Re-Examining the Jennex Olfman Knowledge Management Success Model

Murray E. Jennex
San Diego State University
mjennex@mail.sdsu.edu

Abstract

The Jennex and Olfman KM success model was first published at HICSS in 2004 and in the International Journal of Knowledge Management in 2006. Since then there has been many technology changes and innovations as well as further research on KM success. This paper re-examines the Jennex Olfman model and suggests a newer model that incorporates the past ten years of research and technology innovation.

1. Introduction

The 2006 Jennex Olfman KM Success Model [20] was a knowledge management explication of the widely accepted DeLone and McLean IS Success Model. DeLone and McLean was used as it was able to be modified to fit the observations and data collected in a longitudinal study of Organizational Memory, OM, and KM, it fit success factors found in the KM literature, and the resulting KM Success Model was useful in predicting success when applied to the design and implementation of a KM initiative and/or a KMS. Additionally, the stated purpose of the DeLone and McLean IS Success Model [7] [8] is to be a generalized framework describing success dimensions that researchers can adapt and define specific contexts of success. The Jennex Olfman KM Success Model (2006) [20] has been cited over 600 times (based on citation counts in Google Scholar on June 10, 2016). The model was expected to be used by researchers to understand how to build and assess KM systems and KM initiatives. A review of the first ten pages of citations from Google Scholar found that 58 of the citations used the model to assess success/effectiveness, 29 citations used the model to help guide design of KM systems/initiatives, and 11 citations used the model to help assess organizational readiness to adopt KM systems/initiatives. This shows that the model is being used mostly as expected with the new use being to determine/assess organizational readiness to adopt KM systems/initiatives

However, the last 10 years have brought tremendous innovation to information technology and subsequently knowledge management. Key technical innovations include social media, the cloud, software as a service, mobile technologies, Internet 2.0 and collaborative technologies, unstructured data, big data, the Internet of Things, artificial intelligence, and improved connectivity and capacity. Additional emphasis on information management issues such as governance, risk and security management, leadership, innovation, business intelligence and analytics, and strategy have gotten organizations thinking new processes and new ways in managing, transferring, and utilizing data, information, and knowledge. To keep the Jennex Olfman KM Success Model (2006) relevant and viable as a tool for assisting researchers and practitioners in the creation and implementation of KM systems and initiatives this paper will re-examine the KM literature to determine if the model needs modification.

2. Background

2.1. DeLone and McLean IS Success Model

In 1992 DeLone and McLean published their seminal work proposing a taxonomy and interactive model for conceptualizing and operationalizing IS Success [7]. The DeLone and McLean IS Success Model (1992) is based on a review and integration of 180 research studies that used some form of system success as a dependent variable. The model identifies six interrelated dimensions of success and each dimension can have measures for determining their impact on success and each other. Jennex, et al. (1998) [22] adopted the generic framework of the DeLone and MCLean IS Success Model (1992) and customized the dimensions to reflect the System Quality and Use constructs needed for an organizational memory information system, OMS. Jennex and Olfman [19] expanded this OMS Success Model to include constructs for Information Quality.

DeLone and McLean (2003) [8] revisited the DeLone and McLean IS Success Model (1992) by

URI: http://hdl.handle.net/10125/41691
ISBN: 978-0-9981331-0-2

incorporating subsequent IS Success research and addressing criticisms of the original model. 144 articles from refereed journals and 15 papers from the International Conference on Information Systems, ICIS, citing the DeLone and McLean IS Success Model (1992) were reviewed with 14 of these articles reporting on studies that attempted to empirically investigate the model. The result of the article is the modified DeLone and McLean IS Success Model (2003) [8]. Major changes include the additions of a Service Quality dimension for the service provided by the IS group, the modification of the Use dimension into a Intent to Use dimension, the combination of the Individual and Organizational Impact dimensions into an overall Net Benefits dimension, and the addition of a feedback loop from Net Benefits to Intent to Use and User Satisfaction.

2.2. Jennex and Olfman KM Success Model (2006)

The 2006 model was initially proposed by Jennex, et al. (1998) [22] after an ethnographic case study of KM in an engineering organization. The model was modified by Jennex and Olfman (2002) [19] following a five year longitudinal study of knowledge management in an engineering organization and is based on the DeLone and McLean (2003) revised IS Success Model. This final model [20] was developed to incorporate experience in using the model to design KMS and for incorporating other KM/KMS success factor research from the literature. Figure 1 shows the KM Success Model. Dimension descriptions of the model follow.

