Why Financial Planning Informatics?

Introduction

Casas (2008) proposed the establishment of a new field of knowledge: "Financial Planning Informatics." The 2008 paper presented a general model for a financial planning information system. This article presents an update to the 2008 model based on a review of the current state of information technology used by financial planners. Financial planning practitioners create comprehensive financial plans, manage documents, and manage client relationships using information technology (IT). Information technology evolves quickly and newer technologies are available today, which were not available in 2008.

Technologies such as cloud computing, document management, electronic signatures, and mobile applications (apps) became mature since 2008. The updated model incorporates these newer technologies. The update also includes integration with other systems such as Customer Relationship Management (CRM), Advisor Web Portals, Enterprise Resource Planning, and Decision Support Systems (Kundisch and Dzoienziol, 2008). In addition, the paper examines the potential impact future technologies such as electronic currencies (i.e. bitcoin) will have on financial planning technology (Gaertner, 2012).

"Financial planning informatics is the application of information and communication technologies and information management techniques to financial planning" (Casas, 2008). Multiple information and communication technologies are available to support financial planning and financial planners. Financial products and services evolve almost as quickly as computer information technology. The complexity of these products and services is growing exponentially. This growing complexity makes it necessary to have a good understanding of the technology, the products, and the services to build robust financial planning software and systems.

On the other hand, the burden of retirement planning, for most individuals the most significant component of financial planning, is now placed primarily on the individual (Choi, Laibson, and Madrian, 2004) as opposed to the employer. Because of this, the role of a financial planner is critical in the wellbeing of individuals, particularly when they are most vulnerable: during retirement. The financial planner has increased fiduciary responsibility (Finke, Huston and Waller, 2009) and need to utilize the best available tools to offer adequate service. The following section presents a background on the role of the financial planner and how technology supports the practitioner's role. The article continues with a review of literature related to the use of information technology in financial planning and a brief description of these technologies. A proposed model for a financial planning information system follows and the paper ends with a look at the future of information technology applied to financial planning.

Background

The fact that the role of the financial planner has become so critical has compelled regulatory agencies at federal and state level to scrutinize the practitioner's function and the recommendations they offer to their clients. Laws and regulations are updated and created regularly to protect the individual. The US Department of Labor (DOL) Regulation § 2510.3-21(c), known among practitioners as the "DOL rule", assigns fiduciary responsibility to practitioners that offers advice for a fee. Under the fiduciary status, the practitioner is regulated under ERISA Sections 406(a) and (b). Under these sections the planner is prohibited from certain transactions and is subject to the ERISA code of loyalty and prudence (Ferrera & Schleppegrell, 2015). This is an example of how the complexity of the legal system that affects financial planners is increasing, which results in additional challenges to the practitioner (Macey, 2002). Financial planning information systems can help planners be in compliance with all laws and

regulations and support their fiduciary role. They also can and should generate all the documentation required by the planner to demonstrate compliance with all laws and regulations.

The development of an updated financial planning information system model and the establishment of a discipline to organize and disseminate the knowledge of information technology applied to financial planning will benefit the profession and, more importantly, the client. Other professional fields have created similar disciplines to support their professions. These include nursing informatics, medical informatics, legal informatics, bioinformatics, forensics informatics, health informatics, ecoinformatics, and biomedical informatics just to name a few. The accounting profession calls their field Accounting Information Systems and is part of the curriculum of college accounting majors. This paper presents an updated model and proposes a plan to solidify the financial planning informatics field.

Literature Review

An exhaustive search of literature related to information technology used in financial planning returned only a handful of articles, the first of which is Casas (2008). The search included several databases such as ProQuest, ABI/Inform, IEEE Xplore, and EBSCO. The following paragraphs present a summary of the most significant findings.

Friedman (2004) lists 10 technology tools that support financial planners, most of them to support office automation and client management. The author suggests the use of these technologies can have a profound impact on the existence of the financial planning firm. Winterberg (2015) refers to the benefits or personalization of the technology used by financial planners. Some of these technologies include email, web sites, and video.

