An Innovative Computer Network Design for Improving Workflow at HCU: A Case Study Analysis

Abdelmnim Khan*

*Department of Computer Networks, University of Petra, Jordan. E-Mail: aaltweiqkhan@gmail.com

***Abstract*---** In organizational contexts, workflows reflect sequences of administrative and other processes that allow a piece of work to pass from the point it is initiated to that at which it is completed. According to workflows play a crucial role in the healthcare industry. Particularly, the home healthcare sector continues to face growing pressure relative to the need for alterations in business processes, as well as the manner in which electronic information flows are managed.

***Keywords*---** Study Analysis, Innovative Computer Network, HCU, Proposed Innovation.

I. INTRODUCTION

ACCORDING to Alexander, Madsen and Miller et al. (2017), workflows play a crucial role in the healthcare industry. Particularly, the home healthcare sector continues to face growing pressure relative to the need for alterations in business processes, as well as the manner in which electronic information flows are managed (Abramson, McGinnis & Moore et al., 2014). It is also worth noting that the healthcare industry forms one of the trillion dollar industries, but significant losses of revenues continue to be reported. As avowed by Adler-Milstein, DesRoches and Furukawa et al. (2014), a significant amount of the lost revenues are attributed to aspects such as inefficiency and wastes in the manner in which information is handled. Some of the specific trends that account for the growing pressure in the industry include the demand for the use of information technology and operating expenses accruing from some of the systems' heavy reliance on paper records (Feldman, Schooley & Bhavsar, 2014). In this paper, the main focus is on a specific sector, home healthcare. Offered in home settings, the home healthcare services include leasing durable equipment, nursing, and infusion therapies linked to procedures such as chemotherapy. As avowed by Gabriel, Jones and Samy et al. (2014), many physicians have turned to home healthcare as an alternative path to office visits and hospitalization. Hence, the current study's central objective is to identify some of the problems facing the workflow process at Health Care Unlimited, Inc. (HCU), which forms one of the renowned home healthcare providers in the U.S. The paper proceeds to establish a web-based system or Internet-based information system through which HCU could overcome the perceived problems facing its workflow process.

The rest of the paper is organized in such a way that the current state of the home healthcare company is described before giving insights into system problems or issues facing the healthcare institution, the proposed innovation, the proposed implementation of the perceived innovation, a training plan, support strategy, and ongoing maintenance to ensure that the implemented system, projected to address workflow problems at HCU, lives up to meet the needs of the facility's end users in the far future. Imperative to highlight is that the intervention is implemented from the perspective of a project manager and that a project management model will be utilized to govern the development of different project implemented phases, their associated tasks, and the expected milestones that are worth accomplishing in the phases established.

To ensure that the Center for Medicare's mandated information is captured, HCU uses external software in the form of Patient Care Technologies (Sanchez, Sethi, Santos & Boockvar, 2014). Through this software, the institution's nurses rely on specialized laptop devices to achieve patient bedside documentation. Thus, patient-driven data is obtained relative to their (patients') care, with the Patient Care Technologies aiding in the access of the data. In relation to the Medicaid/Attendant Division, it is notable that HCU utilizes Vesta as software through which all attendants and clients' databases are maintained. According to Thorn, Carter and Bailey (2014), Vesta offers reports in the form of dates of nursing visits, client statuses, and census. Another broad area reflecting HCU's current state involves the coordination of care. Indeed, HCU's care package holds that the Home Health Division guides CenMed in issuing supplies or items and that the processing of the medical supplies or pieces of equipment delivered is achieved via signatures or approval from State caseworkers, nurses, and doctors (Winden,

Boland, Frey, Satterlee & Hokanson, 2014). Furthermore, the printing of orders is done using Vesta (or handwritten using standard forms) (Alexander, Madsen & Miller, 2017). A summary of the current state of workflow system functionality at HCU is illustrated in the figure below.

