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OPEN-SOURCE OPTIONS FOR SMALL BUSINESSES

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## ABSTRACT

This research is on finding different conditions for small businesses to implement open-source software. The purpose of the study is to increase the knowledge of open-source solution to smaller businesses. As a result, small organizations can take advantage of open-source applications that can better manage their information.

Open-source software is a licensing model that discloses the software's source code to the public and does not charge a fee in exchange for the source code to be credited by the developer, even after modification. Therefore, software applications developed through the open-source model does not cost as much as commercial software programs. However, open-source programs lack technical support and program hands-on training. These disadvantages lead to the findings of the four parameters for small businesses, who consider implementing open-source solutions.

The four parameters are technical support, cost of the software, conversion / maintenance cost, and importance to core business. With better recognition of the business' needs to serve its customers through software applications, businesses will have a more efficient and effective business operation. Overall, small businesses should view open-source programs as alternative applications that are available for anyone and not to be anchored to purchasing commercial software for certain function of the business operation.

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## Chapter 1

### Introduction

Technology, computers, and software are ubiquitous. Program applications, such as Internet Explorer, Firefox, and Microsoft Word, are used daily to support the digital life. Learning the features and capability of the everyday computer programs and software applications is considered advantageous in the 21<sup>st</sup> century. Businesses that use software as part of the function of their business operation will find software programs evolving every day. Companies are using software applications to manage mass amounts of data and manipulate the data to fit companies' need. Managing the mass amounts of data masterfully will be the key in becoming an organized and successful business.

Information is extracted from data and it plays an important role in the economy. Data is used to assist companies in understanding their customers and their own business operation. Software programs used to collect data and extract information cost more as the amount of data increases and therefore require more storage space and time for processing.

Currently, large corporations and profitable midsize companies are the only organizations who can afford capable data collecting software. On the other hand, small businesses face disadvantage in competing with big corporations in this area. However, if small businesses can harness the power of open-source software and use it as an alternative option in maintaining their businesses' needs, they will be able to capitalize on raw data and turn it into information that helps them make the optimize business decision. The intertwined influence of the open-source community will be the catalyst in introducing open-source software to the economy, allowing small businesses to be profitable enough to support a growing economy.



## **Background of the Problem**

The rationale for conducting this study is that the general audiences, especially small businesses, lack the knowledge of open-source applications. Not many people know what open-source means or which software is considered open-source. Open-source software is not widely used in small businesses because its unfamiliarity of the software itself. Most of the time, commercial software companies take advantage of small businesses who cannot afford the software. With an increase in advertisements either by word of mouth or by increasing the open-source software availability, small businesses can better utilize software that cost less than commercial software.

## **Purpose of the Study**

The purpose of this research is to have small business owners be familiarized with open-source software so that businesses are aware of its existence and benefits. The motivation behind the study is the aspiration to learn more about open-source software and how its application can be of help to the small businesses. I have friends and family who own small businesses, who have not heard of or used open-source software. Because they do not know open-source software as alternative options, they lose capital by spending more on commercial applications.

## **Scope of the Study**

The scope of the study will include research studies of open-source software that present the variety of available applications. Chapter two will be an overview of open-source software. It will compare open-source software with commercial software to help differentiate the two models. In addition, there will be a further discussion on the distinction between “open-source”

and “free” software. Chapter three will be on the impact of open-source software on small businesses. The chapter will further discuss the advantages and disadvantages of open-source software. Chapter four identifies the four parameters for users who are considering open-source software application for their organization. Chapter five will apply the four parameters discussed in Chapter four to an actual small business. Finally, Chapter six is the conclusion and final thoughts of the research.

### **Research Question**

Even though open-source software is available for free, under what condition is the adoption for open-source software reasonable? With the consideration of technical support and training, will it become a negative reason in adopting open-source software? Compared to a packaged version of open-source software will that be an optimized choice for small businesses? Will there be different trainings provided for the open-source software as most companies are used to certain commercial software interfaces?

### **Disposition of the Thesis**

In hopes of benefiting the business community, I want to find the conditions under which users should implement open-source software. There may be insufficient data and facts to prove that open-source software will be able to be implemented as a wide-range application throughout the business world. Nevertheless, the fact remains that open-source is a less expensive alternative. Having more knowledge about open-source software will not only be the computer programmer’s job but also the entrepreneur’s job to learn about them. Especially, if users who want a more efficient and effective system which can collect, store, and process information

properly. Information will be the most powerful tool in the future but it will be obsolete bits and bytes unless there is a suitable application to cultivate the information into useful data to make wise decisions.

In the real world, large corporations that have the resources and capital are able to purchase state of the art systems in order to convert massive information into useful data. However, small businesses can also realize this process inexpensively with the implementation of open-source software applications.

## Chapter 2

### **The Fundamentals of Open-Source Software**

The terms “open-source” and “closed-source” software are widely misunderstood by the general public. Cost, security, and flexibility are used to measure the usefulness of the software. These points are used in debates among users to cause distrust regarding open-source software. Over the past years, there has been a growing acceptance of open-source software, which has been widely adopted and is viewed as a beneficial advantage by large and mid-sized businesses. The following sections of this chapter will further discuss the differences between “open” and “closed” software, as well as the different methods and policies of open-source software.

#### **The Differences Between “Open” and “Closed” Software**

Open-source software and closed-source software are two of the most popular software licensing models. Closed-source software licensing model requires users who use their software not to modify the source code and to pay a fee to use the software application. On the other hand, open-source software licensing model discloses its source code to the public and does not charge a fee in exchange for the source code to be credited by the developer, even after modification (Categories of Free, n.d.).

#### **Uses of Closed-Source Licensing Models**

Proprietary, private, and commercial software are software examples which follow the closed-source software licensing model (Categories of Free, n.d.). Proprietary software is not free, while redistribution and modification to the source code is prohibited or restricted. On the

other hand, private software is developed and customized for the use of a single organization (Categories of Free, n.d.). Because of security reasons, many private software source codes are not disclosed. For instance, Wal-Mart uses a private software application where information on customer purchases are recorded and are used to be analyzed between its suppliers and stores for restocking and better serving consumers (Wal-Mart Sets the, n.d). The private software Wal-Mart uses is only available to its employees and vendors. Wal-Mart would not want its superiority in supply chain to decline. Therefore, the software would be kept for private use to support its operations. Commercial software developed by businesses is used as a means to make a profit. For example, Microsoft Office Suite is a software application developed by Microsoft for either writing documents, storing data, or creating slide presentations. Commercial software vendors do not disclose its source code to protect intellectual property rights of its programmers.

Commercial software and proprietary software are not similar in the sense that there are commercial free software and non-commercial non-free software for proprietary software. For instance, Linux is an open-source operating platform which is available to be freely downloaded on its website: [http://www.linux.org/dist/download\\_info.html](http://www.linux.org/dist/download_info.html). However, the software is also available as a packaged software including customer support, special features, and regular maintenance with the charge of a fee.

### **Open-source licensing models**

Open-source software was started first as an application created by an interest group as a hobby. Open-source software applications are distinguished between two principle licensing models: GNU General Public Licensing (GNU GPL/ GPL) and Berkley Software Distribution (BSD) (Adida, n.d. and Hiong, 2005).

Under the GPL policy, all organizations which practice this policy are prohibited from imposing a fee on the distribution of the source code. In addition, all versions and derivatives of the software must be licensed and distributed as the original. For example, if a programmer develops an application for a GPL software platform to use, it will also be submitted under the GPL policy, because it is considered to be a derivative of the software. The remuneration under the GPL licensing policy comes from the fee the software developer charges when the software application (not the source code) is sold. They can also charge a fee for system setup, system management, system support, or system maintenance.

The Red Hat organization is a company that stems from the GPL policy. Red Hat was founded in 1993 with the purpose of helping companies of any size to gain access to available open-source applications, such as Linux (redhat.com, n.d.). Red Hat is reputable in uniquely assembling qualified open-source software together from different open-source providing communities for a small fee (redhat.com, n.d.).

The BSD licensing policy is more flexible and less restrictive for organizations to develop open-source software. The BSD license allows the developers to integrate open-source code along with their own source code to create a new product. Apple's Macintosh is an example of the application following the BSD licensing policy because it uses Linux as the foundation of the platform along with the developer's own source code to create the Macintosh platform. Therefore, Apple's Macintosh is not under the GPL policy and would not be required to disclose its source code to the public.

Table 2-1 is a summarized difference between open-source and close-source software.