Decision Support Systems (DSS) are computer based tools that analyze input data and help individuals make decisions. They are widely used by managers and executives. Kundisch &

Dzoienziol, J. (2008) present a DSS based financial planning model. In essence, financial planning software used today is a DSS. The planner inputs client data to the system, which processes the data and produces a plan. The planner uses that plan as the basis for the recommendations given to the client.

Kundisch, D., & Dzoienziol, J. (2008) also present a review of literature related to the application of DSS in financial planning. Most of the material covered is prior to the year 2000. Recent articles in this literature review refer to the use of algorithms and econometric models used for investment strategies. DSS use these models. Financial planning goes beyond investment strategies and a financial planning information system includes additional components and technologies. Gao, Wang, Xu, and Wang (2007) also present an intelligent based DSS model in support of family financial planning.

King (2010) offers recommendations to get the most out of financial planning software, one of the elements of the financial planning information system. Littell (1999) wrote about the benefits of information technology for financial planners and provided a list of web based tools only nine years after the web had been created. Today, there is an immense amount of technology available and being used by financial planners. However, there is minimal academic literature that looks in depth at these technologies and how they can be best used. This gap is worth researching as well as the direction these technologies should follow to better support the financial planning practitioner. This article intends to get this conversation started.

Information Systems

An information system consists of five elements (fig. 1), hardware, software, data, procedures, and users. The hardware element includes all physical devices such as computers, routers, peripherals (printers, scanners, keyboards, monitors, cameras, mice, etc.), and modems.

Software covers the operating system (Windows, OS, or Linux) and application programs such as financial planning, customer relationship management, office automation, database management, and tax planning software. The data, stored in a database, includes client data, market data, and product data. Procedures define policies to use the system and restrictions to access it.
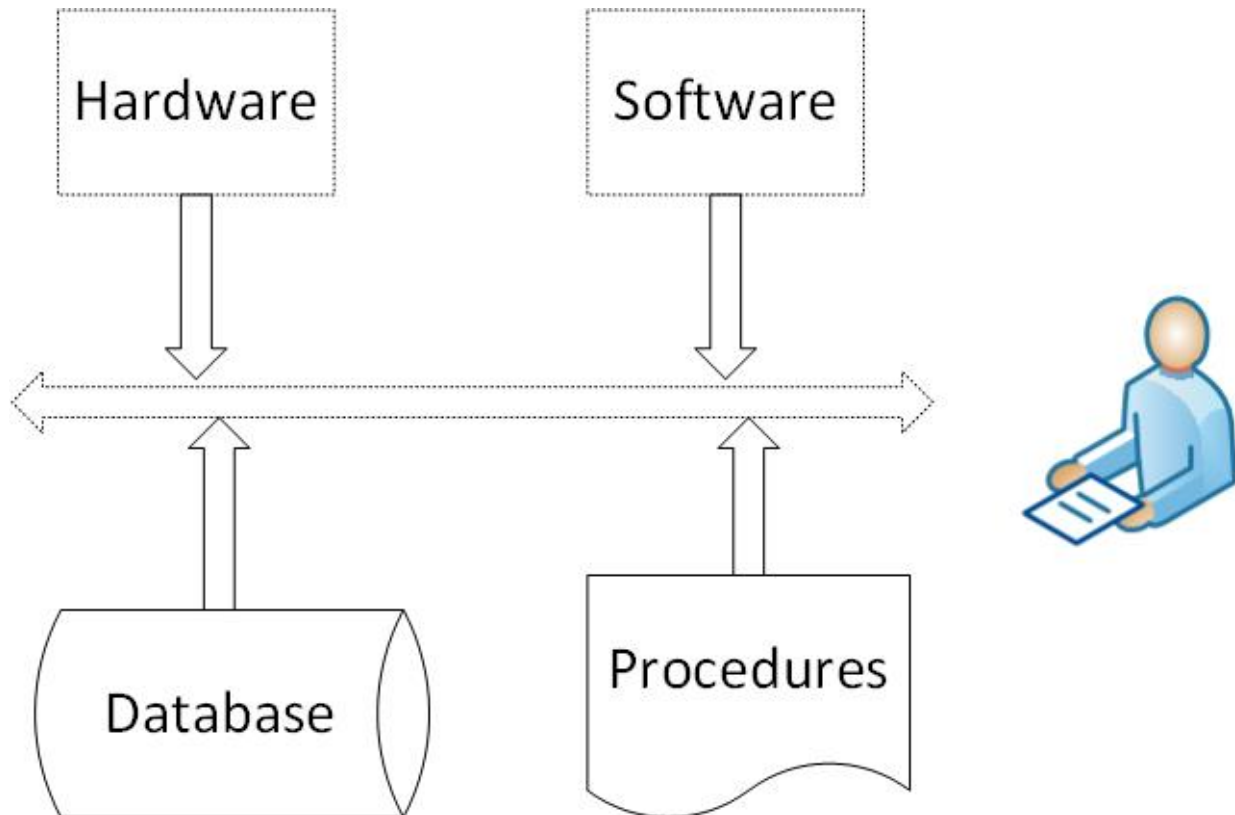

