Innovation by Design

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Introduction

Organizations are seldom shy about their aspiration to be innovative. In a competitive arena, executing "tried and true" approaches tend to leave one mired in the middle of the pack while unique ideas and approaches have the potential to leave the others far behind. Within this context, it is not surprising that nearly everyone strives to innovate. For them, it represents the difference between merely surviving and effectively "knocking it out of the park."

In pursuit of the lofty goal of innovation, organizations will often publically state this value while simultaneously employing futile initiatives to achieve this outcome. They typically assemble teams with specific domain experience and effectively task them to "innovate." Their approach reflects a profound misunderstanding about where innovation comes from and how it is actually accomplished. A second approach is to review innovative case studies and attempt to mirror them. The path to any given innovation is nearly always unique, however, and simplistically heading down known avenues will invariably lead you only to known locations.

It is not all bad news for those of us struggling to match the exploits of our innovative betters. While case studies are naturally specialized, they do reflect fundamental aspects that can be leveraged if one can tease out the generic dynamic from the specifics of the example. A structured approach to innovation recognizes these qualities and exploits the predictable aspects where they exist. The following paper outlines the process ladder that one naturally follows in order to innovate and describes the necessary elements required at each stage.

Data

Data represents the first rung on the ladder to innovation. This is not surprising. It is unlikely that any innovation can occur when there is no clarity whatsoever about a domain of interest. This is not to say that one cannot pursue innovation without perfect clarity. Quite the opposite. This is almost never attainable as data may be non-existent, unavailable, incomplete, or unreliable. The key requirement for obtaining data has historically been access. Key data is often restricted or sub-optimal for a variety of reasons. The ability to locate and obtain access to relevant data is the first hurdle one would need to overcome in order innovate. Broad access provides the opportunity to assess data from alternate sources and to identify what is and often more importantly, what is not valid or usable.

A contemporary challenge is that we are often swimming in data, but our relationship to it is too far downstream to properly assess its quality and this, unfortunately, is also an access problem. Provenance matters, and to effectively work with data, one needs to

understand what it represents, where it originated, and how one truly came by it. Only when we have this full picture can we realistically place data in its proper context and that is vital to both its assessment and development.

Information

Information represents the second rung on the ladder to innovation. It consists of data that has been ordered and refined. Starting with readily available raw data that has been properly assessed, we are all too often still faced with a massive signal to noise challenge. Within vast sums of data that might be relevant exists a relatively smaller amount that is truly useful within the context of innovating. Judgement is the key requirement to achieving quality information. One must be thoughtful about what data is ultimately relevant and what data is not. This is not an impossible challenge, but it is not always obvious and oversights or omissions at this stage can have a far greater impact than one might otherwise think.

The inclusion of unhelpful data decreases the value of information because it potentially obscures more relevant data. This is makes information development more difficult but not impossible. It is far worse to eliminate important data while developing the information view of a domain. The former makes an effective information view more difficult, while the latter potentially makes it impossible. Unfortunately, information complexity grows quickly, and eliminating data to produce workable information is a key part of the process. It is simply not a risk-free part.

Iteration is an invaluable process element that mitigates the risk of discarding data incorrectly. It allows one to be conservative when eliminating and to err in the direction of retaining data. This, combined with a willingness to go back to raw data and reassess/refine in order to build the proper information view, is a fundamental tool in the professional toolbox. It takes judgement to refine data into information and it, likewise, takes judgement to know when to reset the process for an additional round of development.

Knowledge

Knowledge represents the third rung on the ladder to innovation. It consists of learning information and having it remembered. The key requirement to achieving knowledge is commitment. It can require a substantive effort to learn a body of information, but without knowledge, one is relegated to being a consumer and not a developer. Passivity is not a part of innovation.

While it is true that everyone has differing capacities to learn, knowledge acquisition at an individual level is still not uniform. When a body of knowledge is small or nonexistent, acquisition can be quite slow. New information lacks context and is much harder to comprehend and retain. As knowledge grows, so does the capacity to learn and learn more quickly. A common impediment to knowledge is often this ramp up period

because the rate can feel so slow. Another challenge is that task switching is cognitively expensive. There is a period of reduced efficiency until one orients oneself mentally, and this is compounded when an individual lacks minimal context. This makes task switching to information that is entirely unfamiliar a dynamic that most individuals will strongly avoid.

Still, it is clearly possible, and people invariably acquire new knowledge throughout their lives. Recognizing and acknowledging that knowledge acquisition in an unfamiliar domain is difficult steels one for the potentially painful period of low initial productivity. One should level set their personal expectations and plan for early periods of reduced growth. Building on this will eventually lead to increased productivity where discernable progress is much more appealing.

Understanding

Understanding is the fourth rung on the ladder to innovation. It consists of a genuinely deeper level of knowledge. When we understand something, we have clear recognition of how elements of knowledge are connected. This is critical because absent these connections, one merely knows about something, and this represents a major impediment to innovation.

If one were to visit any successful business endeavor, and I use that expression very loosely, one could ask lots of questions about what is done under various circumstances. Individuals would likely quickly and easily respond. The fact that they are successful suggests that they will have relatively good answers to these questions. They have lots of domain knowledge. Under circumstance A, we do B. Under C, we do D. This can go on and on. If the follow up question to one of these answers is a simple "why?" we will likely face blank stares.

