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# Stakeholder Perception of Information Systems Development Success in the Public Sector

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**Abstract:** Definition of Information Systems (IS) success has eluded researchers over time with no readily acknowledged and acceptable success model. The models so far developed for IS success measure success from the viewpoint of the system, users, and the organization. The system viewpoint is measured by information quality, system quality, and service quality; the users' viewpoint by user satisfaction, use, and individual net benefits; and the organization's viewpoint by organizational net benefits. Moreover, the research done has mostly been in the private sector. This study attempts to add the development team's viewpoint as well as public sector perspectives. This is done by conducting a qualitative case study of the implementation of an information system in the public service in Kenya. Unlike previous studies on IS success, this study acknowledges the fact that there is need for a model that can be used to evaluate systems during the development cycle as well as on projects that never reach completion or are never used. In addition, findings of the study identified key IS success variables relevant to the public sector and characteristics that distinguish the public from the private sector.
**Key words:** IS Success; IS Development Success; Public Sector; IS Success Variables

## INTRODUCTION

Information Technology is an indispensible tool with which accurate, reliable and timely information can be produced through the development of Information Systems (IS). An Information System is not only considered successful when it is up and running but there are many other additional criteria it must satisfy to be regarded so, especially in today's competitive world. Drury & Farhoomand, 1998 note that IS should indeed be a key component in achieving the organisation's mission and it is expected that it should improve productivity and facilitate service delivery (Brown, 2000). A cursory examination of the IS literature reveals that organisations have utilised numerous surrogate measures for IS success (see Hwang, Windsor, & Pryor, 2000). However, the definition of success is context dependent and most of the research to date has focused on measuring success from the perspective of the user and the organization (a proxy for senior management) using the IS.

Moreover, available literature indicate that most of the studies on IS success have tended to focus more on the private sector (Specht, 1999) leaving a major research gap on IS success within the public sector as noted by (Seneviratne, 1999). Brown, 2000 concludes that not much has been done to investigate how IS success within the public sector can be achieved. The importance of IS in increasing effectiveness and efficiency in the delivery of public services, the management of critical information sources for decision making affecting the population, and formulation of public policy cannot be gainsaid. The potential for

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improving the performance of public organizations is evident in the increased investment in IT by the public sector and therefore the need to understand what contributes to IS success in this particular sector.

## STUDIES ON IS SUCCESS

The work done by DeLone and McLean must have been the first that documented a model on IS success. DeLone and McLean made an analysis of more than 180 studies on IS success and identified over 100 IS success measures during the analysis. They established that System Quality, Information Quality, Use, User Satisfaction, Individual and Organisational Impact were the most distinct elements of the IS success equation. This work culminated in the development of the D&M IS success Model (DeLone &McLean, 1992). A critical assessment of the work by DeLone and McLean was done by Seddon (1997) who proposed a respecification and extension of the original D&M IS Success model with the purpose of clarifying confusion caused by the integration of process and casual explanation of IS success measures. Seddon asserts that DeLone & McLean "tried to do too much in their model, and as a result, it is both confusing and misspecified" (p. 240). More specifically, Seddon takes the position that combining a process model with a causal model creates confusion. He also believes that the model leads to three possible meanings for IS use; 1) use as a variable that proxies for benefits from use, 2) Use as a dependent variable in a variance model of future use, and 3) use as an event in a process leading to individual or organizational impact. In his respecified model the IS success variables were: System Quality, Information Quality, Perceived Usefulness, User Satisfaction, Net Benefits to Individuals, Net Benefits to Organisations and Net Benefits to Society. DeLone and McLean (2003) and Seddon (1997) both agree that setting the context to measure net benefits is necessary. Seddon (1999) states that "different measures are likely to be needed to assess the impact and effectiveness of a system for different groups of stakeholders."