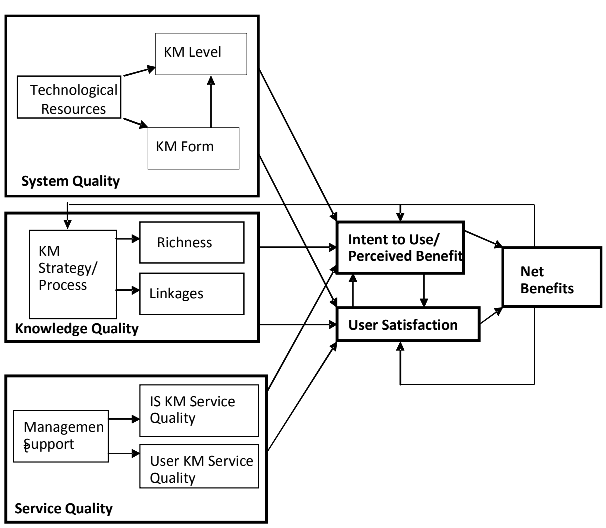

Figure 1. KM Success Model (2006) [20]

System Quality. System Quality consists of three constructs, technological resources, KM form, and KM level. Technological resources define the capability of an organization to develop, operate, and maintain KM infrastructure and systems. These include aspects such as amount of experience available for developing and maintaining KM, the type of hardware, networks, interfaces, and databases used to hold and manipulate knowledge, capacities and speeds associated with KM infrastructure, and the competence of the users to use KM tools. Technological resources enable the KM form and KM level constructs. KM form refers to the extent to which the knowledge and KM processes are computerized and integrated. This includes how much of the accessible knowledge is on line and available through a single interface and how integrated the processes of knowledge creation, storage/retrieval, transfer, and application are automated and integrated into the routine organizational processes. This construct along with the technological resources construct influences the KM level construct. KM level refers to the ability to bring knowledge to bear upon current activities. This refers explicitly to the KM mnemonic functions such as search, retrieval, manipulation, and abstraction; and how well they are implemented.

Knowledge Quality. The Knowledge Quality dimension ensures that the right knowledge with sufficient context is captured and available for the right users at the right time. Three constructs: the KM strategy/process, knowledge richness, and linkages between knowledge components are identified. The KM strategy/process construct looks at the organizational processes for identifying knowledge users and knowledge for capture and reuse, the formality of these processes including process planning, and the format and context of the knowledge to be stored. This construct determines the contents and effectiveness of the other two constructs. Richness reflects the accuracy and timeliness of the stored knowledge as well as having sufficient knowledge context and cultural context to make the knowledge useful. Linkages reflect the knowledge and topic maps and/or listings of expertise available to identify sources of knowledge to users in the organization.

Service Quality. The Service Quality dimension ensures that KM has adequate support for users to utilize KM effectively. Three constructs, management support, user KM service quality, and IS KM service quality, are identified. Management support refers to the direction and support an organization needs to provide to ensure that adequate resources are allocated to the creation and maintenance of KM, a knowledge sharing and using organizational culture is developed, encouragement, incentives, and direction is provided to the work force to encourage KM use, knowledge reuse, and knowledge sharing; and that sufficient control structures are created in the organization to monitor knowledge and KM use. This construct enables the other two constructs. User KM service quality refers to the support provided by user organizations to help their personnel utilize KM. This support consists of providing training to their users on how to use KM, how to query KM, and guidance and support for making knowledge capture, knowledge reuse, and KM use part of routine business processes. IS KM service quality refers to the support provided by the IS organization to KM users and to maintaining KM. This support consists of building and maintaining KM tools and infrastructure, maintaining the knowledge base, building and providing knowledge maps of the databases, and ensuring the reliability, security, and availability of KM.

User Satisfaction. The User Satisfaction dimension is a construct that measures satisfaction with KM by users. It is considered a good complementary measure of KM use as desire to use KM depends on users being satisfied with KM. User satisfaction is considered a better measure for this dimension then actual KM use as KM may not be used constantly yet still be considered effective. Jennex [13] found that some KM repositories or knowledge processes, such as email, may be used daily while others may be used once a year or less. However, it was also found that the importance of the once a year use might be greater than that of the daily use. This makes actual use a weak measure for this dimension given that the amount of actual use may have little impact on KM success, as long as KM is used when appropriate, and supports DeLone and McLean (2003) [8] in dropping amount of use as a measurement of success.

Intent to Use/Perceived Benefit. The Intent to Use/Perceived Benefit dimension is a construct that measures perceptions of the benefits of KM by users. It is good for predicting continued KM use when KM use is voluntary, and amount and/or effectiveness of KM use depends on meeting current and future user needs. Jennex and Olfman [19] used a perceived benefit instrument adapted from Thompson, Higgins, and Howell [33] to measure user satisfaction and predict continued intent to use KM when KM use was voluntary. Thompson, Higgins, and Howell's [33] perceived benefit model utilizes Triandis' [34] theory that perceptions on future consequences predict future actions. This construct adapts the model to measure the relationships between social factors concerning knowledge use, perceived KM complexity, perceived near-term job fit and benefits of knowledge use, perceived long-term benefits of knowledge use, and fear of job loss with respect to willingness to contribute knowledge.

