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Applications of a UX maturity model to influencing HF best practices in technology centric companies – Lessons from Edison

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Abstract

In recent years, user experience design (UX) and Human Factors (HF) have become key components of many business models, but there are still many technology companies which view UX and HF as less than central to their product's value proposition; and, in extreme cases, they view it as aesthetics and visual design only. This lack of HF, or UX "maturity", makes the adoption of effective HF practices problematic. There are a number of models[1] that describe various levels of organizational maturity with regards to adopting HF and UX best practices. The authors will show how one of these UX maturity models[2]can be used with organizations that are in early HF adoption stages, to better understand approaches to organizational change. Pragmatic "success" in this context would be the introduction of accepted HF best practices into an organization where none had previously occurred. The authors will then examine three case studies and analyze the lessons learned in terms of: activities introduced; as well as the resultant "state" of UX and what would be required to enable the organization to advance to the proverbial "next level." As a means to illustrate the fundamental nature of UX maturity and innovation we will compare these practices to the approach of Thomas Edison.

*Keywords:*UX maturity; Maturity models; Usability; User-centered design; User satisfaction; Edison

1. Introduction

"If we did all the things we are capable of, we would literally astound ourselves."- Thomas Edison

Organizations are seeing the value of hiring user experience (UX) professionals and incorporating user-centered design. Large name companies such as Google and Apple have incorporated UX design as a centerpiece of their successes. There have been a number of well-known treatises on the introduction of usability into an organization. For example, Shaffer's work [3] documents some of the key components organizations must have in place to

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institutionalize usability. The overall "maturity" of UX design, when it comes to creating software and technology in general, has made huge leaps over the past few decades. Naturally, like any function or practice, not all organizations have adopted or embraced UX design to the same degree or at comparable levels of maturity.

We briefly review here what we use as six key indicators of an organization's UX maturity:

1. The timing of UX involvement in the design and development process.
2. The UX expertise and resources in house and/or ability to bring in UX expertise quickly as needed.
3. The use of appropriate techniques and deliverables to obtain and understand user input and capture UX design.
4. The leadership and culture in the company. How well the leaders, and company as a whole, appreciate the value and necessity of UX design from a business perspective.
5. The degree to which UX processes are connected and integrated with other corporate processes that enable individuals to work together to create the user experience of the product(s).
6. Design thinking is applied in the broadest perspective possible to drive consistent customer experience.

Three of these six indicators are shown here diagrammatically in five stages:

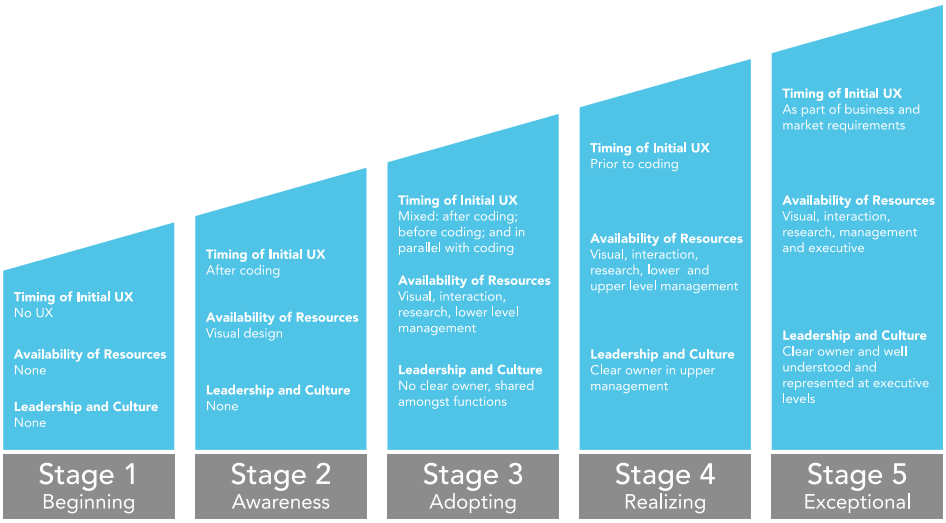

Fig. 1. The Stages of UX Maturity Model.