Table 2-1 Table of Comparison between Open and Closed software

Open-Source Software Licensing Method	Closed-Source Software Licensing Method
<ul style="list-style-type: none"> <li>- Marketed through the spread of word of mouth</li> <li>- Driven by the self-interest group of community</li> <li>- No ownership after downloading the software</li> <li>- Developed in a opened and collaborative organization</li> <li>- Receive revenue through user support, commercial company support, and charges to package software</li> <li>- Allow modification of the source code as long as the original programmer is credited</li> </ul>	<ul style="list-style-type: none"> <li>- Marketed through advertisements and commercials to the general public for years</li> <li>- Driven by the demand of customer of functionality and usability</li> <li>- Ownership after the purchase of the software license</li> <li>- Developed in a confined single organization</li> <li>- Receive revenue though customer paying of the license</li> <li>- Does not allow modification and redistribution of the source code</li> </ul>

### Different Concepts of Open-source and Closed-source Software

Figure 2-1 illustrates the different categories of free and non-free software. There are at least eleven different categories of software which falls under the umbrella of open-source and close-source software licensing method (Categories of Free, n.d.). Under the open-source category, it includes: “Free” software, open-source software, public domain (with source), copylefted software, and non-copylefted free software. The close-source or non-free software consists of: commercial software, public domain, private software, shareware, freeware, and proprietary software (Categories of Free, n.d.).

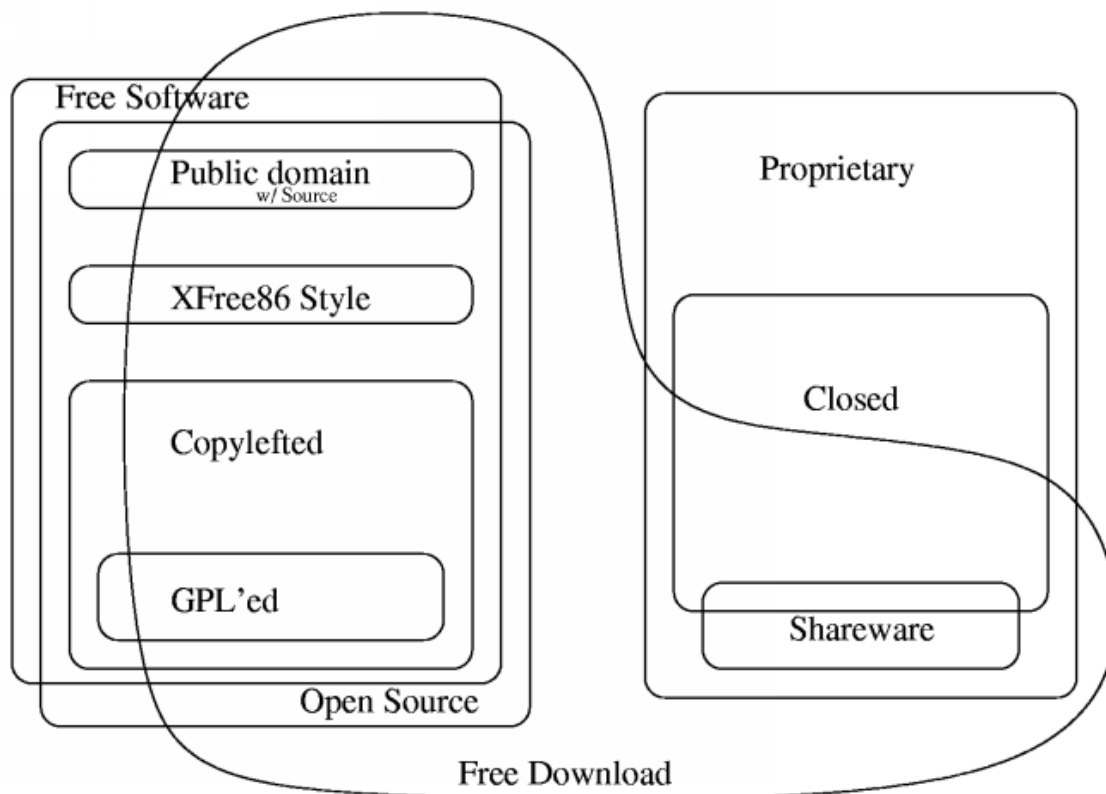


Figure 2-1 Drawing depiction of “free” software, “open-source” software, proprietary, and close software. (Source: Categories of Free, n.d.).

Public Domain Software is an example of the software that is not copywrited. If the public domain software does not include the source code, the software is not free and open-source. On the other hand, if the public domain software includes the source code it is considered to be under the free and open-source category. Copylefted software is free software whose distribution term of all copies of the software carries the same policy in prevention of modification of the application into proprietary software (Categories of Free, n.d.). Non-copylefted software requires the permission of the author to be redistributed and modified as proprietary software. Shareware allows users to use the program but does not release the source code or allow modification and may require a licensing fee to be paid in order to continue to use the program (Categories of Free, n.d.). Freeware must not be confused with the term “free”



because freeware software only allows redistribution but modification of the source code is not (Confusing Words and, n.d.). “Free” and “Open-source” software definition will be defined in the next section.

### **“Free” Software and “Open-Source” Software**

Open-source software itself is an abstract concept. By definition, Open-source software and “free” software are interchangeable; however, “open-source” and “free” software both have different value beliefs (Woods, n.d). “Open-source” software is referred to the source code being available to the public to view. “Free” software is defined as software for user to “run, copy, distribute, study, change and improve the software” with no payment and permission from the developer of the source code (Stallman, n.d.). The “free” software is developed with the concept of not making a profit at all but similar to the concept of the United State First Amendment: The freedom of speech.

“Open-source” software supports the enhancement of software that would appeal to businesses based on practical views, “such as making or having powerful, reliable software (Stallman, n.d).” The criteria of “open-source” software is that the software must be free to be redistributed along with the source code, allow adjustment of the software as a patch under certain licensing, and credits the author of the original source code. The licensing policy of the open-source software applies to all software applications that is derived from it, and the license of the software must not be for a specific product that restricts other software and must be technology neutral (The Open Source, n.d). Although the source code is available to the public, under the license term of the software, there are restrictions that does not allow users to access the encrypted media but only allow others within the open-source community to change it (Confusing Words and, n.d.).

GNU, the proprietor of “free” software, established the “free” software philosophy to distinguish “free” and “open-source” software. According to the GNU website, the “free” software definition:

The freedom to run the program, for any purpose (freedom 0). The freedom to study how the program works, and change it to make it do what you wish (freedom 1). Access to the source code is a precondition for this. The freedom to redistribute copies so you can help your neighbor (freedom 2). The freedom to distribute copies of your modified versions to others (freedom 3). (The Free Software, n.d.)

The philosophy of “free” software expresses the word “free” as a word that stands for freedom and not the value of the software. Fundamentally, “free” software does not necessarily mean that the software developed is a gift that requires an act of exchange; a concept the general public does not recognize (The Free Software, n.d.).

The overall belief value between “open-source” and “free” may be different, but fundamentally both methods’ main goal is to develop software available for any user and consumer alike.

## Chapter 3

### **Small Businesses and Open-Source Software**

As larger enterprises are opening their options to open-source software, they are gaining new markets and exploiting opportunities that smaller companies cannot. According to Penny Crosman, a former Senior Technology Editor of IT Architect, there are less than 50 percent of small to midsize businesses that use some form of open-source software (Penny, 2006). Surveys do show that smaller businesses who implement open-source applications because of low costs, simple adaptation and upgrades, and allowing vendor independence and more functionalities (Penny, 2006). This shows the brighter side of open-source software as businesses integrate open-source programs into the organization. The following section will further explain the advantages and disadvantages of open-source software.

#### **Why Implement Open-Source Software?**

Most small businesses do not know enough about open-source software and would rather use older versions of commercial software in order to save money (Andrew, 2006). Many times small businesses would pirate the commercial software. However, this may cause a problem when there are technical difficulties, especially if there is no one in the company who can fix this problem. It will be further complicated because the program installed is a pirated version of the official software which does not have the official software customer service support (Jennifer, 2006). Small businesses should look at open-source software as an alternative to avoid these types of issues. Furthermore, open-source should be viewed as a gateway to advance and compete with larger corporations (Andrew, 2006).

Recently, open-source applications have become more widely accepted along with the growth of small businesses, though commercial application vendors still dominate the market (Rick, 2008). According to Rick Whiting, editor of InformationWeek, many smaller companies would rather pay for basic commercial applications such as Microsoft Office and QuickBooks, but would not be willing to purchase the premium upgrades for these applications. These basic applications may not be enough to perform all the functions of the company in the first place and the premium upgrade is in fact a necessity. Companies do not comprehend that most open-source applications work just as good as or even more suitable than commercial applications in a business setting (Rick, 2008).