Net Impact. An individual's use of KM will produce an impact on that person's performance in the workplace. In addition, DeLone and McLean (1992) [7] note that an individual 'impact' could also be an indication that an information system has given the user a better understanding of the decision context, has improved his or her decision-making productivity, has produced a change in user activity, or has changed the decision maker's perception of the importance or usefulness of the information system. Each individual impact should have an effect on the performance of the whole organization. Organizational impacts usually are not the summation of individual impacts, so the association between individual and organizational impacts is often difficult to draw. DeLone and McLean (2003) [8] recognized this difficulty and combined all impacts into a single dimension. Davenport, et al. [6] overcame this by looking for the establishment of linkages to economic performance. We agreed with combining all impacts into one dimension and the addition of the feedback loop to the User Satisfaction and Intent to Use/Perceived Benefit dimensions but take it a step further and extend the feedback loop to include the KM Strategy/Process construct. This model recognizes that the use of knowledge may have good or bad benefits. It is feedback from these benefits that drives the organization to either use more of the same type of knowledge or to forget the knowledge and which also provides users with feedback on the benefit of the KMS. Alavi and Leidner [1] also agree that KM should allow for forgetting of some knowledge when it has no or detrimental benefits. To ensure this is done feedback on the value of stored knowledge needs to be fed into the KM Strategy/Process construct.

3. The Reexamined Jennex Olfman KM Success Model

The re-specified is shown in figure 2. The most change is in the Service Quality dimension which has all three constructs modified. This was due to the original model not really understanding service quality, it was originally perceived as providing help and assistance to KM users. While help and assistance is important, it is even more important to have leadership, a strategy that guides KM, and a governance process for ensuring KM alignment with the organization, realization of KM benefits, and that risk associated with knowledge use is managed. The result is the three constructs of leadership/management support, KM governance, and KM strategy. Additionally a feedback loop from net benefits was added to reflect ongoing changes/monitoring by these constructs. Knowledge quality has only one change: knowledge content management is split away from knowledge strategy and kept here as the construct controlling KM content while knowledge strategy was moved as previously mentioned. System quality shows no changes to construct names however the definitions of the constructs has been changed and will be discussed. Intent to use is modified by adding extrinsic motivation as an alternative to perceived benefit. Finally, net benefits are modified to include the four areas of KM success impact. The bases for these changes are discussed in the discussion section.

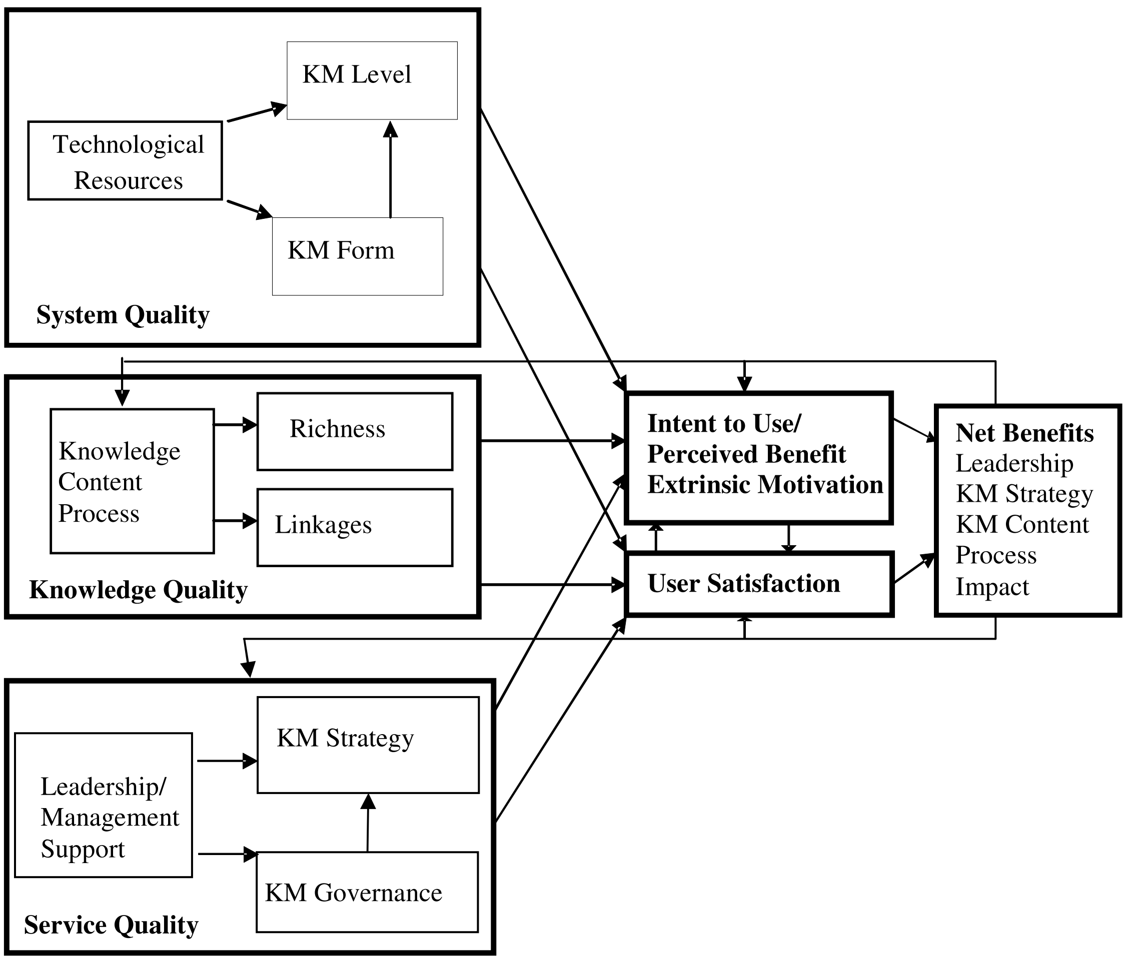

Figure 2. KM Success Model (2017)

4. Discussion

The changes to the Jennex Olfman KM Success Model come from three sources: the first is a reexamination of the knowledge pyramid that added in technologies such as the cloud, social media, big data, the Internet of Things, sensors/sensor networks, business intelligence, data mining, and analytics. The second is quantitative research into the artefacts of KM success that identified four outcomes of KM success. The third source is a targeted literature review focusing on papers that have used the model.