Ballantine Bonner, and Levy (1998) offer an alternative model to the D&M model. They identified the need to restructure existing relationships between identified dimensions, identified the lack of accountability for the systemic nature of organisations and the need for critical awareness of identified dimensions and their limitations. In developing the model, they considered three specific IS dimensions, namely; Development, Deployment and Delivery. Therefore, the model is aptly referred to as the 3-D Model of IS success. Ballantine et al. (1998) identified factors for each level/stage of implementation of an IS project in the model that determine the quality of the IS. Those factors are either endogenous or exogenous. Exogenous factors include those that cannot be predicted, such as economic and political factors, while endogenous factors, on the other hand, include items that are controllable.

Other researchers in this area have made a case for environmental factors related to the organisation, users, IS operations, IS development, IS and external environment as having a direct impact on the success of an IS project. Notable among this is by Hwang et al. (2000). Hwang et al posit that these factors influence Use, Satisfaction, and the Individual and Organisational Impact of IS. The five environmental variables provided in their System Success Model come from the Ives et al (1980) model which included three process variables, which have been replaced by four success measures from the DeLone and McLean IS Success Model of 1992.

## THE STAKEHOLDER PERSPECTIVE

An IS project like any other project brings on board varied interests and views from many stakeholders. Different stakeholders view the outcome of the project from different perspectives and therefore will more likely than not arrive at different conclusions. Stakeholders in an IS project can broadly be classified into two; those that will ultimately use the system and those charged with delivery of the system. The ultimate users of the system can further be classified into end-users and senior user management whereas those charged with the delivery of the system can further be identified as system development staff and system administration and support staff. From an end-user perspective, high usability of the system is logically linked to IS success. "If users cannot use the system effectively and efficiently it cannot be deemed to be a success" (Fisher, 2001: 25). Fisher (2001) identified several factors that have greatly contributed to the success of an IS from a users perspective. They are broadly classified under; user expectations of a system; system usability; and user acceptance and ownership of a system.

These are summed-up in the table below.

**Table1**
**User Satisfaction Factors**

| | | |
|---|---|---|
| 1. | User Expectations of a system | • Task-Technology fit<br>• Understanding the users perspective<br>• Meeting user expectations of the system |
| 2. | System Usability | • Quality and effectiveness of the interface design<br>• Quality and effectiveness of user documentation and information<br>• Ease of use |
| 3. | User Acceptance and Ownership of a system | • Level of user involvement in the development process<br>• Participation in the development leading to greater commitment<br>• Extent of user involvement and participation<br>• Quality of user-developer communication<br>• Quality of the system and system reliability |

The variables shown in Table 1 as identified by Fisher, relate to the end-users perspective of a successful IS project. First and foremost, the user's expectations of a system is important in gaining an understanding of the user's perspective on IS success. The expectations in question have to be realistic otherwise users with unrealistic expectations will more likely have low levels of satisfaction compared to those with realistic expectations (Ginzberg 1981; Szajna & Scamell 1993).

Secondly, system usability refers to "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320). In this category, the quality and effectiveness of the user interface, documentation of information as well as ease of use are indicators of IS success. Ease of use has been defined as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989, p. 320). It contributes significantly to user satisfaction (Seddon & Kiew, 1996).

Thirdly, user acceptance and ownership of the system can be defined as "a subjective psychological state reflecting the importance and personal relevance of a system to the user" (Barki & Hartwick, 1989, p. 53). This can be refined further into user participation which is "a set of behaviors or activities performed by users in the system development process" (Barki & Hartwick, 1989, p. 53). Both user involvement and participation have been linked to the success of an IS project (Hwang & Thorn, 1999; Kappleman & McLean, 1991; Saleem, 1996).

Another important stakeholder in systems development hence success is senior management. An IS project has to receive senior management's commitment and support in addition to satisfying the end-users (Bloom, 1996). This stakeholder group has its own perspectives on what makes a successful IS. A study by Adelakun and Jennex (2002) revealed that IT executives, CIO's and IS managers assess success of an IS project by focusing on costs, savings, user satisfaction, value to the organisation and how well the IS interacts within the organisational infrastructure. In a study involving 118 executives, Campbell ranked these perceptions (Campbell, 2003). Internal customer/user satisfaction was considered one of the top three measures for determining the value and success of an IS project by 78% of participants. Staying at or under budget was the second most popular determining factor of IS project success (57% of participating executives), followed by external customer satisfaction, employee productivity, improvements in competitive advantage, system uptime, organisational and IT department productivity, service level agreements and generating revenue.