For example, Collax, an IT solution service provider, introduced an open-source server to the market on August 2006. This application gives organizations more options other than commercial software. In addition, Collax also provides technical support services for their open-source software, but for a fee. The solution Collax introduced uses Linux, an open-source platform, as its foundation to create the software solutions. An advantage of this application is that the server will not require a Linux expert on staff just because the software is based on Linux. Collax's software solution uses an understandable interface to interact with the users so that they will not have to know Linux to use the software (Jennifer, 2006). If businesses were to learn about this open-source server alternative, they would not need to pay higher price to a commercial server provider.

### **Cost of Open-Source Software Development**

According to surveys done by the IDC Emerging Technology shown in Figure 3-1, most customers purchase open-source software because of the cost. However, there are customers who understand the benefit of the software other than saving money, such as a competitive advantage,

optimal use of IT resources, and the upgrade of a company's infrastructure (Rick, 2006). Since price is a driving reason for implementation of open-source software, customers need to comprehend the reason why open-source applications cost less.

The development of open-source applications is less expensive compared to closed-source because open-source applications are developed in a worldwide community of programmers and hackers (Rick, 2008). All developments of open-source programs are created by members of the open-source community during their spare time. As the community is hosted on the Internet, there is more reach to different people from anywhere and anytime to develop the software. With a low research and development expense, the sale price of the open-source applications is not high (Rick, 2008).

For instance, Digium, a company that sells small business phone systems, is built from open-source software called Asterisk and Zenoss (VoIP Telephony, n.d.). Asterisk and Zenoss are applications that make open-source network management software. Digium makes money by selling support services as well as extra features that enhance the software, such as high-end security (VoIP Telephony, n.d.). Digium is an example of a proprietor software vendor who makes phone systems using open-source application as the foundation for lowering its research and development expense.

Moreover, many open-source applications are available to download for free at the community website. There are also some exceptions to the statement. Some vendors sell proprietary open-source programs, where customers are given the option to pay a subscription fee for a more professional edition of the application which include more functions, features, and support (Rick, 2008).

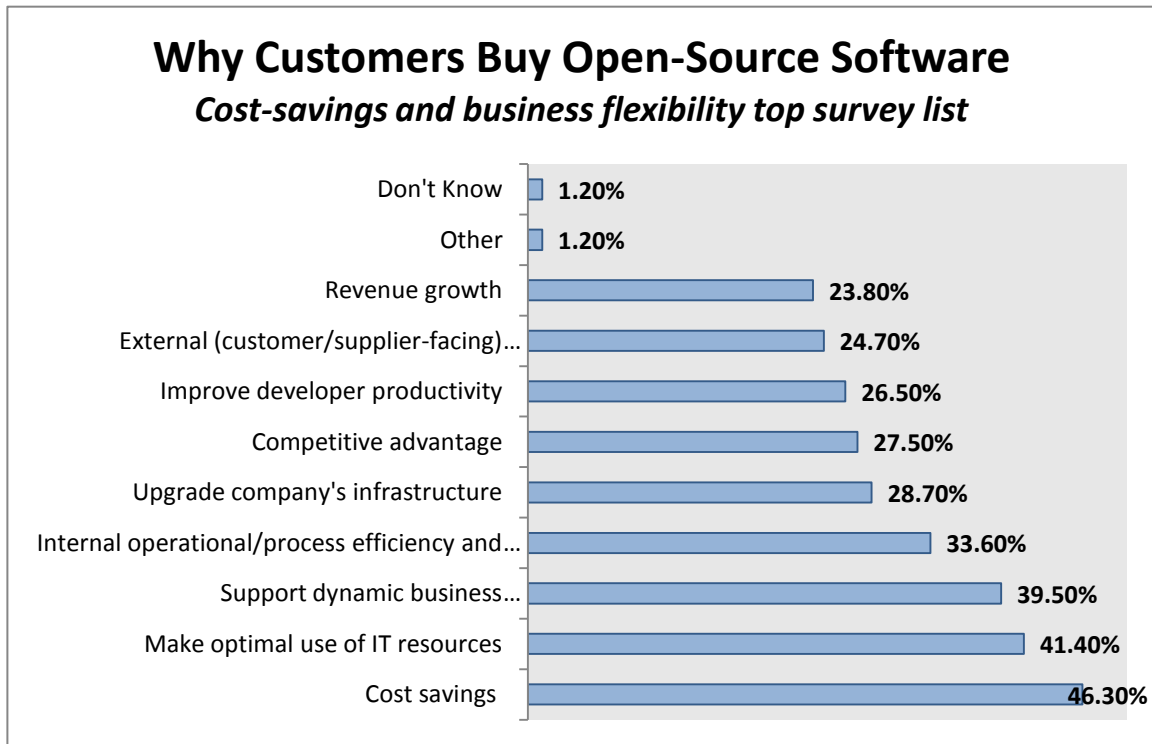


Figure 3-1 Why Customer Buy Open-source Software Reasons (Source: Jennifer, 2006).

### Security Issues on Open-Source Software

According to an analysis done by the Business Software Alliance, open-source solutions are usually viewed as applications whose security is inferior compared to commercial software solutions because the source code is publicly available (Hiong, 2005). As source codes are published, it is believed that flaws are more exposed thus leading to hacking of the security system if a company were to implement the application.

In reality, security is not a concern only for open-source applications but also for closed-source applications. Many commercial programs have been hacked even after large amounts of money were spent on efforts to strengthen their technical security. For instance, Microsoft is known for its vulnerabilities not because their security is flawed but because of the wide-range adoption of Microsoft which attracts hackers. According to Microsoft Security Intelligence 2009

Report, there has been 56.4% of Microsoft software attacked by either virus or malicious code (Microsoft Security, n.d.). Figure 3-2 shows the two different Windows operating systems (Windows XP and Windows Vista) that have received software attacks during 2009. From this data, Windows Vista may seem like an operating platform with less vulnerability. However, the transition from Windows XP to Windows Vista has been unsuccessful for many businesses. After the release of Windows Vista in 2006, only 13 percent of businesses have adapted Vista and the rest stayed with Windows XP because its standards are more accustomed to by business users (Tindal, 2007). Crackers, hackers who hack into systems to inflict damages, use this opportunity to hack into software, such as Microsoft's Windows XP, a platform that has many end users (Zetter, n.d.). Figure 3-3 shows an increase of software vulnerability throughout the industry for every year in increment of 6 months.

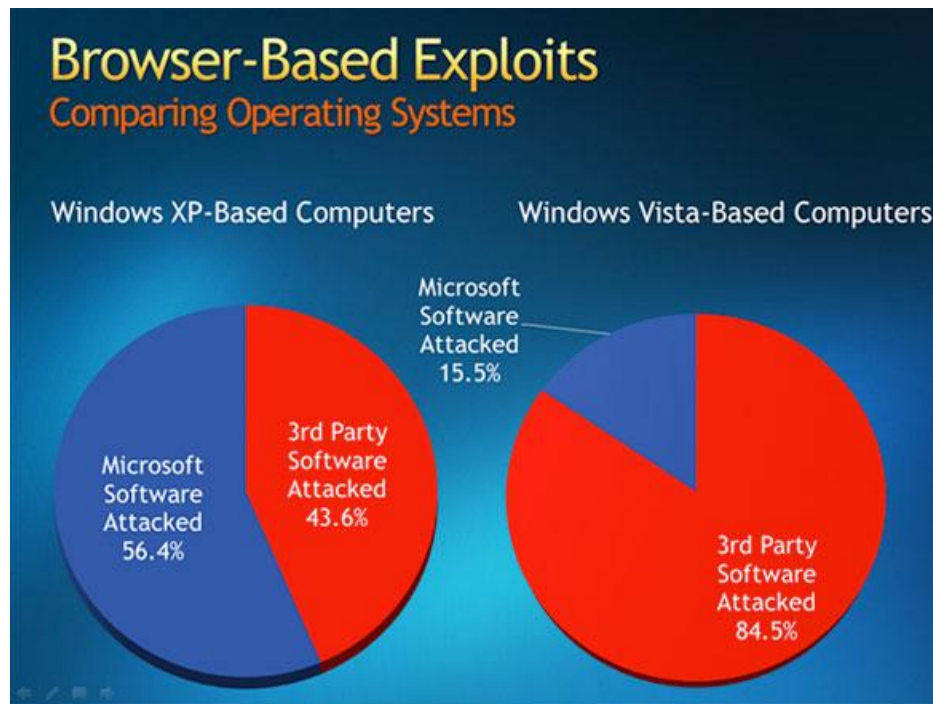


Figure 3-2 Microsoft operating system security vulnerability (source: Microsoft Security, n.d.)



Figure 3-3 Industry-wide software vulnerabilities (source: Microsoft Security, n.d.)