4.1. Reexamination of the Knowledge Pyramid

Jennex and Bartczak [17] revised the knowledge pyramid to incorporate learning, filtering, and transformation processes and technologies; and to reflect their perspective that there is a difference between the KM knowledge pyramid and the general knowledge pyramid. This model reflected that KM is about generating actionable intelligence and identified filters, processes, and technologies to accomplish this. Jennex [16] revised pyramid further, see figure 3, to consider big data, analytics, and the Internet of Things. Adding in these new technologies leads to insights that are valuable for revising the Jennex Olfman KM Success Model (2006). The following paragraphs discuss the technologies and their impact on the KM Success Model.

McAfee and Brynjolfsson [28] and Madden [27] define big data as unstructured data sets so large and complex and generated so fast that traditional data analysis methods are inadequate. Chen, et al. [5] suggest analytics tools such as text analytics, web analytics, network analytics, mobile analytics, and data analytics are the key to transforming big data to data, information, knowledge, and intelligence. All agree the artifacts of knowledge are changing because of big data and look at the goals of big data being to identify intelligence for evidence based decision making, transforming intuitive based decision making to evidence based decision making, and pushing decision making to lower levels of the organization. Finally, Koronios, et al. [26] found that a key big data success factor is having a strategy to determine what big data is needed to generate business value.

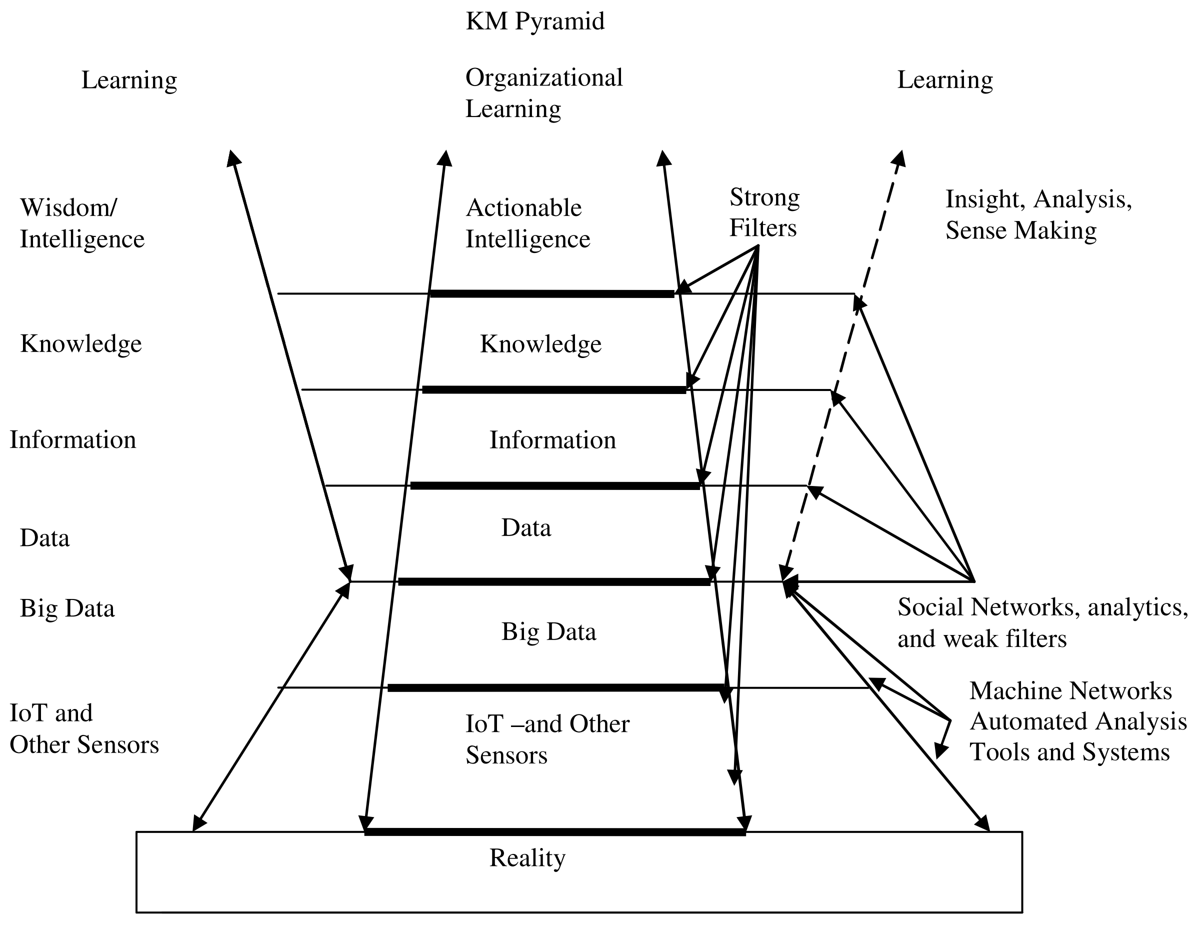

Figure 3, The Revised Knowledge Pyramid [17]