Figure 1- Elements of an Information System

A financial planning information system includes these five elements. Information systems interact with other systems. A financial planning information system may interact with payment systems, live market data systems, tax return preparation software, online banking systems, and online brokerage systems (fig. 2). Financial planning software contains multiple modules such as a DSS, a Monte Carlo simulation module, a graphical user interface, and a report generator (fig 3).
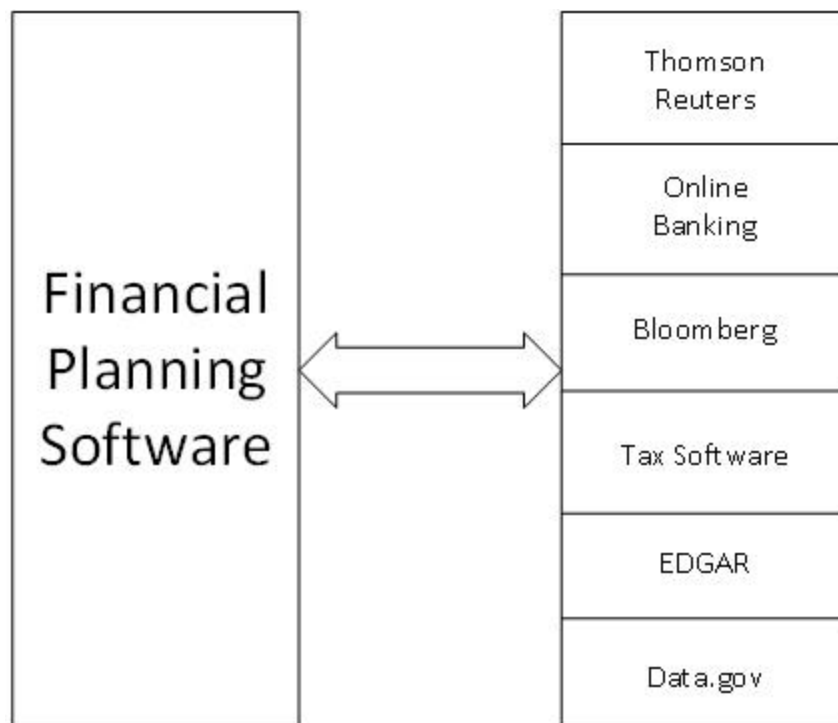
Figure 2 - External Systems