As demonstrated, Microsoft is a closed-source commercial vendor and the software Microsoft develops still has shortcomings that many other software solutions have. The deficiency of Microsoft's security does not imply that their products are inferior, but it is to demonstrate that closed-source applications are also subjected to security concern.

Many critics' security concern stem from open-source's source code availability to the public's scrutiny. Even so, critics should not assume that once the source code is known, crackers will have access into the program to alter information. According to an article on why hackers hack, it states that many hackers hack into computer systems to show superiority in programming skills (Zetter, n.d.). Open-source application is a community with many programmers and experts who are also hackers. If there is any vulnerability in the system, the flaw can be detected and mended faster. In an analysis compiled by the Business Software Alliance on open-source security, it has been discovered that there are open-source programs that



have vulnerabilities undiscovered notwithstanding public availability of the code (Hiong, 2005). The analysis also states that “having access to source code does not prevent a backdoor from being hidden and remain undetected in software (Hiong, 2005).”

Security of software application is eminent, however, business owners should not judge any software based on the development or distribution method but by the program’s initial security design and most importantly the user’s deployment, configuration, and maintenance of the software (Hiong, 2005).

### **Other Advantages of Open-Source Solutions**

Open-source applications are more advantageous in vertical markets because of their ability to customize applications with little or no charge (Rick, 2008). With the increase in popularity of open-source software, companies will also weigh in an “open-source option along with commercial software packages in any buying decisions (Jennifer, 2006).” As open-source communities grow, more bugs and technical problems are being solved every day by someone (Jennifer, 2006). In order to cater to businesses’ fear of privacy and security, open-source communities would offer packaged versions. Packaged open-source solutions contain much more securities and technical supports and customers can test the product freely before purchasing or continuing using the product if the product’s free features allow the business to run smoothly (Jennifer, 2006).

Flexibility is an advantage to open-source programs, as it allows the flexibility in upgrading and maintaining maintenance of the application (Hiong, 2005). This advantage is believed to be a demonstration of superiority compared to closed-source software. Nonetheless, the Business Software Alliance believes that the flexibility of both closed and open software is equally accessible to the user (Hiong, 2005). Commercial software provides patches and updates

to the software within the licensing term for no cost. As for open-source application, the community provides different versions of update and patches of the application as the program is continued to be developed into an optimized software application for users (Hiong, 2005).

Customization is an advantage of open-source software. Customization can be requested to the programmer of the open-source community to be developed with a lower cost compared to the customization of applications from commercial vendors to the user themselves (Hiong, 2005). The drawback of customization is when the original program receives an updated version, the customized program may not be able to receive the same upgrade and support (Hiong, 2005).

Finally, open-source offers more sets of eyes to understand the source code. Because of the availability of the source code on the internet, programmers all over the world can give their opinion and expertise to the source code.

The flexibility, customizability and publicity of open-source programs insinuate advantages that commercial software does not have or does not provide. Even so, commercial software insures users trust and reliability of the applications that open-source applications cannot compared to. There is no superiority between the two models as both have advantages and disadvantages. The most important lesson is that the users of the software application understand what their core business functionality needs and how they use the proper software with the necessary update and maintenance.

### **Open-Source Existence in Small Businesses**

If small businesses are still conscious of the disadvantages such as technical support and training of open-source solutions, they can look into commercial open-source vendors. For example, small businesses can look into Red Hat, an open-source vendor, for solutions and applications that are suitable for the company. In a Business Week reporting on cost conscious

ways to save on information technologies, commercial open-source vendors have been making the most of the recession as companies have to cut cost globally (King, n.d.). As more companies turn toward open-source solutions, the software industry became more competitive. Open-source programs not only increases the competition between commercial software in the software market, but also offers new products developed from open-source's source code which leads to lower costs of the software products (Andrew, 2006).

### **Future Goal of Open-Source**

Bob Igou, a research director at Gartner, believes that open-source applications are going to be the back bone of small businesses (Jennifer, 2006). While smaller organizations may look at open-source applications as a cost saving solutions, they should also view it as a way to integrate more optimized software to compete with enterprises who can afford the commercial software. The ignorance of open-source applications should not be an excuse to not explore the idea.

As open-source software becomes more popular, so will the sophistication of the open model. Open-source solutions are prospected to be more well-rounded as more users and businesses acknowledge its existence and usage (Larry, 2005). For example, Open Office is an open-source alternative to Microsoft Office. Many people have never heard of it had it not been for word of mouth. As the application became more popular, the application itself became more commercialized in a non-costing version. Open Office provides technical support and training programs just like its commercial counterpart while the price of the software itself is all for free.

## **Chapter 4**

### **Parameters to Consider in Evaluating Open-Source Software**

No matter what kind of business is being run, not all software programs are suitable for every business. Small business owners need to assess the following four conditions before embracing open-source software into their organization.

1. Technical Support
2. Cost
3. Conversion Cost/ Maintenance Cost
4. Importance to Core Business

Each of these conditions will be further explained for a better understanding and what kind of affects can occur after implementing open-source software without any consideration of these parameters.

#### **Technical Support**

Technical support is a service many commercial software vendors offer, such as Microsoft's call center. If there are any technical problems that occur with the installation, or using of the application, there are technical representatives available to give advice. As an example for comparison, commercial software vendors' technical support package versus open-source software vendor technical support package will be evaluated.

Apple is used as a comparison for the commercial vendor technical solution package. Because both Red Hat (Linux) and Apple (Macintosh) provide technical support for their platforms, both are used as comparison. Macintosh's platform, Mac OS X version 10.6 "Snow

Leopard" is based on Unix, a open-source platform, their technical support package can be expensive (Mac OS, n.d.). The solution package can range from \$5,995 for selected service to \$49,995 for full service for one year (Apple – Support, n.d). Table 4-1 displays a detail description of the package that Apple offers.

Red Hat as mentioned earlier is an open-source software vendor. It is an organization that is built on the foundation of helping businesses transit into open-source software applications, provide services, and advice to users who have technical problems with the application. The support package can cost from \$80 to \$9000 (Red Hat Small, n.d.). The service all depends on the needs of the customer and core of the business. For instance, if the core of the business depends highly on a server, it is best to purchase the more expensive solution package for an immediate attention to the problem, therefore leading to little or no downtime. Downtime of the server can affect customer to interaction with the server. Table 4-2 displays a full description of the price and the solution package Red Hat offers.

Technical support is a necessity when dealing with software programs because most software programs have bugs that programmers may not have found and can only be discovered when it is in use (Larry, 2005). Most businesses and people in general should purchase technical support packages as insurance for incidents that are caused by data, the computer, or the application itself.

Open-source software programs that are not provided by Red Hat are in the gray area of technical support. The reason is because most open-source applications are created by freelance programmers or the community. Compared to commercial packaged solutions technical problem would not require a technician or cost much. Questions regarding the program are asked in a forum or by email directly to the programmer (Larry, 2005). Solutions are contributed by members of the community. Other open-source software communities use Internet Relay Chat (IRC) for users to be able to have a live chat with the programmer. The drawback of IRC is that

the programmer may not be on 24/7. To have a good understanding of how the program functions regarding its feature, it is best to join the open-source community that created the program and begin by asking other users.

Table 4-1 Apple Mac OS X software technical support packages (Source: Apple – Support, n.d)

<b>Package</b>	<b>Description</b>	<b>Cost per year</b>
<b><i>Mac OS X Software Support Select</i></b>	Mac OS X Server Software Support - Select provides ten enterprise-level support incidents for Mac OS X Server and other Mac OS X based client-server technologies. The plan provides support 12 hours a day, seven days a week, with as fast as a four hour response during normal business hours. Unused incidents expire after one year.	\$5,995
<b><i>Mac OS X Server Software Support - Preferred</i></b>	Mac OS X Server Software Support - Preferred covers an unlimited number of enterprise-level support incidents for two technical contacts from your organization, provides two-hour response for priority 1 (server down) issues 12 x 7, and assigns a technical account manager to your organization.	\$19,995
<b><i>Mac OS X Server Software Support - Alliance</i></b>	Mac OS X Server Software Support - Alliance covers an unlimited number of enterprise-level support incidents across multiple locations for four technical contacts in your organization and provides one-hour response for priority 1 (server down) issues, 24 x 7. This plan also includes an onsite review by an Apple technical support engineer and assigns a technical account manager to your organization.	\$49,995

Table 4-2: Red Hat technical solution package (Red Hat Small, n.d.)