Barnaghi, et al., [3] define IoT as the network of physical devices that connect to the web, usually through a wireless connection, and communicate with other physical devices for improving service of all devices and the generation of big data. They then describe the knowledge pyramid of the IoT as being raw data leading to structured data with semantics leading to abstractions and perceptions leading to actionable intelligence [3]. Gubbi, et al. [10] and Atzori, et al. [2] expand on the IoT and see it as a vast sensor network with devices generating tremendous amounts of data by nearly continuous recording of data reflecting the devices state and using ubiquitous analytics and cloud technology to generate value through networks of devices.

This model provides several impacts. Provost and Fawcett [31] say Data Science is about extracting information and knowledge from data. Big data uses analytic tools to process it into human understandable data chunks. Chen, et al. [5], McAfee and Brynjolfsson [28], and Madden [27] all agree that automated tools and analytics are changing the nature of knowledge and wisdom as they focus on producing actionable intelligence to support evidence-based decision making and automated decision making. This implies that the social networks previously used between the data, information, knowledge, and wisdom layers need to be expanded to include analytics. However, these analytics and the big data they help transform reflect the findings of Koronios, et al.[26] that strategy is required to guide the use of big data. Additionally, Weinberger [35] suggests that the availability of Internet based digital media sources are changing the shape, evolution and perception of knowledge resulting in the traditional pyramid of knowledge becoming a formless "network of knowledge." This is due to the ineffectiveness of filters normally used by organizations to verify sources. The use of strategy to guide acquisition of big data is an example of the application of filters, albeit weak filters, allowing big data to operate within KM function in many different ways. System quality is impacted by expanding the definitions of all constructs. Technological resources is expanded to include the above mentioned analytic and automated tools as well as expanding networks to include social networks, cloud storage, . KM form is expanded to include structured and unstructured repositories. KM level is expanded to include the data models, ontologies, and taxonomies needed to organize, search, and retrieve structured and unstructured data. Knowledge quality is impacted in the knowledge content process construct as this construct needs to expand beyond Hansen, et al.'s [11] storage strategy of codification and personalization to include structured and unstructured data, big data, and IoT data conversion data processes into data. Service quality is affected in the KM strategy construct as the KM strategy needs to be expanded to include big data and IoT strategies.

4.2. Measuring Knowledge Management Success

Defining when a knowledge management project or initiative is successful is difficult. Jennex, Smolnik, and Croasdell [23] [24] found that KM success is measured in four dimensions: impact on business processes, impact on KM strategy, leadership/management support, and knowledge content. A quantitative study further identified a set of 20 measures that operationalizes these four dimensions. An examination of these four success dimensions shows that three are also antecedents of KM success. Leadership/management support is necessary for a KM initiative to be started and was included in the Jennex Olfman 2006 KM Success Model as management support. This research found that successful KM feeds the support that was present to start the KM initiative while a lack of success lowers the leadership/management support for the KM initiative. The construct was changed from management support to leadership/management support and the definition of the construct expanded to include leadership. Additionally, a feedback path was added from the net impacts dimension to the service quality dimension to show that KM net impacts influence leadership/management support. Knowledge content is reflected in successful KM by an expansion of knowledge repositories and use. This reflects the impact of the feedback loop from the 2006 KM Success Model. Also, this research found that KM strategy has two main functions. The first is the identification of knowledge content, its representation strategy, and appropriate capture and storage processes. The second function is more strategic in that KM strategy also focuses on ensuring alignment between the KM initiative and the organization's competitive strategy as well as identifying KM metrics, key knowledge users, key knowledge needed, and incentives needed to ensure knowledge use. Ultimately, KM Strategy is necessary to design the initial KM initiative and was found to be refined through KM success. Impacts to the 2006 KM Success model are threefold. The first is the renaming of the KM strategy/process in the Knowledge Quality dimension to KM content process. This reflects the content function of KM strategy. The second impact was the addition of a KM Strategy construct to the Service Quality dimension. This reflects the alignment and measurement function of KM strategy. The third impact is the addition of the feedback loop from the net impacts dimension to the service quality dimension (previously discussed). The final modification to the KM Success Model is in redefining the net impacts dimension to specify the four indicators of KM success: impact on business processes, leadership/management support, knowledge content, and KM strategy.

