THE CHALLENGE OF SUPPORTABLE OPEN SOURCE SOFTWARE: IS IT REALLY OPEN?

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Abstract

Information sharing has become an important phenomenon in Information Systems, as "Open Source" software continues to spread. College campuses in the United States and Developing Countries find this particularly attractive, since the cost of technology projects effectively has reduced. However, this implies a willingness to share one's talents openly. Many software engineers are eager to do so, however, they thus lose their competitive edge. This paper examines the forces leading up to the Open Source era, and what one might expect in the future.

Introduction

Researchers and academics acknowledge a transition in the economy from an industrial model to a new model, which is often described as data, information, knowledge, service, digital, or some other conveniently descriptive term. The post-industrial economy started around 1950 as commercial computers were increasingly used in business applications, while the roots of the industrial/manufacturing revolution can be traced back to the late 18th century (15). Some experts have indicated that the information age is now being replaced by a fourth revolution, which is referred to as the knowledge economy and is described as "the collective consciousness of the knowledge workforce" (9). Despite this recognition of a new era based on human knowledge, intellectual capital has only recently been explicitly identified (11). Organizations still struggle for an integrated and managed organizational knowledge solution in a global economy (10).

Intellectual capital is not necessarily accepted in all countries. In China, for instance, major Western corporations confront the reality of their proprietary knowledge used by local organizations without prior consent or compensation. Perhaps the global economy only exacerbates the unauthorized use of proprietary knowledge.

During its 250-year history, the field of operations management contributed several important developments, such as specialization, interchangeable parts, scientific management, worker motivation, commercial computers, quality management, and the global computer network (14). More recently, the field has witnessed a few new advancements, such as the balanced scorecard, and business performance measurement. These programs have expanded organizational measurement beyond financial metrics with the hope of identifying other important aspects of an organization, such as customer satisfaction, employee engagement, and the organization's internal effectiveness. Many of these developments are used in the disaggregation of processes as globalization enabled by superior network connections. However, this disaggregation implies sharing and distribution of some knowledge. The extent to which knowledge sharing is utilized will affect the success of global projects.

Experts have noted for several years, that creating and executing strategy has become a required competency for modern-day organizations (5). Organizations that simply improve through incremental enhancements will gradually lose their competitive advantage in today's hyper-competitive economy. Organizations that can enable employees with technology and organizational architecture may be able to gain a strategic advantage by using the insight and solutions provided by these knowledge workers (6).

Research indicates that strategy, much like knowledge, remains a somewhat undefined term (7). This area may be open for the most opportunity. That opportunity is evidenced in the growing IT offshoring, where companies that use outsourcing to gain a strategic advantage have been successful. However, numerous smaller organizations sought merely to reduce

technology costs, without considering an overall strategic purpose to the outsourcing. Those organizations have not all been as successful in maintaining a competitive advantage.

Industrial era organizations refer to supply chains as a series of steps and inputs required to transform raw materials into an output in the form of a finished product (1). These chains also represent the people, process, and technology required to complete a certain task. In the same way, organizations are now employing value streams to represent the steps required to assemble data and information into products and services that are non-physical, such as financial advice. However, mapping value creation through information and knowledge is multidimensional and requires more than linear thinking (12). As knowledge becomes a commodity readily accessible through the World Wide Web, organizations need to find a niche in the specific value that they create, and then to find ways to protect that knowledge.

The field of information systems is relatively new and has evolved from rudimentary data processing to more sophisticated manipulation and delivery of data and information (8). Data mining is one such sophisticated technique that is capable of adding enormous value to an organization. There is significant research that indicates IT has bolstered productivity in organizations, but most of these gains have been transactional in nature. These activities become attractive targets for outsourcing. In contrast to transactional data, knowledge is much more difficult to quantify. Tom Peters has stated that the microchip will replace the need for humans to perform routine mental tasks. Online loan application and review is an example of a routine task that has almost been entirely turned over to artificial intelligence applications.