Finally, those involved in the development and implementation of an IS project are another key group of stakeholders. They can be referred to as system developers to encompass the practitioners and project managers. This group of stakeholders is expected to reconcile the expectations of end-users and those of senior management as outlined above. They are expected to "see the big picture…be aware of the results expected…and look for long term benefits" (Shenhar, Levy, Dvir, 1997). For project managers, managing user expectations within the IS field has become a critical factor for delivering successful IS projects (Staples, Wong, & Seddon, 2002). Nonetheless, the challenges the system developers/project managers

face including time and budget makes them focus more on the delivery of the system on time and within budget and not necessarily satisfy the user requirements. This is an observation that made by Wateridge (1998). Wateridge noted that the appraisals by superiors on the ability of system developers/project managers to deliver projects within a defined period of time and within budget was the overriding factor. A reinforcing study by White and Fortune found that IS success from a project management perspective was mainly associated with items such as organisational fit and business performance, cost, time and quality components (White & Fortune, 2002).

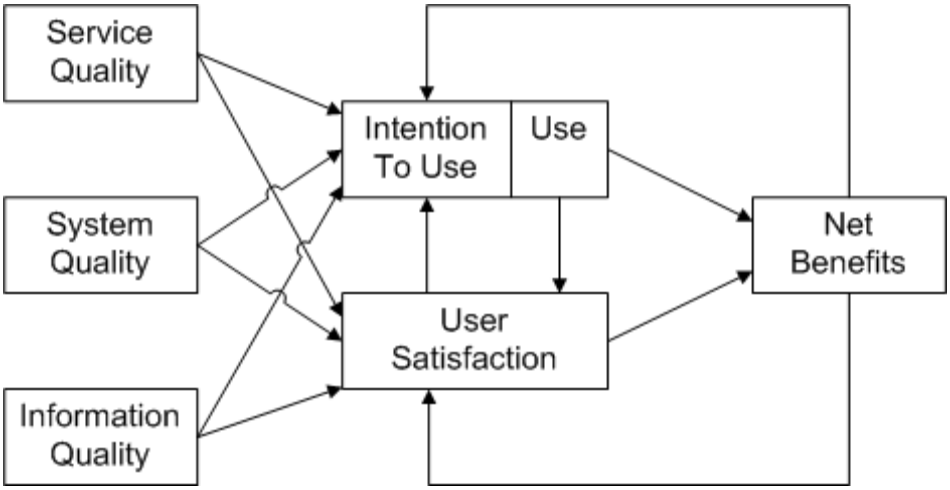


**Figure 1.The Updated DeLone and McLean IS Success Model**
Note: Adopted from DeLone and McLean (2003)

Figure 1 above shows the updated version of the D&M model. DeLone & McLean (2003) assert that the process understanding of IS Success has three stages; 1) creation of the system, 2) use of the system, and 3) consequences of system use. Based on the constructs contained within D&M's model, the system must first be used before net benefits can be realized. The D&M IS Success model as it stands cannot be used to evaluate systems that have yet to reach or will never reach completion and have never been used.

The IS success models reviewed do not show a complete picture of IS Success. These models measure the product through the System Quality and Information Quality constructs, this in essence captures benefits from the perspective of only two stakeholders (e.g. users and the organization) and is lacking in that it only partially covers the process stages. This fact is better articulated by looking at the definition of a system. (Oz, 2009) defines a system as an array of components that work together to achieve a common goal, or multiple goals, by accepting input, processing it, and producing output in an organized manner. On the other hand, Davis (1995) believes that there is a duality between product and process. "You can never derive or understand the full artifact, its context, use, meaning, and worth if you view it as only a process or only a product" (Davis, 1995). Baccarini (1999) states that the combination of project management success (process) and product success needs to be used to get the complete picture of project success. The perception of success is best judged on both the product (artifact) created as well as the process undergone to create it in which case all stakeholders perception shall have been captured.