Here we will examine case studies for organizations in the "Adopting" stage and look at the interactions between the various indicators and their impact on the relative success of the product design and development. Note, for each case study we are intentionally vague about the product and the company in order to protect the identity of the organization and the people.

Now, what does UX Maturity have to do with Thomas Edison?

Thomas Edison is widely known as a prolific inventor, who has 1,093 US patents in his name.[4] While people generally associate his name with inventions such as the phonograph and the light bulb, Edison has also been attributed to be the first inventor to apply mass production and cross-functional teamwork to the process of invention. As a result, in addition to his better-known inventions, he has also been credited as being the inventor of the first industrial research and design facility.[5] Edison brought together cross-functional teams of people: scientists, craftspeople, machinists, mathematicians, and engineers, put them together in an environment filled with an amazing assortment of materials and tools, and created what he referred to as his "invention factory". In a

Harvard Business Review article on “Design Thinking”, Tim Brown, CEO and President of IDEO, Brown states that, “… Edison made it [innovation] a profession that blended art, craft, science, business savvy, and an astute understanding of customers and markets.”[6] Therefore, when Edison invented the light bulb, he didn’t just create the light bulb. He created the light bulb, he created the power distribution system to get the power to the light bulb, and he also created the power metering system to measure how much electricity was being used so he could charge people for it.[7]

Design thinking, and by extension, the UX Maturity of an organization, can be seen as a descendant of that tradition. But, for various reasons, we lost sight of Edison’s tradition and design came to be treated as a downstream step in the development process, similar to the UX Maturity seen in Stage 2: Awareness. Eventually, during the late half of the 20th century, design started to become valued as a competitive asset in automotive and consumer goods. This began to push design further upstream in the development process. Now, with the popularization of concepts such as “Design Thinking”, instead of asking designers to make an already developed idea more attractive to consumers, designers are being asked to create ideas that better meet consumers’ needs and desires. And, this request no longer applies solely to products; it applies to processes, services and interactions.[6]

2. Case Study One

2.1. Context and description

In the first case study a small application(minimal functionality, with only a few screens) was created for small to medium size businesses. The application was intended for use by multiple users across the business, with varying degrees of frequency depending on the nature of their job.

The organization creating the application had a highly skilled UX team, but the UX team was not involved in the requirements definition, ideation or initial design, nor was the company’s marketing team. Instead, a small “agile” engineer-only team led by a senior manager rapidly created the product based on their impressions of the user and market need.

The UX team was later brought in with requests for specific activities and deliverables, which included creating what are typically UX research deliverables, after the fact, and not based on user feedback.

2.2. Results

The product has not been adopted by any of the intended market. There has been no follow-up to understand what aspect of the value proposition failed, whether it was marketing, usability, technical integration or some other issue impacting part of the ecosystem. Essentially, once the initial product was not immediately adopted the small product team went on to another project.

2.3. Discussion

Saying the product failed as a result of the lack of UX maturity would be an unfair statement. Products fail in the market for a myriad of reasons and, we recognize that a UX approach, by itself, does not guarantee good results on any given endeavor. However, it is possible to identify a number of weaknesses in this approach, and how the lack of UX maturity could have contributed to failure in the market and contrast it to a more UX mature “Edison-like” approach to product creation.

It is clear, in this case, that the leadership and culture were the determining factor in the organization not embracing a user-centred design approach. In particular, while there was access to UX skills and resources it was deliberately decided to forgo them. This shows a principle that is generally true for adopting organizations. It really is a game of “follow the leader”. If the people with access to money and resources do not invest in UX – often out of a misunderstanding of its nature and value, not maliciously – then all other characteristics of maturity are unlikely to see the light of day.