The hardware provides the computing power required to process the data. The information system processes data entered by the user, stored in databases, and/or imported from external systems to which the information system is connected (fig. 2). Hardware requires of software to use its computational power. The operating system manages the hardware resources. It allocates computing power to application programs such as financial planning software. The most widely used operating system is Microsoft's Windows. Until recently, most professional financial planning software ran under the Windows operating system.
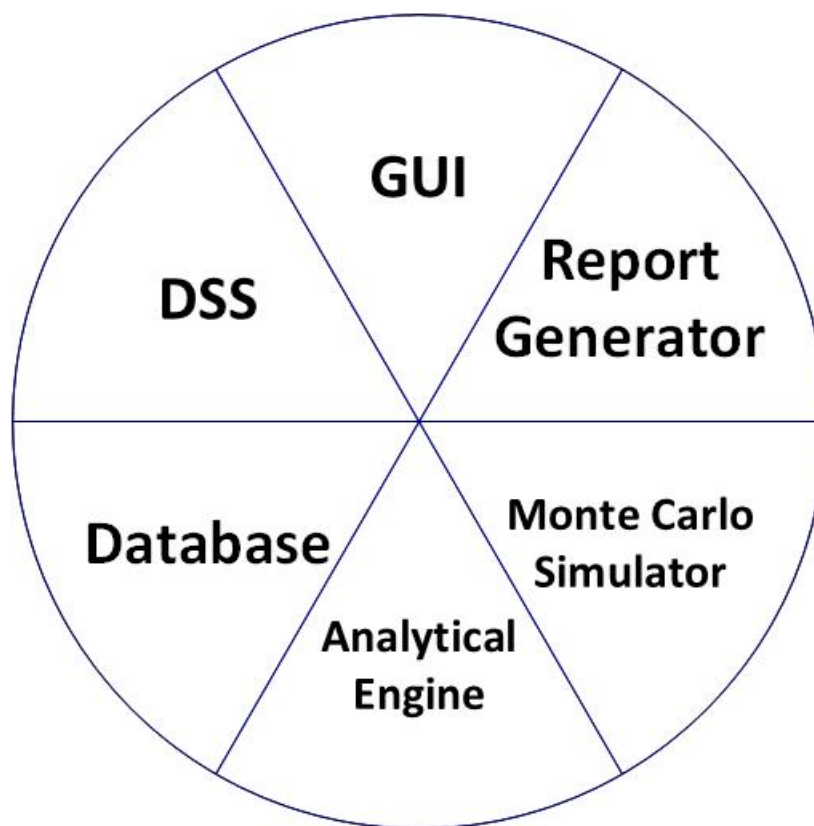
Figure 3 - Financial Planning Software

Examples of application software used in financial planning are the planning software itself, customer relationship management software, office automation software (i.e. Microsoft Office), document management software, and accounting/billing software. In small firms, procedures are defined by the planner, while in larger firms these are developed by teams of professionals from Information Technology, Financial Planning, Marketing, Sales, and the Legal Compliance Department.

Typically, an information system stores and processes data that is confidential or proprietary. Financial planning systems process very sensitive data. A financial planning information system stores client data, which identifies the client. Income data, assets, and documents such as wills and trusts are part of client data. Procedures must be in place to protect that data from theft and to maintain its integrity. These procedures involve the use of usernames

and passwords, biometrics, and other screening techniques to restrict access to the data. System security is a key priority in the implementation of a financial planning information system.

The users of financial planning information systems are primarily financial planning practitioners. However, their clients and the planner's staff may also need to access the system. In some instances, clients enter data directly into the system or request reports. They can also make payments into the system. Similarly, staff enters data or produces reports for the planner or for the client and processes payments and/or refunds.

Cloud Computing

This general discussion on the architecture of an information system concludes with an introduction to the concept of cloud computing. This is an emerging technology on which a definition has not been agreed. Different authors define cloud computing differently. Frantsvog, Seymour, & John (2012) define cloud computing as "a giant pool which contains hardware, software, and other services that can be accessed through the 'cloud'."

The "cloud" implies hardware and the software are remotely located. They no longer need to be in the user's physical location. Instead, these are located and managed remotely by a Cloud service provider and accessed by the user through an Internet connection. The implications of this emergent technology are huge. For a financial planner or financial planning firm cloud computing means the planning software and the data don't need to be stored in a local computer. The hardware that runs the applications is in the "cloud". Therefore, the planner's computer doesn't need much computation power as the processing of the data is done in the "cloud".

Cloud computing services providers charge a "per use" fee for their services. The more the resources are used, the more the user pays. For financial planners this means they do not have

to buy expensive software and hardware. Instead, the pay a fee for the use of both. For example, the planner may pay a fee for each financial plan and a monthly fee for the storage of the client documents and data. For many financial planning practitioners this results in significant savings. The next section presents in greater detail the architecture of a financial planning information system and the role cloud computing plays in such a system.

Financial Planning Information Systems

Figure 4 depicts Casas' (2008) financial planning information system. The model uses a DSS as the central unit, which retrieves data from a database and a user interface. The DSS also interacts with a knowledge base. This knowledge base is a specialized database that stores financial planning knowledge. The DSS generates the plan recommendations, which can be sent to a report generator that produces the printed financial plan. The database is fed from external sources with data about the client, the markets, and living standards and expenses.