<b>Package</b>	<b>Description</b>	<b>Cost per year</b>
<b>Red Hat Enterprise Linux (up to 2 sockets)</b>		
<b><i>Basic</i></b>	Web support, 2 business day response, unlimited incidents	\$349
<b><i>Standard</i></b>	12x5 phone support, web support, unlimited incidents	\$799
<b><i>Premium</i></b>	24x7 phone support, web support, unlimited incidents	\$1,299

<b>Red Hat Enterprise Linux (unlimited sockets)</b>		
<i>Standard</i>	12x5 phone support, web support, unlimited incidents	\$1,499
<b>Red Hat Enterprise Linux Desktop</b>		
<i>Basic</i>	Web support, 2 business day response, unlimited incidents	\$80
<i>Multi-OS w/ Basic</i>	Web support, 2 business day response, unlimited incidents	\$120
<i>Workstation w/ Basic</i>	Web support, 2 business day response, unlimited incidents	\$179
<i>Workstation + Multi-OS w. Basic</i>	Web support, 2 business day response, unlimited incidents	\$219
<i>Workstation w/ Standard</i>	12x5 phone support, web support, unlimited incidents	\$299
<i>Workstation + Multi-OS w. Standard</i>	12x5 phone support, web support, unlimited incidents	\$339
<b>Red Hat Application Stack</b>		
<i>Basic</i>	1 year web support, 2 business day response, unlimited incidents	\$1,999
<i>Standard</i>	1 year 12x5 phone support, 1 year web, unlimited incidents	\$5,499
<i>Premium</i>	1 year 24x7 phone support, 1 year web, unlimited incidents	\$8,499
<b>Red Hat Directory Server</b>		
<i>Small Business Bundle</i>		\$5,000
<i>Small Business Bundle w/ Red Hat Enterprise Linux AS Premium</i>	1 year 24x7 phone support, 1 year web, unlimited incidents	\$9,000

### Cost of the software

Cost is an important factor in determining software for a company. In the cost parameter, only the software price will be taken account of. It will not include additional purchases of technical support, consulting, and training. These expenses are considered to be parameters in making open-source software as a choice for small businesses.

Not all businesses have the capital to spend on systems, software, or programs to run their businesses. Most small businesses rely on commercial software programs in order to simplify daily functions (Larry, 2005). For instance, small businesses would recognize

QuickBooks as accounting software and would implement it into their business. Many small business owners would not look into other account software programs that may be less expensive compared to QuickBooks.

Taking QuickBooks as an example, a new copy of the latest version of QuickBooks Pro 2010 can cost \$199.95 and for additional licensing, it will cost an extra \$180 (Intuit QuickBooks, n.d.). The upgrades for the QuickBooks Pro 2010 software are \$179.95 per computer and cost an additional \$160 to upgrade each additional license. QuickBooks Pro is regarded as basic package for small business as Intuit does offer QuickBooks Premier, which includes more modules to cater larger small businesses. QuickBooks Premier costs \$399.95 per computer, and an extra \$350 for each additional license. In addition, if Intuit releases a new version every year, it is equivalent to getting another license, which requires an upgrade of the current QuickBooks software on all the computers (Beware the Ides, 2010).

OneStep Accounting is a freeware accounting software. As mention before, freeware is not considered to be open-source software; however, with the permission of the administration, others are allowed to use the program with restriction to some of its feature. The OneStep Accounting Standard Edition 4.0 application license is emailed to the company email address as the company registers with the website to download the program (OneStep Accounting, n.d.). The standard edition of the program has limited features, but depending on the core businesses functionality, the standard edition may be enough to fulfill the requirement. Features of OneStep Accounting include standard accounting features such as general ledger, invoicing, bill paying, and inventory tracking. If a small business feels the need to purchase a full version of the software application, it will cost \$90.00 for one license and for additional licenses, it will be \$45 more (OneStep Accounting, n.d.).

*TurboCASH*, open-source accounting software, is a program developed toward small and midsize businesses (TC4:TurboCASH4, n.d.). The software is available to be downloaded freely



at: <http://www.turbocash.net/>. *TurboCASH* does not cost anything to be utilized, but the drawback of using this and any other open-source software is the lack of technical support, training, and cost of converting existing data into the program's file extension.

Table 4-3 illustrates an overview of the three account software programs that are used to compare against each other along with features each program offers.

Table 4-3 Accounting Software Price Comparison (Source: Intuit QuickBooks, n.d., OneStep Accounting, n.d., and TC4:New Features, n.d.)

Product	Features	Price
<b>QuickBooks Pro 2010</b>	<ul style="list-style-type: none"> <li>Track expense</li> <li>track sales and payments</li> </ul>	\$199.95 per computer
<b>QuickBooks Pro 2010 additional license</b>	<ul style="list-style-type: none"> <li>manage payroll</li> <li>create invoice</li> </ul>	\$180.00
<b>QuickBooks Pro 2010 upgrade</b>	<ul style="list-style-type: none"> <li>inventory management</li> <li>provide international sales and expenses</li> </ul>	\$179.95 per computer
<b>QuickBooks Pro 2010 additional license upgrade</b>	<ul style="list-style-type: none"> <li>Login Protection</li> <li>allow multiple users to work on QuickBooks at the same time</li> </ul>	\$160.00
<b>QuickBooks Premier 2010</b>	<ul style="list-style-type: none"> <li>Everything that QuickBooks Pro offer with addition to:</li> </ul>	\$399.95 per computer
<b>QuickBooks Premier 2010 additional license</b>	<ul style="list-style-type: none"> <li>Create business plan</li> <li>Forecast sales and expense</li> </ul>	\$350.00
<b>QuickBooks Premier 2010 upgrade</b>	<ul style="list-style-type: none"> <li>Create industry-specific reports and install industry features</li> </ul>	\$349.95 per computer
<b>QuickBooks Premier 2010 additional license upgrade</b>		\$325.00
<b>OneStep Accounting Standard Edition 4.0</b>	<ul style="list-style-type: none"> <li>Customer and vendor management</li> <li>Credit and debit memo</li> <li>Create sales invoice and purchase invoice</li> <li>Create order form</li> <li>General Ledger</li> <li>Cash Management</li> <li>Inventory Management</li> <li>Create Reports</li> <li>Login Protection</li> </ul>	Free but need to register company
<b>OneStep Accounting Professional Edition 4.0</b>	<ul style="list-style-type: none"> <li>Everything that the standard edition offer with addition to:</li> </ul>	\$90.00 per computer
<b>OneStep Accounting Professional Edition 4.0 additional license</b>	<ul style="list-style-type: none"> <li>Sales quotation</li> <li>Sales order</li> <li>Delivery order</li> <li>Purchase order</li> <li>Goods received note</li> <li>Multiple user access</li> </ul>	\$45.00
<b>TurboCASH</b>	<ul style="list-style-type: none"> <li>Available in more than 81 languages</li> <li>General ledger</li> <li>Banking</li> <li>Transaction and budget ledger</li> <li>Customer and supplier management</li> <li>Stock portfolio</li> <li>Generate reports</li> </ul>	Free

### **Conversion Cost/Maintenance Cost**

Conversion cost transpires as an organization switches from commercial software to open-source software. The cost appears in the form of training programs, data conversions, system updates/system changes, and consultation fees. Open-source software may not have costs to acquire, but time is spent to understand the feature and teaching others to use the program instead of having a more productive work outcome (Larry, 2005). For instance, GnuCash, open-source accounting software, offer users to keep track of accounts receivables and accounts payables. The program has a simple interface outlook as shown in Figure 4-1. The simplicity of the interface does not make up for the complicity in inputting data. Many businesses already use software programs which can perform similar tasks. In a scenario where the business decides to switch to GnuCash, a transfer and conversion of the past data may not be possible if the open-source software does not support the function. The business will more likely have to hire an external technical support, such as Geek Squad, to perform the task if the company does not have an in-house technician. Furthermore, if the open-source application does not provide a file converter to convert files of different programs into the implemented open-source software application, manual reentering of the data may be required. In addition to hiring a technician, training will be required to teach employees to use the program. Training programs cost money and time of the employees. The following section will further illustrate the conversion cost that can affect companies when open-source software is implemented on an impulse.