## THE PUBLIC SECTOR CONTEXT

The driving force for a public enterprise to deliver service is not the profit motive as it is the case in the private sector. This fact brings into play different aspects of the two sectors. Although the public sector does not endeavor to make profit and maximize shareholder value, the accountability of an IS project team within the public sector is often much wider and stringent than in the private sector (DeLoof, 1996; (Briner,

Hastings, Geddes, 1996). In addition, changes within different stakeholder groups can create much organisational turbulence in the public sector than private sector. This will include political, legal, public, financial, managerial and professional issues. Public sector organisations are therefore strongly political and institutionalized (Dowse, 2003). A classical case is during an election period where Organisational turbulence can be very high (Campbell, 2003). As a result, the IS implementing team can find themselves working for two different governments in quick succession who dislike and distrust each other and have a different attitude towards the importance of IS within the agency. Therefore, a change in stakeholders of an IS project has a direct flow on effect on 'success' attainment.

Campbell (2003) having noted the organizational turbulence that can occur in the public sector also appreciated the financial rigidity within the public sector and concluded that, government agencies don't have financial flexibility for quick changes like private sector organisations have given that budgets in the public sector are planned at least a year in advance. If the budget were to be revised in line with a ministerial request, the time lag is equally long yet systems may have to respond in the short term. Financial accountability in the Kenyan public sector dictates that any alteration or change in the budget must revert to the legislature for approval.

Another aspect of the public sector that can have a bearing on the successful implementation of an IS project is the organizational structure. According to Indeje and Qin (2010), the identification and understanding of meanings, norms and power in organizations is an important consideration when developing and implementing an information system. The issues of power are expressed within the public service daily activities, that is, between not only different levels of officers but also within the same level and between the lower levels and higher levels of government. A conflict arising from these power play can be very detrimental to an IS project.

Procurement policies are critical in most government agencies and typically require that IS within an agency need to deliver value for money, be very efficient, innovative, responsive, customer focused and provide a high quality service at optimal cost to taxpayers (Marriott, 2002). IT departments within the public sector operate with very tight budgets and decisions at every step must be justified. As Marriott (2002) states, "it is imperative that public-sector bodies are demonstrably open and fair. In addition, senior public servants need to constantly ask themselves what their decision would look like if they had to defend it to their parliamentary public-expenditure scrutiny committee" (p. 1).

According to Flowers, (1996) delivering successful IS projects within the public sector face with specific constraints as compared to the private sector. Those constraints are outlined in Table 2 and include the politics surrounding the creation and operation of the IS, highly bureaucratic decision making processes, management, technology led, uniqueness and cost.

**Table 2**
**Typical Government IS Characteristics**

| ***Factor*** | ***Typical Government IS Development*** |
|---|---|
| Politics | Priorities may be refocused: for instance as a result of changes in government policy. Impositions of external deadlines: primarily for political reasons |
| Decision making | Highly bureaucratic decision-making processes. High level of public interests and oversight |
| Management | Short-term tenures of managers overseeing projects |
| Lead from | Technology led |
| Uniqueness | Custom systems rather than packaged preferred |
| Cost | Low-cost solutions not sought |

Note: Adapted from Al-Wohaibi, Masoud, & Edwards, 2002, p. 6

# RESEARCH DESIGN

The approach to this study is in the context of Seddons' view that IS success can be defined as "a measure of the degree to which the person evaluating the system believes that the stakeholder in whose interest the evaluation is being made is better off"(Seddon's (1997) (p. 246). The study therefore adopted the

stakeholder approach in order to capture the opinions of those involved with IS in the Kenyan public sector. Stakeholders are in a position to view the IS from various perspectives (Belassi & Tukel, 1996). The target groups were, system end-users, project development and administrative staff and senior user management.

