removing the requirement to manually design the label and quote the customer.
The "Label Maker" code was built-upon for the next phase of Selectamark's unified website redevelopment, when the Company's main website (www.selectamark.co.uk) was redesigned and relaunched with e-commerce functionality, adding functionality for the online design of Selectamark's well-known property-marking stencils. Being core to the business's brand identity and position as a market leader, the success of this exercise shows the benefit of the "agile" approach to meeting the KTP's objectives.

2.3 New threats: Risks from enhancement and change

Raising BikeRegister's profile by relaunching the site and winning a prestigious contract had unexpected consequences: In the run-up to LPS reaccreditation the auditor received notice from an unknown 3rd party that the new website did not meet certain criteria in LPS-1224 [1]. This was a potential threat to the business which would not have been rectifiable on the old platform but the new platform and in-house resource meant this was addressed quickly within the KTP project plan and, moreover, the opportunity was taken to enhance the BikeRegister platform with new features that guaranteed the continuation of another existing Police contract.

Relaunching www.selectamark.co.uk, Selectamark's "original" website, was also not without its risks. Even though the website was dated, it was functional and benefited from reasonable search-engine ranking. Whilst "search engine optimisation" (SEO) is often considered something of a black art, best practices were followed when moving from the old site to the new (in that new content was created and old links were correctly forwarded to their new destinations) and the opportunity was taken to move to secure connections (HTTPS) throughout. Together these had the effect of temporarily removing the site's established page ranking whilst the search engines (Google, Bing *etc.*) reindexed the site's content. This required the company to hold its nerve in the face of an apparent loss of online marketability. The new site's page ranking re-established itself after 8 weeks and the new platform provides opportunities for more frequently updated and SEO-optimised content.

2.4 Disunity: Business reality

At the same time as the TfL contract and Met Police expectations brought-forward the BikeRegister redevelopment deadline, Selectamark's SelectaDNA site was being criticised for its old-fashioned e-commerce functionality and design. A global distributor's conference provided the deadline for launching a new site, the preparation time for which would overlap with BikeRegister's redevelopment, so a new design was created by the company marketing agency and converted by PSD2HTML for the web. A final year undergraduate student volunteered to take the design and apply it to the Bluepark [7] content management system (CMS), which was in-use for selectadna.co.uk, as part of a final year project. This short-

term aim was a financially-efficient stop-gap to work towards the long-term aim of moving Selectamark's UK site to the unified platform, together with all 29 international distributors who at the time were all running web sites on different platforms and, more crucially, with potentially different branding. Ultimately the international distributors were won-over by the unified branding and transitioned to the Bluepark platform in the following 12 months. In the end to-date there has been no strong business case for moving the SelectaDNA sites, UK or otherwise, to the unified platform and there have been distinct business advantages to continuing to use Bluepark. For example, it has proved relatively straightforward and time-efficient to spin-up a new copy of the SelectaDNA template branding in English for the overseas distributor to translate and localise themselves rather than utilising ExpressionEngine's built-in internationalisation features. This has been successfully managed with minimal overhead for approximately 20 distributors to-date. It is also a sound commercial strategy, particularly in times of recession, to leave the international SelectaDNA sites on Bluepark's host and allow Selectamark focus on its core business rather than leaning towards becoming a hosting company or software-as-a-service provider.

2.5 Agility: Project management influences company management

One other change that has arisen as a direct result of the KTP is the adoption of more of an Agile Style of management by Selectamark's MD. Rather than spending blocks of time in meetings, much shorter, focused meetings with very truncated agendas are used. This means that only the key items are discussed and decisions are made so that the business keeps moving forward. There is also the acceptance that the decisions made will not always be the optimum but using the "80:20 rule" the speed of reasonable decision making allows Selectamark to maintain rapid momentum. It also means that the Company has become more flexible and finds changing priorities easier.

2.6 Overview of commercial benefits

- Four new web sites in a twelve month period
- Positioning of Company as market leader
- Improved brand positioning in security industry (20% growth in distributor enquires)
- New partnerships with Police & Government departments (including training users and building long term trust)
- Increased website traffic (BikeRegister website visitors up 120% in November 2012)
- New e-commerce platforms for new growth markets (Selectamark and SelectaLabel)
- E-commerce sales growth
- Growth of International Distributor Network (from 2 to 29)

3. Conclusions

Whilst traditional project planning generally leans towards a waterfall approach, with detailed analysis and research at the start before moving towards implementation in a sequence of measured steps, agility and flexibility are key to taking advantage of timely opportunities and responding to business threats. With an agile approach to the management of the KTP and other business projects, Selectamark and Kingston University have worked successfully together to exceed

the intended outcomes of the original KTP plan, taking advantage of opportunities and responding to business threats when they arose. The partnership with the university has provided opportunities for working together and sharing resources that were not originally foreseen but flexibility in the partners' approach to the project has allowed these opportunities to be taken, all to the mutual benefit of the university and its students as well as to the commercial benefit of Selectamark.

4. References

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