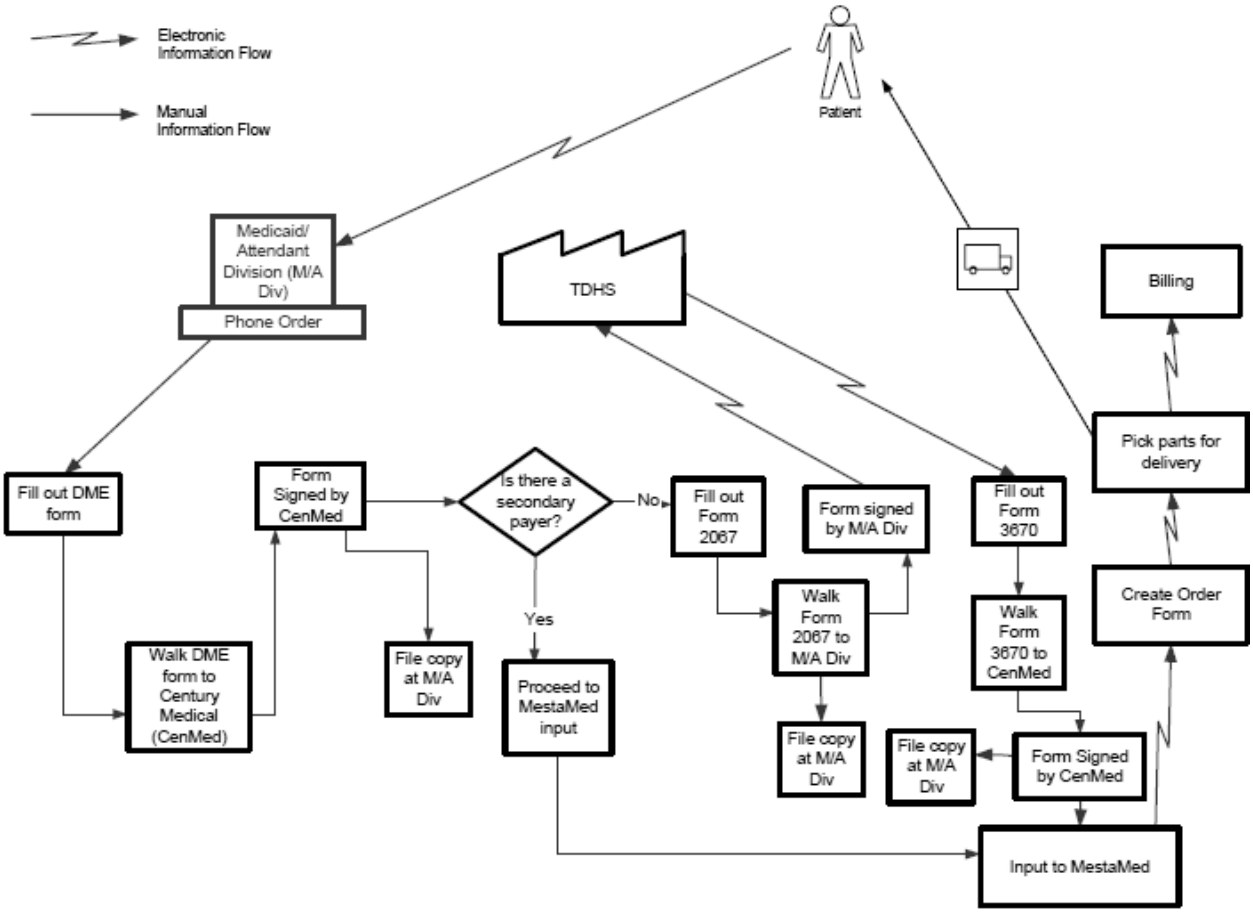

Figure 1: Current State of Workflow at Health Care Unlimited, Inc. (HCU)

II. System Issues or Problems

Regarding the use of the Patient Care Technologies program, it is worth acknowledging that it fails to offer relevant data through which billing functions can be performed. To obtain visit-driven information, HCU uses the Datacron software (regarding information such as disciplines and the number of visits performed); pointing to the presence of two independent databases. One of the databases is for Patient Care Technologies while another database is for Datacron). The eventuality is that HCU is yet to implement an adequate program that promises health care standard interfaces that involve the financial and clinical departments (Abramson, McGinnis & Moore et al., 2014). It is also imperative to highlight that the Vesta software plays a crucial role in maintaining client databases but fails to communicate with the rest of the agency's software programs. Given this limitation, Abramson, McGinnis and Moore et al. (2014) avowed that Vesta is problematic whereby it calls for the re-entry of all of the agency's referrals before the clients' paperwork admissions are accomplished. In relation to the aspect of coordination of care, it is worth indicating that the transcribing and writing of requests have led to confusion at HCU. Particularly, there is an increasing trend in the incidence of transcription errors that have, in turn, yielded complexities such as duplication of efforts, missed deliveries or lost orders, and the delivery of wrong items (Feldman, Schooley & Bhavsar, 2014). Another issue that is important to note is that CenMed's timely confirmation of deliveries or checks and balances is inadequate (Gabriel, Jones & Samy et al., 2014). Due to the latter problem, Militello, Arbuckle and Saleem et al. (2014) documented that most of HCU's missed deliveries have ended up undiscovered until the concerned personnel establishes that the delivery tickets are missing.

III. Proposed Innovation

Based on the perceived flaws characterizing HCU's workflow, a new system is proposed. Particularly, the proposed system seeks to achieve a workflow that is governed by front-end intranet application in the form of a web-browser. Notably, the role of the proposed workflow arrangement entails the receipt and entry of orders electronically. This entry and receipt process occurs between HCU and the Medicaid/Attendant Division. Using HCU's current workflow, the proposed innovation entails the development of proprietary front ends. As concurred by Richardson, Malhotra and Kaushal (2014), these front ends refer to web-browser-based applications that enable inter-divisional sharing of forms. Indeed, Figure 1 indicates the

manner in which HCU's workflow has been achieved previously to ensure that documents flow from one unit or department to another. In this case, the proposed, new system reflects an improved version of the home health care agency's previous workflow arrangement. With major areas of the workflow identified as the Century Medical or DME Division and the Medicaid/Attendant Division, the proposed workflow system emphasizes aspects involving the flow of electronic information, as well as improvements in the various processes involved during the low of documents.