The model in figure 4 incorporates basic elements of a financial planning information system. This paper expands the model to propose a more general view of a financial planning information system, which incorporates elements such as customer relationship management, office automation, document management, and cloud computing. The updated model also provides additional details on the user interface given the increased use of mobile devices and the impact these have on all sorts of information systems.
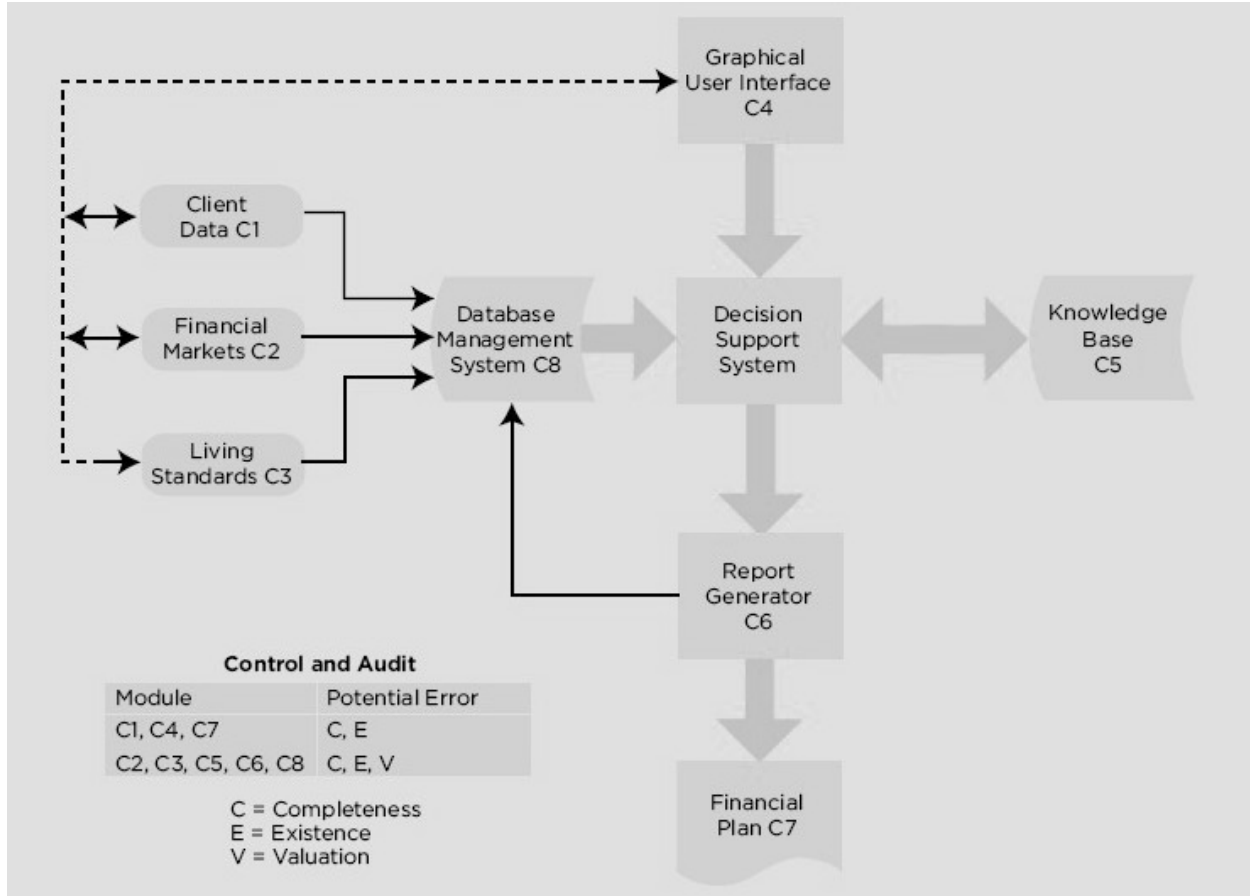
Figure 4 Original Financial Planning Information System Model, Casas (2008)