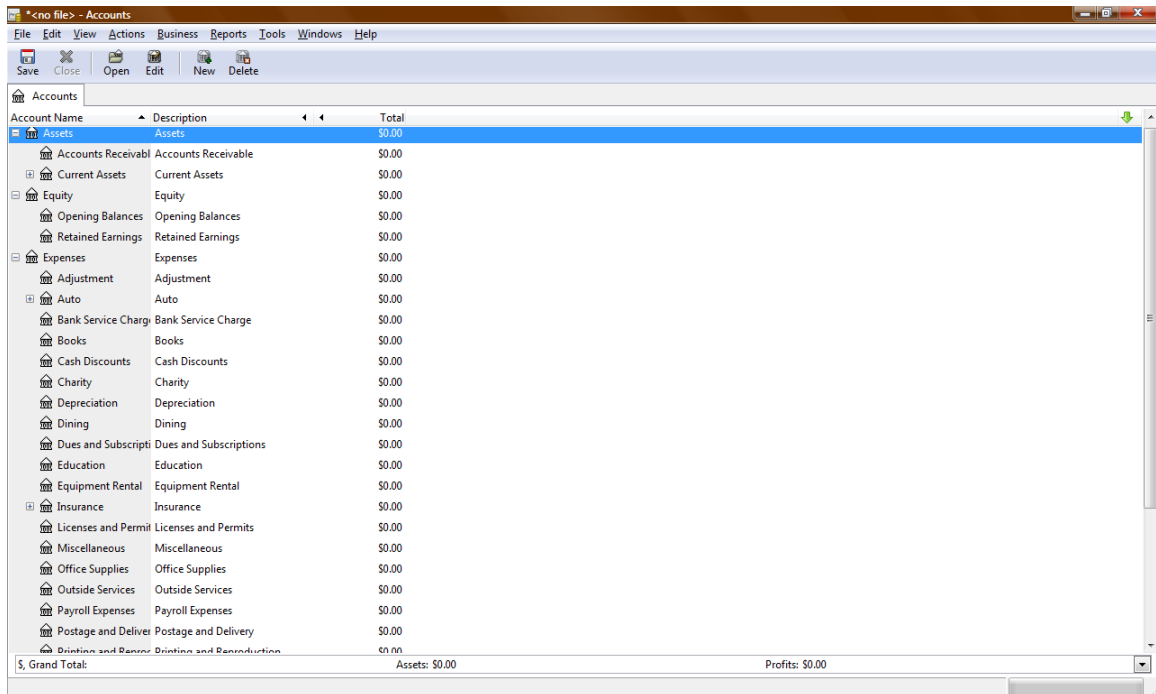


Figure 4-1 GnuCash interface (Source: Welcome to GnuCash, n.d.)

## Consultation Fee

Businesses seek consultants for advices, especially for recommendations on software programs that are best for the company. According to Forbes magazine, IT consulting firms can charge from \$175 to \$294 per hour, or even higher for their service (Crane, 2006). Small businesses seek IT consultants to make sure their system is compatible with the open-source software of their choice (Larry, 2005). Eventually, the consultant can recommend training programs for employees.

## Training Program

Commercial software vendors usually offer training programs in their package, but it depends on the software that is implemented. Microsoft provides training to employees if there

are users who have trouble using the application. The training programs that Microsoft put forth are available both online and in classroom settings. Taking Microsoft SQL 2005 as an example, Microsoft offers an introduction training program for \$2,225 in a classroom setting in Philadelphia that lasts for five days (Microsoft Training, n.d.). The cost and training days are different depending on the course the user wants to take and how the course is to be taken (online or in class). On a side note, online classes are less expensive compared to classroom setting classes.

Open-source software also offers training programs. For instance, Red Hat, the open-source packaging vendor, provides training for companies both virtually and on site in major cities in the United States and Canada. The program's rate depends on the training course the user wants to participate in. Each course can range from one to five days long and can cost \$2,500 and up (Classroom Courses, n.d.).

Not all open-source applications will offer training program, only the popular open-source software have training program design for them (Andrew, 2006). Many times, users who install open-source software will have to self-teach the program to themselves. The community's forum, where the application is developed will serve as an online training program for users to ask questions. The open-source training programs provided may not require money as community members help each other. But, time may be needed to learn the functions of the software as they may take longer compared to actual training programs (Andrew, 2006).

### **Third Party Technician**

A third party technician will be called if there are no in-house technicians available to see what went wrong with the software or the hardware. According to a blog on PC support call on different technician around the area, third party technicians charge on average from \$99 to \$229

per hour as a flat rate. The service different technicians provide varies. However, the more expensive the technician charges, the more thorough the procedure will be provided by the technician (McLaughlin, n.d.).

Geek Squad is a subsidiary of the Best Buy Company and a reputable third party technician (Geek Squad,n.d.). Their services are not only for personal problems, but businesses rely on their service for technical difficulties too. Some of Geek Squad services consist of computer set up, security performance, data recovery, hardware installation, software install, and virus removal. Each service cost differs depending on the difficulty of the problem. Table 4-4 displays the price of each service Geek Squad charges.

Table 4-4 Geek Squad service charge (Computer Set, n.d.)

<b>Service</b>	<b>Description</b>	<b>Price</b>
<b>Security and Performance: standard</b>	<ul style="list-style-type: none"> <li>• Install security software</li> <li>• Perform system update and cleanup</li> <li>• Test and Verify PC and software functionality</li> </ul>	\$69.99
<b>Security and Performance: advance</b>	<ul style="list-style-type: none"> <li>• Everything in standard package in addition to:</li> <li>• Create a backup restore CD</li> </ul>	\$99.99
<b>Security and Performance: premium</b>	<ul style="list-style-type: none"> <li>• Everything in advance package in addition to:</li> <li>• 1 year anti-spy protection</li> </ul>	\$129.99
<b>Computer Repair</b>	<ul style="list-style-type: none"> <li>• Software and Hardware Evaluation</li> <li>• Removal of Spyware and Viruses</li> <li>• Repair Operating System</li> <li>• Install patches and system updates</li> <li>• Optimize to fit your needs</li> <li>• Remove unnecessary files/icons</li> </ul>	\$199.99 and up
<b>Hard Drive Installation and/or File Transfer</b>	<ul style="list-style-type: none"> <li>• Install and format hard drive</li> <li>• Transfer data from old storage to new storage</li> </ul>	\$ 149.99 per computer
<b>Technology Consultation</b>	<ul style="list-style-type: none"> <li>• Review device</li> <li>• Recommend solution</li> </ul>	\$99.99 flat rate

Third party technician services are inevitable when it comes to technical difficulties. Because not all open-source software can offer technical support, users who decide to use it may have to hire a third party technician to fix any technical problems.

### **Importance to Core Business**

The importance to core business parameter is the most vital constraint of consideration for open-source applications. It is used to determine if the core function of the business operation requires intensive software applications or not. For instance, if the business is in manufacturing, it may require software applications that can better manage the company's inventory, employees, customers, or orders. Business should not assume open-source applications as less expensive solutions and only implement the software without understanding the software. The lack of thorough consideration may lead to more expensive consequences. For example, if the software applications are not compatible with each other or if there are technical difficulties that occur, it would cost the business owners time and money to resolve the issues. Software incompatibility occurs between many open-source applications if the programs installed are not developed by the same open-source community (Andrew, 2006). This drawback can cause inconsistency between the program and the user experience. For example, GnuCash is an open-source accounting software that keeps track of invoice, customers, suppliers, and most importantly accounts. However, GnuCash does not offer business a module for businesses to manage their inventory. Business would have to install a different program that can perform the operation such as Simple Inventory, an open-source inventory management software for personal or small businesses (Open Source Inventory, n.d.). Both GnuCash and Simple Inventory are not developed by the same community so it might not be possible to link the two programs together to function as one

application. As a result, there is no perfect program that can cater to all of businesses' needs. As businesses trade in for more features in application, the result will be an increase in the price of the application.



## Chapter 5

### Case Study of KH Wholesale

KH Wholesale's full name and actual location will not be mentioned throughout the study to protect the interest of the company as requested from the business owner. The following investigation will study the company's current information systems and is evaluated with the four parameters: technical support, cost of the software, conversion cost/maintenance cost, and importance to business. The study's purpose is to demonstrate the different kinds of open-source software available for small businesses.

KH Wholesale is an Asian wholesale and retail trading company located in the United States. KH Wholesale is a small, private, sole proprietorship that consists of a boss who manages four officers and five truck drivers, who supervise four helpers, as shown in Figure 5-1. With a small business, all the employees usually have multiple tasks, but there is only one person who is responsible for updating and backing up data of the account receivables and account payables on the computer. In addition, third party accountants and technical support technicians are hired to assist the company. KH Wholesale's core customers are restaurants and Chinese take-out restaurants within the tri-state area. The company provides restaurants products such as rice, vegetables, meats, and take-out containers.