To gain a competitive advantage, organizations must now begin the process of identifying and mapping knowledge particular to that organization. To realize the benefits of knowledge transfer fully, employees need to be open to sharing their insight and base knowledge. However, employees may withhold sharing information based on the fear of losing an individual competitive edge within the organization, especially during trends of downsizing and rightsizing (3). Human beings typically try to protect their own well-being, even at the expense of the organization for which they work. Some employees who suspect that their employment might be terminated if they share their knowledge and training with newer employees, or potential competitors, could be expected to find ways to protect themselves by keeping some important information away from others. Concepts such as learning curves, experience curves, and manufacturing progress functions have existed for many years; they are based on the belief that something must be measured before it can be improved (4). Unfortunately, many of the benefits of knowledge management are difficult to quantify. The open source phenomenon, which includes blogs and wikis, has demonstrated that individuals are open to sharing ideas in a public forum. Openly available information (open source) could take many forms; it should be evaluated just as any other knowledge would, for value, accuracy, and currency. The One Laptop Per Child (OLPC) project benefited from the availability of a free Operating System – Linux. Poor countries benefit from the low-cost laptop, made possible by open source software (13). The widespread use of open source software at many US college campuses gives additional credibility to the robustness of Linux, and to the viability of open source software. Research indicates that a conversational style of knowledge management requires a change from gathering knowledge from a few experts, to acquiring contributions from many participants (16).

There is clear evidence of a growing acceptance of open source software within the academic establishment, and amongst many users in developing countries. The low cost of the software, and the continuing improvements and support that is cost free, is attractive to individuals with limited resources. However, the researchers are interested in examining the extent to which companies would use open source software for mission-critical applications. If ABC Co. acquires software from IBM or Microsoft, and the software malfunctions causing ABC a financial loss, the company would have recourse to legal remedy via the courts. In a true open source environment, any user may modify the original programming code, and after presumed testing, it would be incorporated into the latest version of the software. However, ABC might consider what action it could take if the software functioned improperly, causing the company loss of business. It would appear that ABC would have

to bear the burden of the loss resulting from software errors.

Information technology can be used to automate almost any routine white-collar work. By eliminating or reducing routine work assignments, knowledge workers should be freed for tasks that are more creative. However, organizations will need to find creative ways to make knowledge sharing an integral part of the employees' experience. There should be a pervasive culture of openness, such that the company's goals and objectives include a free exchange of ideas. The company provides the individual with the opportunity to innovate, and should share in the benefits of the innovation. Organizations will also need to review and alter their organizational structures and capabilities to match these new requirements (2). In the present business environment where nearly every organization has a supply chain that stretches across several time zones and continents, linked by unprecedented communications facilities, old corporate structural models are inadequate. Companies should be nimble and flexible to react with alacrity to the ever-changing technology options. Recent articles in the financial press indicate that despite the expected downturn in the US economy, most major corporations, such as AMR (the parent of American Airlines) do not intend to reduce their IT investment significantly. They consider IT the heart of the business and a competitive necessity. Similarly, the corporate structure should also be considered of critical importance in the competitive position of the company.

Conclusion

Open source software is a powerful motivator for the development of innovative techniques that empower creative individuals. Just as system and product development have a life cycle, so also Open Source software development appears to have a life cycle. The life cycle begins with the innovators writing and publishing code. This code is freely available and thus 'open' for all interested users to modify. It appears that in the next phase, as the product matures, and more commercially viable, corporate users are more inclined to accept this freely available software. However, these users are unlikely to adopt this software without the protection against catastrophic software failure. This leads to the next phase, in which technology providers step into the breach to support a mature version of the software and provide the protection that their corporate users require. These supported versions are acquired from the open source libraries, and packaged into a proprietary version. This version may not be altered by the corporate users. The maintenance cycle is managed by the technology provider for the life of that version. At this stage of the life cycle, is the software truly 'open'?

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