It should be noted that the rationale for this “UX-less” approach was essentially rooted in the perception of speed and cost. This allowed for the quick development of a product idea with minimal investment in any of the following: market or user research; user experience design; or follow-up research or analysis of what barriers prevented adoption of the product. The belief being that if enough “good” is created (good being at the discretion of the judgment of the small team), eventually one will be successful and minimal investment will have been spent.

What might Edison have said about this approach?

There was no cross-functional team. There was no integration. There was no consideration of the larger ecosystem. Just as Edison realized the light bulb didn’t act in isolation, this application would not have acted in isolation. That is, it was not apart from other applications and/or from business processes or even from personal preferences for working and adopting it. Yet, none of this was considered in the application, only its “raw functionality”.

How well the leaders, and company as a whole, appreciate the value and necessity of UX design from a business perspective is, in fact, the most fundamental indicator for the success of UX at a company. The company was fully capable of carrying out integrated processes, had knowledge of the right techniques and so on. They simply were not utilized because the project leader in this case did not appreciate or understand how UX applied in this situation.

It is tempting to blame the senior management and software team for not pulling in other functions or seeing this as a holistic cross-functional process, but we believe that is an oversimplified picture. Everyone in the organization plays a role. While it is true, in the end, that those who allocate budget and resources must play a significant role in who is involved, it is also true that there can be many influencers in the organization who potentially could have played a role in changing the outcome.

3. Case Study Two

3.1. Context and description

In this case study there was a large enterprise application that had not had a significant design “overhaul” for close to 20 years. The vendor of the software application still had a significant market share, but was losing recent sales to “easier to use” applications.

UX was completely new to them in the sense it was largely seen as “making the screen design easy to use”. The methodologies, the skills, the processes, were all foreign. Nevertheless, the leadership was behind bringing in outside experts to assist with the re-design for the application.

A professional high-concept design was created and tested with users. Further product work was done, and the product was released to market.

3.2. Results

The market response was positive and the product has attained its key UX objectives (perception in sales, greater efficiency). There was, however, a realization upon execution of the application that the “family” of related products also required some necessary changes in order for the overall product line to be successful. While this had been pointed out in the initial discussions, the business had made the decision to focus solely on the one product.

3.3. Discussion

This demonstrates a number of factors that are relevant to the success of an adopting organization. In particular, the leadership and culture was cognizant of their inexperience in UX practices and were willing to be led – with the caveat that the business goals were clearly defined – in an effective way to bring in UX expertise. It was less about the skills available that led to significant improvements in the product and business (there were more available, in principle, in the first study) and more about the utilization of those skills.

Even without a systematic undertaking in establishing requirements (i.e. there was no ethnographic research, interviews and so forth) and, instead, going from the implicit requirements of the existing product, it was still possible to make a measureable positive impact with design expertise and usability testing. There was a high degree

of coordination of activities between team members on the engagement. The business, technical, and UX experts were in constant discussion about priorities, trade-offs and the focus on overall business value.

So, despite being an "immature" UX organization going into the engagement, they rapidly adopted a number of the characteristics of more mature organizations. Truly led by their leadership, they established a microcosm of an emerging UX culture during the engagement. In fact, this culture eventually led to a reflection on what was missing in the engagement, which was the consideration of the larger ecosystem. This was further considered in what became Case Study 3 and led to an even more successful outcome.

In general, this case study applied very well what we would call some of Edison's most important, implicit tenets: it was a highly collaborative, cross-functional team that led to a success. What it ignored – at least at the beginning – was the larger ecosystem context.

4. Case Study Three

4.1. Context and description

In this situation, the organization that was involved in Case Study Two decided to expand the application of UX best practices. There were two things that were key additions: first, a larger look at the product/business/technology ecosystem was considered before proceeding, and, second some primary research was done in this ecosystem to better understand the needs of various stakeholders.

The eventual output was an update to the "sister" application of the original enterprise application (the one redesigned in Case Study Two) and the creation of a small mobile application. The sister application was an application with complimentary functionality targeted to a smaller user group within that ecosystem. The small mobile application allowed for some approval processes to be undertaken outside of the general usage of the larger application.