The updated view of the financial planning information system appears in figure 5. The diagram suggests a cloud based architecture although the three servers could be physically located on the premises. However, as stated before, cloud computing offers significant advantages and seems the preferred choice for an updated system. A server is a high processing capacity computer that supports applications, communications, and data services (Marakas & O'Brien, 2013). A data server (fig. 6) stores client data, market historical data, documents, the knowledge base, and regulations. The data server (fig. 7) stores the data, runs the database management system software, which manages the database, and may also provide access to the

knowledge base. The web server (fig. 8) hosts the planner's web site. The web server's memory

and storage must have a secure area that only the financial planning practitioner, the

practitioner's staff, and clients can access. The public area of the server stores the pages that

promote the planner's practice. The application server contains the financial planning software,

office automation software, customer relationship management, document management, and

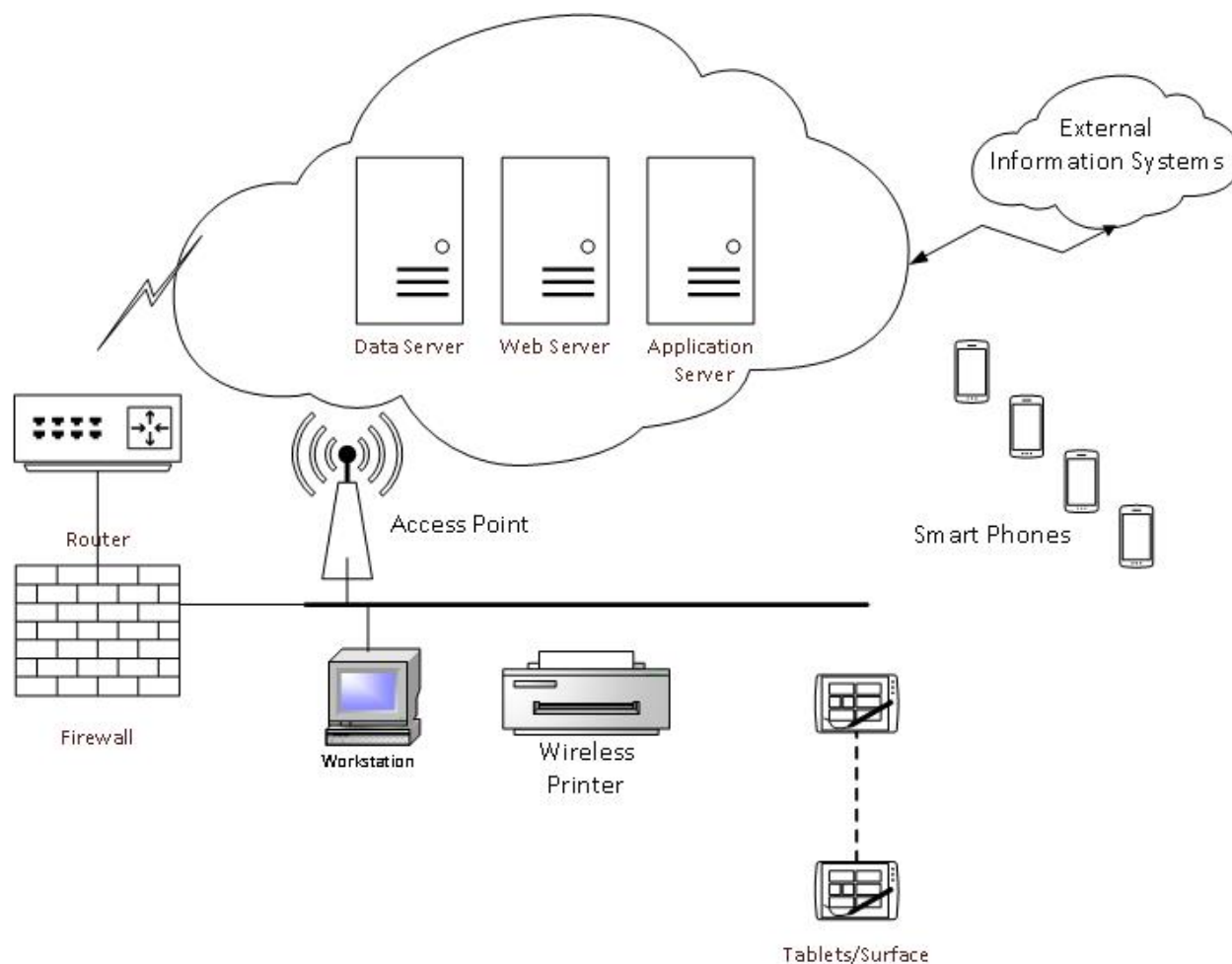other types of support programs.