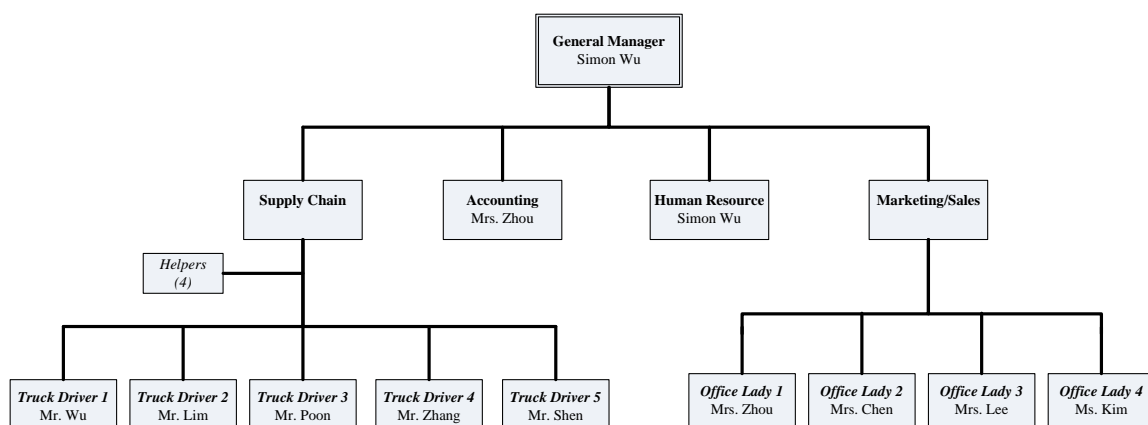


Figure 5-1 KH Wholesale Organization Structure (Source: Interview, 2010)

### KH Wholesale Business Operation

KH Wholesale is a warehouse with an office for customers to place their orders. All orders placed by the customers are either through the telephone, walk-in, or fax. The order purchase placed by telephone and walk-ins are all written on an order forms. Order forms are separated into returning customers and irregular customers. Returning customers are allowed to pay their bills at a later date, usually the following month. In addition, returning customer has the privilege to have products ordered to be delivered on a regular basis and receive discounts. Unlike loyal customers, irregular customers are required to pay in cash or check at the office. In return for the quick order, the irregular buyer will receive their merchandises within fifteen to thirty minutes depending on the order. Purchases placed using the fax machine are filled out as invoice for delivery. The faxed-in customers have a set schedule of when their goods are delivered by KH Wholesale's drivers. The invoices of the order are sent to the restaurant at end of the month for billing. The following Figure 5-2 is flow chart of KH Wholesale's business operation.

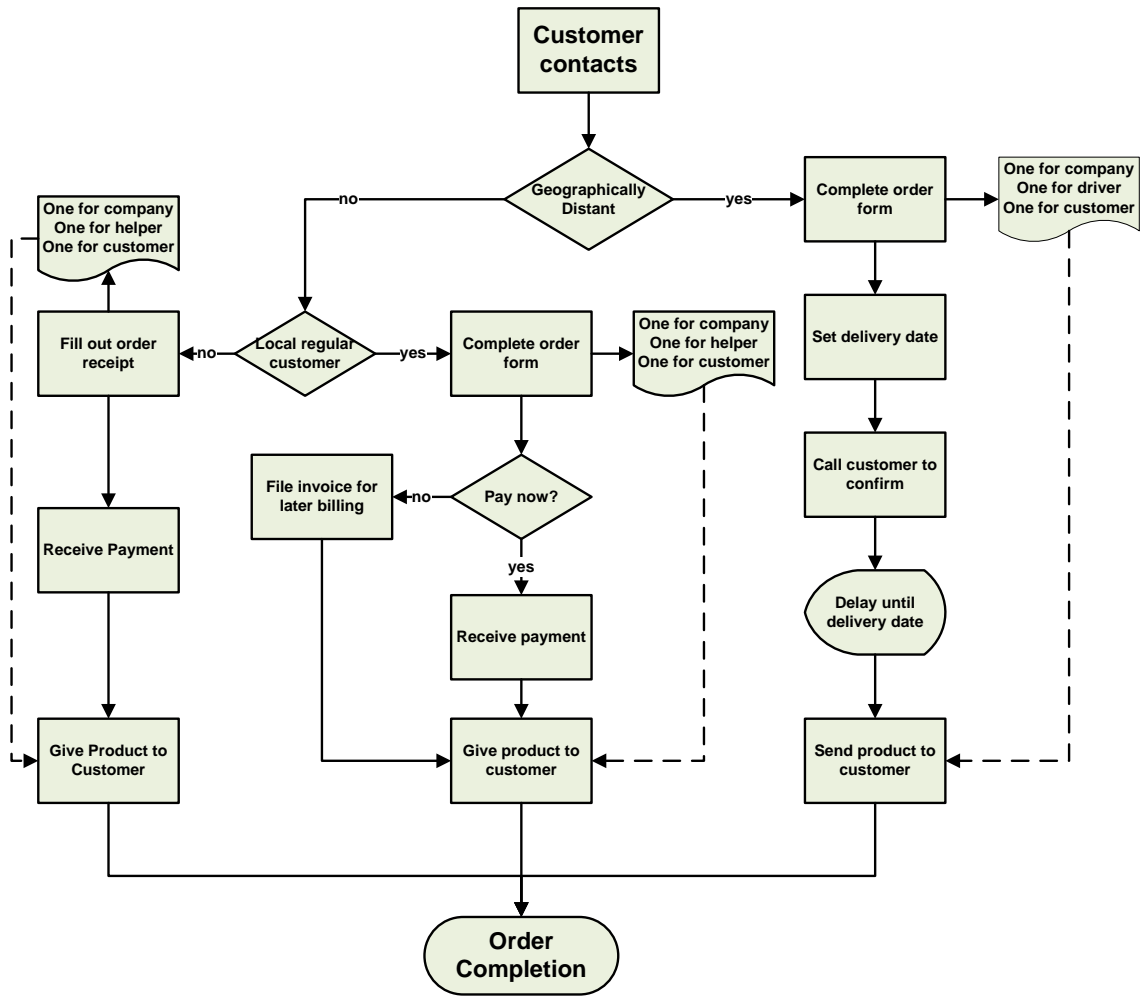


Figure 5-2 KH Wholesale Business Operation of Customer Ordering (Source: Interview, 2010)

### KH Wholesale Current Software System

KH Wholesale’s current software system is simple yet ineffective. KH Wholesale systems consist of little to no integrated information systems. Furthermore, the current software application of KH Wholesale is not used to its fullest potential, thus wasting money spent on purchasing the licensing and possible future upgrades. In addition, human resource or availability of human power is a problem in the company as a result of its weak information systems. Proper

software applications are not implemented to keep the company running efficiently and competitively.

The current business' core software of KH Wholesale is QuickBooks Pro 2008 software on their Windows XP computer. The application is used mostly for accounting purposes, and keeping information on customers and vendors. Microsoft Word is another software application KH Wholesale use in their daily routine. Microsoft Word is used to type documents to vendors and customers. KH Wholesale is not using the full features of QuickBooks. For instance, KH Wholesale did not use the QuickBooks' feature of tracking the company's deliveries and pre-order deliveries. Currently, KH Wholesale keeps track of deliveries through printed invoices. Orders placed by customers are usually left in paper format and are rarely entered into the computer. KH Wholesale keeps track of their inventory by having employees checking and estimating inventory in the warehouse. There is no actual count of inventory stored in the warehouse.

KH Wholesale insubstantial software system places itself in a disadvantage position. With a weak software system, KH Wholesale does not have up-to-date information of their inventories, customers' orders, and deliveries. On the contrary, KH Wholesale can look into open-source application as an alternative solution to solve the problem. However, before the company implements any open-source software, it will have to carefully consider the four parameters mentioned in Chapter 4 of open-source software.

### **Open-Source Consideration for KH Wholesale**

KH Wholesale is a small business that considered open-source software as a foreign object. The company has no idea what it is or what it does. Thus, have no interest in implementing the open-source application. What KH Wholesale can do is broaden its horizon

and take into consideration that open-source software application can be of help in either organizing their information or working along with commercial software. Not only must KH Wholesale widen its spectrum, the company must also understand its organization and its core business for its compatibility for open-source software. An erudite decision can be made by using the guideline of the parameters for consideration before implementing open-source software. They are technical support, cost of the software, conversion cost/maintenance cost, and importance to business.

### **Technical Support**

As mentioned earlier, KH Wholesale core business software is QuickBooks. The company had purchased the annual technical support package of QuickBooks to insure any future problem with the software. Technical support of QuickBooks, Microsoft Office, and open-source alternative that have similar function will be evaluated. The technical support of QuickBooks cost \$79.99 for the first month and \$39 per month afterward (QuickBooks, n.d.). The annual support plan for the software can cost \$349.00 for the first year and \$299.00 afterward (QuickBooks, n.d.). The monthly support service consists of online backup of the data, data recovery, and 24 hour phone assistance. The annual support service includes everything from the monthly support service with the addition of a training CD for step by step tutorial.