Overwhelmingly, once people know what to do, they typically stop pursuing additional knowledge. The effort to achieve understanding is often viewed as simply unnecessary because people can function efficaciously without it, and most are reluctant to invest the additional time and energy under these circumstances. Curiosity is the key quality that drives understanding. The curious among us are those who continuously seek knowledge and strive to recognize the relationships between what they know. They do this well past the point where they are already fully performing in a domain and along the way they achieve understanding.

Assembling people with domain knowledge, but without domain understanding, is almost invariably going to produce the status quo. Without a clear understanding about what already exists, the best we can hope for is a regurgitation of prior success. To pursue alternatives without understanding is to introduce inordinate risk. People recognize this vulnerability, and when they lack understanding, they invariably identify safe approaches, head down already worn paths, and advocate solutions with known qualities. They may ask “what have we done before?” or the tricky “what have our peers done before?” People often think it sounds humble and wise when they ask about others, but

absent understanding of the domain, they are merely trying to mitigate risk by following already identified solutions.

When people with understanding advocate solutions, they are not bound by what they or others have already done. They are entirely willing to consider and pursue alternatives that have not already been tried. This is a big improvement over simply repeating the solutions of the past, but it is not innovative. The solutions identified will, indeed, be those that are expected given the usual connections between elements of knowledge. When people with domain understanding ask the "what are our peers doing?" question, they are pre-populating the solution space with alternatives in order to jump start the process. They are fully prepared to evaluate solutions under their reality and will frequently combine elements from different, but known, solutions. They are prepared to arrive at solutions independently, but this will not change the state space of known outcomes.

A process driven by domain understanding may not ultimately tread new ground, but this does not make it bad. One can almost guarantee that these solutions will be thoughtful, effective, and well aligned with local needs and realities.

Insight

Insight is the fifth rung on the innovation ladder. In some ways, it can be construed as a deeper understanding, but this does it a disservice. If we define understanding as making the usual connections between elements of knowledge, then insight would be to form unusual connections between elements of understanding. When we establish expected connections, we proceed down known paths and arrive at expected results. There is nothing wrong with this, but it merely reinforces our understanding of a known area. Innovation can only come from unusual connections.

Time is what we need to achieve insight. More specifically, we need to remove the constraint of time. It is possible to achieve insight almost immediately. It may appear in a flash after a long period of struggle. It may happen incrementally over time. There is no way to time-box the process of insight. People make obscure connections in their own way and at their own pace. If the connections are non-obvious by definition, then we have no reason to expect that this can happen in accordance with an externally dictated timetable.

The most practical way to foster insight is to give people time and space to achieve understanding and then go beyond that. It is when people understand with both depth and breadth that unusual connections can be gleaned, but only when allowed to percolate. The brain is both marvelous and mysterious and often works best when left to work on its own. Returning to domains of understanding repeatedly increases the chance of that odd and wonderful connection.

Assembling people with broad domain understanding and offering them a grand challenge that can be pursued in big ways and in little ways, in fits and starts, and without

the pressure of instant progress can and often does produce the most peculiar ideas. We should revel in that. This is not simply a glass half full or glass half empty situation. This is when one questions, “what does water in a glass mean anyway?”

Innovation

Innovation is the sixth rung in the ladder and represents, after all, both the purpose and the goal. The dictionary definition for innovation notwithstanding, I would rather describe innovation in the context of the innovation ladder as "execution against insight." It is less traditional, but it succinctly captures when an innovation goes from concept to reality. Defining something new based on the non-obvious connections between elements of understanding is already hard, but it requires courage to act on it in a sea of empiricists bound by existing knowledge and preset ideas.

An insight, by definition, is atypical and possibly even unique. The innovation that can be drawn from this is almost invariably orthogonal to community perceptions. Launching out into uncharted territory requires confidence and a willingness to fail and to fail hard in front of a bevy of critics. However, it is precisely these forays into the realm of the unknown that, when successful, return the biggest rewards.

Enforcing classic project methodology, with its adherence to well established milestones and a risk mitigation philosophy, is likely to terminate an innovative approach early, resulting in a project that is forced back onto a well-known path. A known approach has known risks that can be most easily managed and minimized using known approaches. This is not to say that traditional project management is wrong. Quite the contrary. It is often precisely what one needs to ensure success in a project. It is, unfortunately, entirely at odds with innovation.

Innovative projects on the other hand have a big red flag even before beginning. This is simply the inherent risk of pursuing a creative or unique approach. Since classic project management mitigates risks, the typical project manager would want to remove this risk and hence, the unique approach. Innovation dies before it even begins. To innovate is to embrace this risk and not avoid it. Even an abject failure from a classical sense down an innovative path can produce new understanding and even new insights. Innovative projects may not succeed in the way expected, but they seldom truly fail if one is prepared to extract alternate value from the effort. When they succeed, they often succeed in the most remarkable ways.

Conclusion

Almost all organizations espouse the value of innovation and often launch initiatives with the expressed intention of achieving it. Here I have offered a mental model consisting of data, information, knowledge, understanding, insight, and innovation as a valid path to what organizations ostensibly value. Unless they recognize that this is a repeatable path to innovation and they are also prepared to promote the key qualities of access,

organization, commitment, curiosity, time, and courage, then innovation is not a serious part of the organization. If they can embrace this path and develop these qualities, then there is no true upper bound on the creative and innovative solutions they might produce.