8.1. Targeted Literature Impacts

Governance. KM governance is about ensuring that KM benefits are realized through the implementation of the expected benefits of the KM strategy [37] [38]. Schroeder, et al. [32] discuss various forms and models for implementing KM governance while Onions and De Langen [29] discuss the implementation of KM governance through implementation of standards and processes. Jennex and Zyngier [21] and Zyngier [36] discussed KM and security and identified a purpose of KM governance as risk management for the KM initiative. KM governance processes manage the risks of KM to acknowledge and contend with cultural issues, structural obstacles and other relevant issues as they arise. The management of these risks assist in the resolution of these issues and in turn strengthen the strategies to manage knowledge that are employed within the organization. Acknowledging specific knowledge as the organization's strategic asset and differentiator is the ultimate responsibility of the governance process and a component of KM strategy and management. Jennex and Durcikova [18] discussed the integration of risk management with KM and security. This literature supports the creation of a KM governance construct in the service quality dimension. It is placed in the service quality dimension as governance is a non-technical construct that influences the quality of the KM initiative as well as helps ensure that the net benefits dimension has benefits to measure.

KM Strategy. Koloniari, et al. [25] studied KM critical success factors in Greek libraries. They found KM strategy to be very important where the construct was defined as the degree to which the library links knowledge with its strategy and the degree to which a clear and well-planned strategy exists. This supports the alignment and goal functions of KM strategy and the decision to split KM strategy into the knowledge content process in the knowledge quality dimension and the KM strategy in the service quality dimension.

Jennex [15] found it significant to KM success to have a KM strategy. Analysis of KM strategy found the following to be the main components of a KM strategy:

- creation or modification of knowledge related key performance indicators
- increasing its awareness/mapping of knowledge sources and users
- creation of new or additional knowledge capture processes
- changes to the way my organization assessed knowledge use in the organization
- increased resources for our KM systems and repositories
- changes to my organization's KM goals
- changes in my organization's incentives for using and sharing knowledge

These strategy components show both content and alignment functions of a KM strategy and also support breaking the original KM strategy construct into the knowledge content process and KM strategy constructs in the revised model.

Intent to Use/Use. Many articles have been written using extrinsic and intrinsic motivation as a predictor of knowledge sharing and/or use. Is this approach better than Perceived Benefit? Hung, et al., [12] found extrinsic motivation to be significant to ensure appropriate knowledge sharing behaviors in a KMS. It is apparent that extrinsic motivation is useful for predicting use and so is added to the Intent to Use construct as an alternative (but not replacement) to perceived benefit as Jennex [14] found perceived benefit a useful model for predicting intent to use.

Jennex [14] and Brown, et al. [4] investigated use of KM/KMS and found interesting results. Jennex [14] found that newer members of an organization preferred pointers to people who possessed knowledge instead of taking the knowledge from the computerized knowledge base. It was also found that as these users learned the organizational culture and context of the organization they would become users of the computerized knowledge base and less reliant on talking to knowledge sources. Brown, et al. [4] investigated KMS use in an organization with high turnover and found that users preferred person to person knowledge sharing and not using the computerized knowledge base. This supports keeping the current constructs of richness and linkages in the knowledge quality dimension.

Multiple Constructs. Pee, et al. [30] investigated the antecedents and impact of factors on KM capability in public organizations and found that having information technology resources (the technological resources construct) was most significant for ensuring KM capability. They also were surprised to find that leadership was more important than KM strategy in getting participation in the KM initiative but suspected that it was the nature of public organizations where strategic alignment and goal attainment are elusive to be the cause. Finally they found an impact from non-technology factors such as incentives and training were important to gaining participation.

Filieri and Willison [9] identified the determinants of KMS success focusing on knowledge management processes post-KMS implementation in the context of the new product development process, specifically with knowledge repositories. They found that the system quality and knowledge quality dimensions were critical with specific support found for the richness (accuracy, completeness) construct in the knowledge quality dimension and the technological resources construct. These findings support keeping the identified constructs with expanded definitions.

5. Conclusions

The revised Jennex Olfman KM Success Model is a satisfying re-specification of the DeLone McLean IS Success Model that provides researchers with a usable model of the antecedents of KM success. To summarize the dimensions and constructs of the revised model are as follows:

System Quality. Reflects how well the KMS assists users in capturing, finding, retrieving, manipulating, and using knowledge. The dimension consists of three constructs, technological resources, KM form, and KM level. Technological resources define the capability of an organization to develop, operate, and maintain KM infrastructure and systems. These include all technologies used in KM including storage technologies such as the cloud, data bases, data warehouses, and unstructured databases; knowledge capture/discovery technologies such as IoT, sensor networks, and data, text, web mining, and sense making tools; networking technologies including social media, collaborative, web, broadband, wireless, mobile, and Bluetooth; and display/interface technologies such as 3-D, heads up displays, touch screen, tablets, and plasma; as well as the expertise to integrate, operate, secure, and maintain these technologies. Technological resources enable the KM form and KM level constructs. KM form refers to the extent to which the knowledge and KM processes are computerized and integrated. This includes how much of the accessible knowledge is on line and available through a single interface and how integrated the processes of knowledge creation, storage/retrieval, transfer, and application are automated and integrated into the routine organizational processes. This construct along with the technological resources construct influences the KM level construct. KM level refers to the ability to bring knowledge to bear upon current activities. This includes having an enterprise data model, ontologies, taxonomies, and KM mnemonic functions such as search, retrieval, manipulation, and abstraction; and how well they are implemented.