4.2. Results

Predictably, the results were even more successful than the previous endeavor. The updated application and the mobile application were well accepted and met with success in the initial sales process. The final market success is too early to conclude, but all preliminary indications are that it will meet its goals.

4.3. Discussion

We think this illustrates well what an "Adopting" culture needs, both from a UX maturity point of view, and equivalently, what Edison would have suggested. In particular Edison implicitly or explicitly suggested

1. You need leadership and alignment on how to approach designing a new product or re-designing an old one
2. You need cross-functional teams with everyone on board early in the product creation process
3. You need to look at the broader ecosystem

In this final case study all three aspects were present and the organization was starting to move into the "Realizing" stage. This doesn't mean that there isn't room for improvement, or an opportunity to improve, but the challenges, or opportunities, are of a different nature. Instead of struggling to release a product of value, the organization is looking at: how could it have come to the same result more efficiently; or what skills are needed permanently in-house, versus can be with contractors; or how can some of the "Design Thinking" principles be applied to a broader context?

Not only are the results, from a product perspective, indicative of the design maturity of an organization, but also the types opportunities for improvement are strong indicators of where an organization is in its maturity. However, until it has at least mastered, on one project, the leadership, integration, and proper scope (ecosystem) it is difficult, if not impossible, to deal with some of the more subtle problems of becoming a more UX mature organization.

5. Conclusion

In this paper we have discussed the six indicators of UX Maturity and have illustrated how those indicators were manifested in our case studies of three organizations at the "Adopting" stage of UX Maturity. As previously stated, technology-centric companies can be particularly adverse to the adoption of HF best practices. Instead, they choose to believe that functionality alone, with their advanced technology, will give them sufficient differentiation in the marketplace. This was a belief that Edison discovered, early in his career, to be a fault in his approach to innovation. Instead, in order to define success for one of his inventions, he decided that success needed to be a function of the utility of the invention. In other words, to Edison, the definition of success of an invention was based on its ability to satisfy the needs of the customer. This approach is summed up in the following quote from The Thomas Edison Papers, "Anything that won't sell, I don't want to invent. Its sale is proof of utility, and utility is success."[8]

To understand those needs, Edison conducted ethnographic research. After the end of the civil war, Edison noted an upswing in the need for insurance, and felt that this would be a lucrative market for him to target. Edison went to various insurance offices and gained permission to observe the clerks at work. This observation of clerks making multiple copies, by hand, of a single document, led him to invent a process for document duplication.[8] But, this research was not done in a vacuum. Edison's approach to innovation, linked research to applied science. In the cross-functional teams in his research and design facility, those people doing the research worked closely and collaboratively with the people doing the applied-science investigations. This meant that the insights from his R&D facility always had commercial applications based on a market or customer need. This approach to innovation is one that is found in companies in the latter stages of UX Maturity: a systematic approach to user research; success metrics of innovation based on end-user satisfaction and marketplace adoption; and innovation is seen as a multi-faceted approach that combines design, technology and business.

This approach to problem solving and innovation is needed now, more than ever, according to Tim Brown (CEO IDEO), "The need for transformation is, if anything, greater now than ever before. No matter where we look, we see problems that can be solved only through innovation… problems that all have people at their heart. They require a human-centered, creative, iterative, and practical approach to finding the best ideas and ultimate solutions."[6]

This 5-stage framework may not exactly match the specifics of a particular organization. In the real world, organizations may display a mix of characteristics from different stages across their organization. Nevertheless, we believe assessing a company against some of these key indicators can provide insights into opportunities and issues that will allow a company to adjust its trajectory and attain its business aspirations that are dependent, or related, to successful user experience practices and their execution. Organizations, like people, learn by doing. And to do properly, experts need to be hired or consulted. Identifying projects, deliverables, and activities are key to progressing. Training, attending talks, reading books, is certainly helpful, but not enough. UX design is no different than any other function in this regard.

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