Figure 5 – Updated Financial Planning Information System Model

If the servers are in the cloud, a cloud computing service provider manages these devices,

relieving the financial planner from the task of maintaining and servicing these computing

devices. Many vendors of financial planning software already offer these types of services. Most; however, do not include the other application programs required in a financial planning practice. The offerings of hardware, an operating system, and application programs from the cloud are known as Infrastructure as a Service IaaS, Platform as a Service PaaS, and Software as a Service SaaS, respectively Nawrocki & Soboń (2014).

Linux

SQL

Knowledge
Base

Apache

Secured Area

Public Area

Web Portal

FP Software

CRM/Document
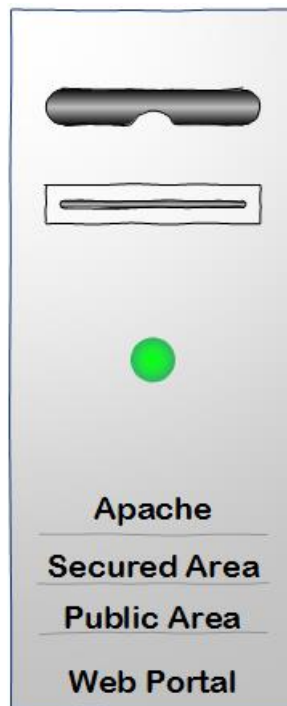Office
Automation

Figure 6 - Data Server

Figure 7 - Web Server

Figure 8 - Application
Server

At the planner's location a router forwards and receives data traffic from and to the Internet. A firewall protects incoming data traffic. A firewall is a combination of hardware and software that screen network traffic and block unauthorized access to the local network (Marakas & O'Brien, 2013). This is an essential device to protect the local component of the information system. The router forwards the traffic to a wireless access point, which broadcasts the signals

coming from the router as well as those coming from the individual computers. Most local networks today are wireless.

Wireless networks offer convenience, full coverage of ever spot in an office, and flexibility. However, they expose the system to significant risks. Because of this, wireless networks must adopt the highest levels of security and must encrypt all the data traveling through the network. In a wireless network the Service Set Identifier (SSID) must be hidden. This will prevent outside parties to detect the signal without knowing the network's name. For a higher level of security, the access point will provide access only to devices whose MAC addresses have been programmed into the access point. A Media Access Card (MAC) is the physical interface between each computer and the network. Each MAC has a unique physical address assigned by its manufacturer. The wireless network supports printers, scanners, office desktops, and tablets or surface computers used by the planner to run financial planning software and make presentations to clients.

The user interface in the updated model is web based. This is because the applications will be accessed through the web server. The web server must support different types of devices including desktop computers, laptops, tablets, and smart phones. Many clients and even financial planners need to access the system from their homes or remote locations using their smart phones. The user interfaces, therefore, must support all these types of devices. The financial planning information system developer needs to create interfaces for each type of device. The full plan, which typically was printed and delivered to the client, is now presented in PDF format or as a multimedia presentation on a laptop, tablet, or surface computer screen. The report

generator, which generates the financial plan, must also support all these different types of devices.

A financial planning information system needs to interface with external systems. These include market databases or information providers such as Thomson Reuters, Morningstar, or Bloomberg. Other external databases may include the US Securities and Exchange Commission EDGAR system, Compustat, or the many databases provided by Data.gov. The system may also need to interact with income tax software, financial institutions, and robo-advisers.

A financial planning information system is complex. It involves the application of data storage, data analysis, network communications, computational power, data security, knowledge management, financial analysis, web services, wireless transmission, graphical user interfaces, mobile computing, and software application development. To develop cost effective and secure financial planning information systems requires a good understanding of how all these technologies work together.