According to Myers (1997), trends within the IS research field show that there has been a general shift away from technological issues towards managerial and organizational issues, thus increasing the application of qualitative research methods. Hammersley (1992) suggests that qualitative data is reliable because it captures the issue from the point of view of the research participants rather than from the view of the researcher. The case study research method was chosen as the appropriate qualitative research method. This method is particularly well suited to research within the IS field, as the objects of the study are linked to Information Systems within organizations (Myers, 1997).

This report forms part of an ongoing research on a large information system project in the central government of the Republic of Kenya aimed at identifying the probable hindrances to the successful implementation of the project. As part of the wider study, an instrument was developed to identify what participants of the project and by extension the study perceived IS success within the government sector to be. It was important that the instrument be pretested before the data collection to ensure reliability (Yin 2003), this was done by involving ten participants of the project but who were not included in the actual study.

The instrument consisted of three distinct parts, and elicited information on the nature of the participant i.e. end-user, development/administration staff or senior user management, importance of identified IS success variables and the differences between the private and public sector within an IS context.

# FINDINGS AND DISCUSSION

The project whose stakeholders participated in this study is a large financial management information system in the republic of Kenya. The Integrated Financial Management Information System (IFMIS) aims at enhancing access and sharing of financial information between the Ministry of Finance and other line ministries and departments. This initiative was brought on board to address the issue of discrete systems that did not “speak to each other” so to speak. The project was initiated in an environment with systems in place that had been established and operated within given structures. Working practices that surround the collection, storage, analysis and transmission of routine financial data throughout the administrative hierarchy, are often in tension with situational, individual and organizational factors of work, which together make up an organization culture.

# IS SUCCESS FACTORS

This study seeks to go beyond the perspectives of the end-user and the organization and in-cooperate the perspectives of the system developer. Therefore, in addition to the IS success variables enumerated by Fisher (2001) which define user satisfaction, we applied proxies for practitioner satisfaction and project manager satisfaction as documented by (Jiang, Klein, & Discenza, 2002; Procaccino & Verner, 2002; Verner & Evanco, 2003). These proxies include satisfaction with the process, knowledge and involvement, and a sense of achievement on the part of the developers. Based on their experiences with the project under study, participants were requested to consider each one of the variables and indicate on a five point likert-scale what corresponded most closely to their perception as to the key success variables for the project. To elicit even more views, participants were encouraged to give further comments on what they considered IS success variables. The respondents were classified in three distinct stakeholder groups to be able to capture their different perspectives of IS success. In total, 68 respondents were reached including 37 end-users, 15 developers/administration staff and 16 senior user management. An analysis of the results was done for each of the stakeholder groups and an integrated account of the findings is provided in Table 3 below.

**Table 3**
**Analysis of Stakeholder Perception**

| *Variable* | *End-User (n=37) %* | *Stakeholder Developers/Adm Staff (n=15) %* | *Senior User Management (n=16) %* | *Average (n=68) %* |
|---|---|---|---|---|
| Quality and effectiveness of the interface design | 59.4 | 73.3 | 56.2 | 63.0 |
| Understanding the users perspective | 83.7 | 80 | 81.2 | 81.6 |
| Meeting user requirements | 100 | 93.3 | 100 | 97.8 |
| Meeting user expectations | 70.2 | 73.3 | 50 | 64.5 |
| Quality and effectiveness of user documentation and information | 72.9 | 86.6 | 75 | 78.2 |
| Participation in the development leading to greater commitment and ownership | 91.9 | 73.3 | 62.5 | 75.9 |
| Level of user involvement in the development process | 86.5 | 86.6 | 68.7 | 80.6 |
| Ease of Use | 94.6 | 93.3 | 93.7 | 93.9 |
| Satisfaction with the process | 75.7 | 100 | 75 | 83.6 |
| Knowledge and involvement | 70.3 | 93.3 | 68.7 | 77.4 |
| Sense of Achievement | 51.3 | 93.3 | 87.5 | 77.4 |
| Quality of user-developer communication | 78.4 | 86.6 | 75.5 | 80.2 |
| Quality of the system and system reliability | 94.5 | 93.3 | 100 | 95.9 |
| Task Technology fit | 89.2 | 73.3 | 87.5 | 83.3 |

On examining the results tabulated above it is clear that some items are ranked highly in IS success across all the stakeholders. However, it is revealing that the ranking is not consistent across all the stakeholders. For example, whereas *meeting user requirements* was considered by all the respondents as an important variable/indicator for IS success, 100% of both groups of users held that view, compared to 93.3% of the developers. *Meeting user requirements* has long been considered as a significant indicator of IS success and these findings are indeed consistent with earlier studies including Wateridge (1998).