Knowledge Quality. This dimension is about the usefulness and accuracy of the content and its ability to assist users in performing their duties. There are three constructs: knowledge content process, richness, and linkages. The knowledge content process construct looks at the organizational processes for identifying knowledge sources and users, knowledge storage formats, and knowledge capture processes. This construct determines the contents and effectiveness of the other two constructs. Richness reflects the accuracy and timeliness of the stored knowledge as well as having sufficient knowledge context and cultural context to make the knowledge useful. Linkages reflect the knowledge and topic maps and/or listings of expertise available to identify sources of knowledge to users in the organization. Additionally this dimension receives feedback from the net benefits dimension to assist in determining adjustments to be made to the knowledge content.

Service Quality. This dimension is about the organization's ability to provide the KMS and to ensure it provides the benefits expected from knowledge use. It consists of three constructs: Leadership/management support, KM governance, and KM strategy. Leadership/management support refers to the direction and support an organization needs to provide to ensure that adequate resources are allocated to the creation and maintenance of KM, a knowledge sharing and using organizational culture is developed, encouragement, incentives, and direction is provided to the work force to encourage KM use, knowledge reuse, and knowledge sharing; and that sufficient control structures are created in the organization to monitor knowledge and KM use. This construct enables the other two constructs. KM governance is a construct enabled by Leadership/management support and is responsible for providing oversight to ensure that knowledge use/KMS benefits identified by KM strategy are realized while also ensuring that risk is monitored and controlled. KM strategy is enabled by Leadership/management support construct and oversaw by the KM governance construct. The KM strategy construct addresses identifying KM goals, alignment, metrics, and knowledge sharing/use incentives. This dimension also receives feedback from the net benefits dimension for adjusting KM strategy and KM governance, and building Leadership/ management support.

User Satisfaction. This dimension is used to measure how satisfied users are with using the KMS and knowledge. This dimension is a good indicator of how users feel about the current KMS.

Intent to Use. This dimension is needed to assist in determining if the KMS is sufficient to ensure that users will use the KMS when appropriate. Knowledge/KMS use may not occur frequently making measuring actual use an unhelpful metric. The dimension uses techniques such as the Perceived Benefit Model [33] and Extrinsic Motivation [12] to predict future/continued usage of knowledge and the KMS.

Net Benefits. This dimension measures the actual benefits derived from using knowledge/KMS. Benefits are looked for in four areas: impacts to business processes, impacts to KM strategy, impacts to knowledge content, and Leadership/management support. This dimension feedbacks to the knowledge content process to adjust knowledge content and to the service quality dimension for building Leadership/ management support, adjust KM strategy, and assist in KM governance.

The above dimension/construct definitions are not permanently set and are expected to be adjusted as technological innovation occurs. The extensive modification of the Service Quality dimension reflects the change in management approach since the initial specification of the Jennex Olfman KM success model. It is expected this will significantly improve the ability of the Jennex Olfman KM success model to meet the needs of KM practitioners and researchers in determining what is important in creating and implementing KM initiatives and KMS.

5.1. Areas of Future Research

There are two future areas. The first is performing an exhaustive literature review to determine if there are other constructs and to help in operationalizing the constructs. The second area is in quantitatively testing the model by constructing and administering a survey to a wide spectrum of organizations.

6. References

[1] Alavi, M. and Leidner, D.E. (2001) Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues, MIS Quarterly, 25(1), 107-136.

[2] Atzori, L., Iera, A., and Morabito, G. (2010). The internet of things: A survey. Computer networks, 54(15), 2787-2805.

[3] Barnaghi, P., Wang, W., Henson, C., & Taylor, K. (2012). Semantics for the Internet of Things: early progress and back to the future. International Journal on Semantic Web and Information Systems (IJSWIS), 8(1), 1-21.

[4]Brown, S.A., Dennis, A.R., and Gant, D.B., (2006). Understanding the Factors Influencing the Value of Person-to-Person Knowledge Sharing. 39th Hawaii International Conference on System Sciences, IEEE Computer Society.

[5] Chen, H., Chiang, R.H.L., and Storey, V.C., (2012). Business Intelligence And Analytics: From Big Data To Big Impact. MIS Quarterly, 36(4), pp. 1165-1188.

[6] Davenport, T.H., DeLong, D.W., and Beers, M.C. (1998). Successful Knowledge Management Projects. Sloan Management Review, 39(2), 43-57.

[7] DeLone, W.H. and McLean, E.R. (1992) Information Systems Success: The Quest for the Dependent Variable, Information Systems Research, 3, 60-95.

[8] DeLone, W.H. and E.R. McLean, (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update, Journal of Management Information Systems, 19(4), 9-30.

[9] Filieri, R. and Willison, R., (2016). Antecedents of Knowledge Sourcing and Reuse from a Knowledge Repository in the Virtual Product Prototyping: The Role of Knowledge and System Quality Dimensions. Knowledge and Process Management 23(2), pp 147–160

[10] Gubbi, J., Buyya, R., Marusic, S., & Palaniswami, M. (2013). Internet of Things (IoT): A vision, architectural elements, and future directions. Future Generation Computer Systems, 29(7), 1645-1660.