As for Microsoft Office, there is no additional cost for the technical support as most technical problems would revolve around installation and bugs on the software (Help and How, n.d.). A call to the technical center, problems regarding the software can be resolved by the technical agent. Furthermore, there is a forum setup on the Microsoft solution website to help users adjust to changes of the Microsoft's software applications.

One main reason open-source software is not utilized in many businesses is because of the lack of a technical support service (Andrew, 2006). If KH Wholesale plans implement open-source applications, they should first excogitate if the software application installed necessitate any technical support. Not all software application available requires technical support (Larry, 2005). The service acts as an insurance for the software installed. For instance, KH Wholesale can consider installing Open Office, a Microsoft Office alternative. Open Office's technical support is in the form of a forum, similar to Microsoft's technical support. Therefore there is no charge for users to access technical support.

For the account software, *TurboCASH* is an alternative to the QuickBooks in KH Wholesale case. *TurboCASH* is an accounting software suitable for small and midsize businesses. *TurboCASH* is only available for Windows platform (TurboCASH. n.d.). The data entry format of *TurboCASH* is similar to SAP, where account windows are accessible by selecting menu options. *TurboCASH* does not offer technical support service as QuickBooks does, however, it does have a forum for members to join to post technical issues. Technical problems that arise from the software can be solved through the forum, especially since programmers who worked on the software can be reached. *TurboCASH* would not be ideal if KH Wholesale requires technical support from expert technician.

### **Cost of the Software**

This section will cover the cost of the KH Wholesale's software. KH Wholesale can determine if the software they purchased is worth the price or not. The software applications evaluated are QuickBooks, Microsoft Word, and open-source alternative that have similar function. According to amazon.com, the cost of Quickbooks Pro 2008 cost \$199.95 (Intuit, n.d.). Because KH Wholesale purchased the software in 2008, the original price is used. KH Wholesale

purchased the 2007 Microsoft Office Home & Student suite for \$149.95 (Compare Office, n.d.). KH Wholesale mainly use Microsoft Word compared to the other office program available in the suite. If the company only purchased Microsoft Word program, it will cost \$229.95 for one full license (Compare Office, n.d.).

The open-source alternative example to QuickBooks is *TurboCASH* and the alternative example to Microsoft Office suite is Open Office. *TurboCASH* and Open Office do not cost money in order to be installed on the computer. The applications are available to be downloaded on its respective website. Furthermore, most open-source applications do not require a fee in exchange for the software to be installed (Larry, 2005). Applications that have open-source code and still charge money for the product to be installed are proprietary software, freeware software, and shareware software. Refer to Chapter 2 for a more detailed understanding of these software application methods.

### **Conversion Cost/Maintenance Cost**

The conversion cost is the cost of maintaining the software applications through consulting fees, training program fees, and third party technician fees. The conversion cost of KH Wholesale current software programs and open-source alternative will be assessed.

QuickBooks consulting fees comes in two packages. Table 5-1 displays the description of the packages. Training and consultation are included in both these service packages.

Table 5-1 QuickBooks Consulting Packages Details (source: Intuit QuickBooks, n.d.)

Package Description	Price
<b>Consolation and training with a QuickBooks expert for only one hour over the phone through shared desktop</b>	<b>\$99</b>

**Consolation and training with a QuickBooks expert for three hour over the phone through shared desktop. In addition, email support following the training will be accessible for two weeks. \$249**

*TurboCASH*, the open-source alternative to QuickBooks, does not provide training programs in the United States. Even though there are in class seminars available for learning the software, those courses are only available in to be attend in Africa. However, an alternative to the training of the software, *TurboCASH* offers a training manual for the cost of \$30 (*TurboCASH*, n.d.). In addition, *TurboCASH* offers third party consultants for its software. As mentioned in chapter 4, the average third party consultant rate can range \$175 per hour to \$294 per hour (Crane, 2006). *TurboCASH* consultants also provide training and setup as part of their service.

Microsoft Office has free accessible training programs for users who are not familiar with the program. The online interactive course for each application in the office is available at: <http://office.microsoft.com/en-us/training/FX100565001033.aspx>. Similar to Microsoft Office, Open Office also offers free training tutorial for user at <http://www.learnopenoffice.org/tutorials.htm>. Microsoft Word files does not need to be converted as Open Office conversion patch is embedded in the application. The conversion patch allows Open Office to open Microsoft documents, as well as saving in Microsoft Word format (open source, n.d.).

### **Importance to Business**

The importance of the software application to the business core is the final parameter of consideration for open-source software implementation. KH Wholesale must identify the usage of its software programs. First, accounting is an important part of its operation. KH Wholesale keeps track of its financial asset through QuickBooks. In addition, QuickBooks, features allow



customer management and vendor management that are also used by KH Wholesale. With the switching to open-source software such as *TurboCASH*, KH Wholesale must consider the first three parameters and the risk of implementing the software.

KH Wholesale does not have to switch to open-source software because of the lack of technical support, and training. KH Wholesale can have open-source program alongside with its commercial software. For example, instead of paying for the Microsoft Office suite, KH Wholesale can install Open Office as an alternative for comparable feature and function. KH Wholesale can mix and match software application to fit its needs as it grows by choosing programs that need intensive support service to programs that resemble commercial software.

### **The Four Parameters Supposition**

The four parameters, technical support, cost, conversion and important to core business, reflect on the significances of what small business owner, like KH Wholesale, should ponder before selecting open-source software as their choice of application. There are limitations in explaining these factors as the examples used in Chapter five are only one of a few software applications businesses can use in their operation. Along with careful contemplation, users who decide to implement the program should also do their part in understanding the software they will be installing. Understanding the software consists of apprehending the utilization of the software features, technical support of the software, and the ease of teaching to other users. Overall, small businesses should view open-source programs as alternative applications that are available for anyone and not to be anchored to purchasing commercial software for certain function of the business operation.

## **Chapter 6**

### **Conclusion**

The research study investigates if small businesses can implement open source software. The description of the parameters and examples are used to evaluate open-source and closed-source applications. The four parameters are technical support, cost of the software, conversion/maintenance cost, and importance to core business. These parameters give a deeper insight to the software programs that businesses plan to use throughout their daily operation. In addition, these parameters are important because they contribute an understanding of cost and risk between open-source software and commercial software. As businesses evaluate the different applications available, they can better comprehend their business operation and the software feature so that the software is exploited to its max capacity. With a better recognition of the business' needs to serve its customer through software applications, businesses will have a more efficient and effective business operation.

### **Discussion of Findings**

The first three parameters, technical support, software cost, and conversion/maintenance cost, are forms of expense that open-source and closed-source incurs. The three parameters overlap with each other, as it is a form of expenses the company pays in return for service support. The studying of the parameters allows assessment of the software to be distinguished and gives positive or negative opinions of the different models.

It is unexpected to discover that even though open-source software is available through the Internet; many businesses are not willing to take advantage of it. Businesses are torn between

lower cost and risks associated with implementation if they are to decide the different models (open or closed) of software. Furthermore, software applications in general are considered to be foreign objects, especially when the end users have never seen it before. The hidden costs behind the software add up. For instances, consultation fee, training fee, and conversion of data fee are expenses that cause users to abandon the idea of installing open-source software.

The last parameters of consideration became a major part of business decisions. The last parameter is the importance of the software to the core business. Businesses are not only going to simply install any software, but also examine alternatives to commercial software. Business owners will have to increase their knowledge of available software and not be limited to commercial software.

### **Significances of Study**

This study is more difficult than anticipated as most findings are not what were initially expected. However, I am more knowledge in open-source software compared to what I understood in the past. The first finding of this study is the topic itself. Not only is the open-source model different in term definition, it has become a revolution in the software of how businesses are conducted. The second finding is the different types of open-source and closed-source concepts and how each of the concepts contributes to a different type of model. My intention of this study is to discover an adoption method for open-source software in small business operation. As a result of my research, the four parameters used to assess the condition for open-source implementation are my final findings.

If I had more time on this study, I would continue to conduct this study in conjunction with open-source communities in order to create a model that allows for wide-range recognition of open-source application through businesses and homes. As there are acceptances of the some

open-source software by the public, it would be an accomplishment to witness the open-source model as it flourishes, evolves and becomes more integrate with business and personal usage though the following decade.

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Presentations:

    Jane E. Cooper Honors Program, Delaware County, from 2007 – 2010

- Created an Access database that stores data with students' information and their minor courses
- Presented Access database at Sigma XI Conference, Saint Joseph's University, Philadelphia
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Community Service Involvement:

    I.D.E.A.S., University Park, from 2010 – 2010

- Organized members for a recycling program of downtown State College
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Management Information Systems Association, University Park, from 2009 – 2010

- Participated in designing a database system for local non-profit organization
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