A similar scenario is exhibited in the other indicators that have been ranked highly (80% and above) by the respondents, namely; *ease of use, system quality and reliability, satisfaction with the process, task-technology fit, understanding users perspective, user involvement and user developer communication* in that order. This is a pointer to the fact that inasmuch as the indicators are common amongst the different stakeholders, the weight each stakeholder attaches to each of the indicators varies. Another observation that can be discerned from these findings is that the variance in ranking is more pronounced amongst the user groups i.e. the end-users and senior user management as compared to the system developers. The lowest ranked item by the end-users is *sense of achievement* at 51.3% compared to the highest *meeting user requirements* at 100%. Senior user management have ranked *meeting user expectations* at 50% being the lowest compared to the highest *meeting user requirements and quality of the system and system reliability* at 100%. This observation can be contrasted with the spread in ranking by the developers. Their lowest ranked items are several at 73.3% and the highest is *satisfaction with the process* at 100%.

This could be explained by the fact that the onus to deliver the project squarely rests with the system developers comprising practitioners and project managers. As pointed out earlier, DeLone & McLean (2003) assert that the process understanding of IS Success has three stages; 1) creation of the system, 2) use of the system, and 3) consequences of system use. Based on the constructs contained within D&M's model, the system must first be used before net benefits can be realized. However, the first stage in their process is that the system must be built. Thus, in order to use the D&M IS Success model the system must first reach the state of being completed. The burden of completing these projects rests with the developers and therefore each and every variable/indicator counts. In any case the developers have to literally go through

all the three aforementioned stages before the system can be used. There are many systems that either get cancelled or are seriously over their time budgets. Research suggests that some of the stakeholders involved in the development of the IS may feel that the project was a success even though the project was cancelled or seriously over budget (Linberg, 1999).

The evidence emanating from this study is that the user group of stakeholders focus more on stage 2) use of the system and 3) consequences of the use of the system as asserted by DeLone & McLean (2003). On the other hand, it's most likely that system developers will inevitably focus on all the three stages.

## PUBLIC VIS-À-VIS PRIVATE SECTOR

In terms of the difference between the public and the private sector within an IS context the majority of participants (88.2%) were of the view that the two sectors are uniquely identifiable. The key differences being accountability, expenditure control and timeframe. This part of the research adopted the interview approach to collecting the information and some of the excerpts from these interviews are give in the succeeding paragraphs.

The interviewees were of the view that public sector was more accountable, and had stringent expenditure control given that there are different arms of government giving checks and balances to each other. For example, whereas the executive prepares the budget, it must be approved by the legislature and once approved no alterations can be made by the executive without reference to the legislature. Investments in the public sector tend to have a long-term perspective compared to the private sector. Most of the views given by the participants on the three issues hinges on the checks and balances inherent in the public sector. Some of the participants had this to say:

> "…accountability in the public sector emanates from the fact that decisions are made in a more institutionalized manner than the private sector. For example the process of procurement has to go through tendering which can take a very long time and there is no way this can be avoided in the public sector unless it is a real emergency". (P 25)

> "The government uses the tax payers money and therefore has to be very accountable anything short of this is easily blown out by the media and can be very disastrous" (P 40)

> "the profit motive in the private sector dictates that expediency has to be the overriding factor in the decision making, insofar as the decision made is geared towards improving the net worth of the enterprise" (P 30)

> "….my guess would be that the private sector is more focused on productivity improvements and financial benefits in contrast to the public sector which is more focused on customer service. Therefore the system in the public sector must be of high quality to last for a longer time." (P 5)

Notwithstanding the foregoing views by the majority of the participants, some participants had misgivings about the impact of the differences between the public and the private sectors on the success of an IS project. According to these participants, the criteria on whether a project is successful or not is not related to whether the project is being undertaken within the public or the private sector. Participants claimed that the underlining reasons for success or failure would be the same regardless of whether the IS project is completed within the public or the private sector.