Regarding the functionality, feature, and design requirements associated with the proposed innovation, the degree of prioritizing these attributes reflects three broad categories in such a way that the features or functional requirements are supposed to be beneficial, highly beneficial, or required. The table below illustrates the proposed timely aimed at supporting and achieving the proposed innovation that seeks to improve the previous state of the workflow system at HCU.

IV. Proposed Budget for Implementing the Workflow System at HCU

Device/Facility/Process	The estimated cost of each unit	The number of units required	Perceived cost extensions
A Windows NT server or a high-end PC	$2,900	One	$2,900
The development and adoption of eForm management	$16,000	One	$15,000
The installation of the proposed workflow system	$11,000	One	$11,000
		Projected total cost	$28,900

Based on the proposed workflow system plan, the main aim is to alter the manner in which documents flow at HCU (as shown in Figure 1) to ensure that the system incorporates a new version of low of electronic information, as well as other relevant process improvements targeting Century Medical, DME Division, and Attendant/Medicaid Division. The figure below highlights the new system plan aimed at improving the previous state of HCU's workflow organization.

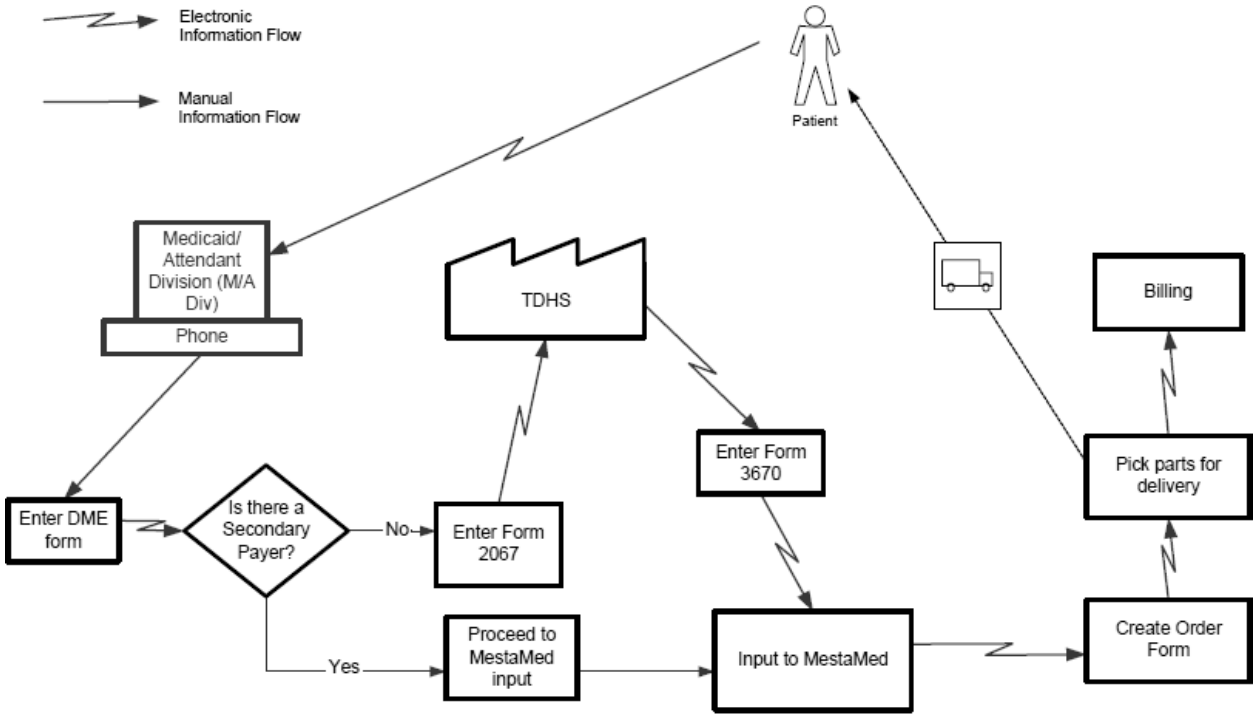

Figure 2: The New System Plan for HCU's Workflow System

V. Summary

Indeed, improvements in information flow and operations at HCU and other home health care institutions calls for the need to embrace information technology, a trend attributed to the need to keep abreast with the ever-changing system user needs and stakeholder preferences. Whereas an increasing number of home health care facilities have resorted to the use of information technology systems and also abide by the regulatory requirements of regional, local and national governments, aspects of financial justification and company-specific details continue to pose a dilemma. At HCU, this paper has emphasized the issues above. Given the perceived workflow problems associated with the institution's current system, a web-based system has been proposed for implementation. From the initial

implementation and performance evaluation outcomes, the proposed system improves workflow operations at HCU. In the future, the design and projected adoption and implementation of this innovation suggest that technology aids in reengineering existing systems to curb resource wastages, but project managers ought to gain support from the rest of the design and implementation teams or programmers by training the team members – and also gaining adequate feedback.

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