This requirement isn't unique to the financial planning profession. However, the combination of financial analysis, the fiduciary responsibility of the financial planning practitioner, the confidential character of the client data and the client-planner relationship, and the impact a financial plan have on an individual are unique to the personal financial planning. The establishment of a field or discipline that focuses on creating standards and the development of effective, efficient and secure financial planning information systems will benefit the profession and ultimately the client.

The Future of the Financial Planning Information System

As information technology evolves so will financial planning information systems. The model presented here will be updated on a regular basis. Mobile devices will acquire more

computing power and wireless networks will support higher transmission speeds. Public wireless networks will also support more bandwidth and fast WiFi hot spots will be prevalent in cities and towns.

Individuals will have more direct access to investments in foreign countries. As a result, financial planning software will have to support currency conversions. Electronic currencies such as bitcoin will be used by individuals and the planning software will need to support these types of currencies (Partheme & Klein, 2014). There will be an increased oversight from regulatory agencies over the financial planner. The financial planning information system will have to support more audits, store more data, and be more secure. Financial planners will become the target of hackers and intruders as income tax preparers are today. The understanding of strategies to protect the information systems and particularly the data will become more challenging.

New communications technologies are having and will continue to have an impact on the planner-client relationship. Video call and conferencing, instant messaging, and video messages will become the preferred interaction methods. Financial planners will be abler to establish client relationships with individuals located remotely, even in different countries. This will have serious legal implications. Will a financial planning prepared by a planner in China be subject to the DOL rule? Competition will also increase for the benefit of the client.

The cloud will be the predominant vehicle to access services for many years until a new more effective technology emerges. Financial planning software will be mostly offered in the SaaS (software as a service) modality and all data will be stored in the cloud. Backup copies of the data can be kept locally or on the servers of multiple cloud service providers.

The Internet of Things (IoT) will have an impact on the financial planning profession. The Internet of Things, also known as Internet of Objects (IoO), is a network of physical devices,

many of them wearable, accessed through the Internet in most cases wirelessly (Dumitrescu, 2014). 3D printing will be used to create visual representations of financial strategies and even plans, and to create support material for sales presentations. The financial planning user interface will move mainly to mobile devices such as smart phones, tablets, surface computers, and possibly smart watches. The financial plan will no longer be a static printed document. Instead, it will be an interactive presentation running on a touch sensitive screen. The client will be able to simulate different scenarios, look at the data directly behind every chart, and access explanatory videos of the different parts of the plan.

The fact that computing is now done in the cloud will easily and smoothly provide planners with access to the capabilities of quantum computing. Quantum computers operate with subatomic particles as opposed to the electricity used by conventional digital computers today. On "The promise of Quantum Computer", Kabachinski (2013) wrote:

> *Quantum computers blow away conventional supercomputers in computing power. Consider how long it would take the current most powerful supercomputer vs. a quantum computer in solving a 400-digit problem. A quantum computer would take about a year to solve the problem. By comparison, the current supercomputer would take a billion years to solve the same problem. Yes, you read that right.*

Future financial planning information systems will be much more complex and will incorporate even more technologies and tools than they do today. Financial planning practitioners and firms will need to keep up-to-date with all new developments. They will also need to understand the technology in order to adopt the most effective tools and services available.

Financial Planning Informatics

A financial planning information system is complex and made up of multiple advanced technologies. Its structure is dynamic and evolves as information and computing technology evolves. A good understanding of the technology and its appropriate use are essential for the success of a financial planning firm.

The amount of knowledge related to the information technology that supports financial planning will grow exponentially. Information systems help the practitioner to be in compliance with all laws and regulations and to proof compliance. The complexity of the systems, its role in the financial planning profession, and the dependence of financial planners on the technology justify the establishment of the financial planning informatics field. The profession needs the development of reliable and robust systems that address the unique needs of the financial planner.

Additional research on how technology can improve financial plans will benefit the client. The development of office automation technologies and client relationship management systems tailored for the financial planner will enable the practitioner to offer better services at lower costs. These developments will be more likely to happen with the establishment of the discipline of financial planning informatics. Financial planning training programs such as those offered in colleges and universities must include courses in information systems. Those courses would be more effective if that are focused on financial planning informatics.

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