## DISCUSSION

The findings from the study point to the fact that available models for IS success are missing out two key aspects of systems development; 1) the systems developer and 2) the characteristics of the sector within which the project is being implemented. We therefore attempt to redesign the DeLone & McLean model in-cooperating the emerging views from these findings. The redesign is based on the following rationale. Firstly, that the *system quality, service quality, and information quality* as presented by D&M model only

comes in the picture after a system has been completed and functional, it is therefore rational to include the process of developing the system in the model. Secondly, the use of the system further enhances net benefits through enabling public sector employees to be 'accountable' (e.g. to the Permanent Secretaries); to exercise 'expenditure control' (e.g. over the budget) and also 'meets long term needs'. Figure 2 below shows the redesigned model.

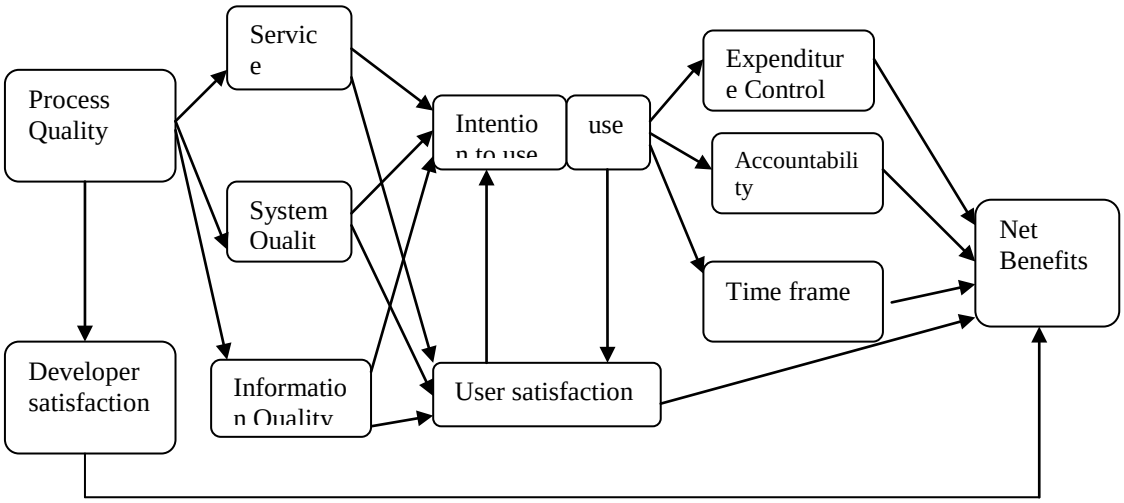


**Figure 2. Emerging IS Development Success Model**

# CONCLUSION

Though widely done, research on IS success other than focusing on end user and organizational perspectives of IS success; there has been no or little attempt to take on board the different characteristics between the Private and Public sectors. The importance of the public sector and its unique characteristics cannot be gainsaid. The public sector is a major investor in IS and relies heavily on IS to stay efficient and effective. The perspectives of the systems developer as a key stakeholder have been missing in the previous research.

This study provides not only one of few attempts that have been made to explore the characteristics of the public sector but also bring on board the perspectives of the system developers in identifying IS success factors. The findings are not a departure from those shown in the IS success models reviewed earlier but rather a redefinition of these models. A rider to these findings lies in the fact that the study took place in Kenya and therefore it is not easy to generalize the findings and conclusions across the entire publics sector. Moreover the study considered only one such project and the findings are merely the opinions of the participants. Therefore, the study should be treated as an exploratory one to encourage researchers to consider the issues raised in this study in future research.

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