[11] Hansen M.T., Nohria, N. and Tierney, T. (1999) What's Your Strategy For Managing Knowledge? Harvard Business Review, March-April, 106-116.

[12] Hung, S. Y., Durcikova, A., Lai, H. M., & Lin, W. M. (2011). The influence of intrinsic and extrinsic motivation on individuals' knowledge sharing behavior. International Journal of Human-Computer Studies, 69(6), 415-427.

[13] Jennex, M.E., (2005). Productivity Impacts from Knowledge Management, 11th Americas Conference on Information Systems, AMCIS, AIS.

[14] Jennex, M.E., (2008). "Exploring System Use as a Measure of Knowledge Management Success," Journal of Organizational and End User Computing, 20(1), pp. 50-63.

[15] Jennex, M.E., (2012). "Identifying the Components of a Knowledge Management Strategy." 18th Americas Conference on Information Systems, AMCIS18, August 2012.

[16] Jennex, M.E., (2017). Big Data, the Internet of Things and the Revised Knowledge Pyramid. forthcoming in Data Base.

[17] Jennex, M.E. and Bartczak, S.E., (2013). "A Revised Knowledge Pyramid." International Journal of Knowledge Management, 9(3), pp.19-30.

[18] Jennex, M.E. and Durcikova, A. (2014). "Integrating KM and Security: Are We Doing Enough?" International Journal of Knowledge Management, 10(2), pp. 1-12.

[19] Jennex, M.E. and Olfman, L., (2002) Organizational Memory/Knowledge Effects on Productivity, A Longitudinal Study, Proceedings of the 35th Annual Hawaii International Conference on System Sciences, IEEE Computer Society.

[20] Jennex, M.E. and Olfman, L., (2006). A Model of Knowledge Management Success, International Journal of Knowledge Management, 2(3), pp. 51-68.

[21] Jennex, M. E., and Zyngier, S. (2007). Security as a contributor to knowledge management success. Information Systems Frontiers, 9(5), 493-504.

[22] Jennex, M. E., Olfman, L. Pituma, P., and Yong-Tae, P., (1998). An Organizational Memory Information Systems Success Model: An Extension of DeLone and McLean's I/S Success Model, Proceedings of the 31st Annual Hawaii International Conference on System Sciences, IEEE Computer Society.

[23] Jennex, M.E., Smolnik, S., and Croasdell, D.T., (2009). Towards a Consensus Knowledge Management Success Definition. VINE: The Journal of Information and Knowledge Management Systems, 39(2), pp. 174-188.

[24] Jennex, M., Smolnik, S., and Croasdell, D., (2016). The Search for Knowledge Management Success, 49th Hawaii International Conference on System Sciences, HICSS49, IEEE Computer Society, January 2016.

[25] Koloniari, M., Vraimaki, E., Fassoulis, K., Zenelaj, I., & Kourniotis, X. S., (2014). A study of KM critical success factors in Greek academic libraries.

[26] Koronios, A., Gao, J., & Selle, S. (2014). Big Data Project Success-a Meta Analysis. In PACIS (p. 376).

[27] Madden, S., (2012). From Databases to Big Data. IEEE Internet Computing, pp. 4-6.

[28] McAfee, A. and Brynjolfsson, E., (2012). Big Data: The Management Revolution. Harvard Business Review, pp. 60-68.

[29] Onions, P. E. W., and De Langen, R. (2006). Knowledge management governance. In Proc. of 7th European Conference on Knowledge Management (ECKM 2006), Corvinus University, Budapest, Hungary (p. 365).

[30] Pee, L. G.; Kankanhalli, A.; Ong, L. L.; and Vu, M. K., "Antecedents and Impact of Knowledge Management Capability in Public Organizations" (2010). PACIS 2010 Proceedings. Paper 22. http://aisel.aisnet.org/pacis2010/22

[31] Provost, F., and Fawcett, T. (2013). Data Science And Its Relationship To Big Data And Data-Driven Decision Making. Big Data, 1(1), 51-59.

[32] Schroeder, A., Pauleen, D., and Huff, S. (2012). KM governance: the mechanisms for guiding and controlling KM programs. Journal of Knowledge Management, 16(1), 3-21.

[33] Thompson, R.L., Higgins, C.A., and Howell, J.M., (1991) Personal Computing: Toward a Conceptual Model of Utilization, MIS Quarterly, 125-143.

[34] Triandis, H.C., (1980) Beliefs, Attitudes, and Values, Lincoln, NE: University of Nebraska Press, 195-259.

[35] Weinberger, D., (2012). Too Big to Know: Rethinking Knowledge Now That the Facts Aren't the Facts, Experts Are Everywhere, and the Smartest Person in the Room Is the Room. Published by Basic Books, a subsidiary of Perseus Books LLC

[36] Zyngier, S., (2008). Risk Management: Strengthening Knowledge Management. International Journal of Knowledge Management, 4(3), pp. 19-32.

[37] Zyngier, S., and Burstein, F. (2012). Knowledge management governance: the road to continuous benefits realization. Journal of Information Technology, 27(2), 140-155.

[38] Zyngier, S., and Venkitachalam, K. (2011). Knowledge management governance–a strategic driver. Knowledge Management Research & Practice, 9(2), 136-150..