Systems Failure

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# Introduction

An information system (IS) refers to a collection of people, procedures, and equipment to better control a business and its resources by collection, storage, and processing of data [5-6]. A system failure definition is inability of such IS to meet defined criterions [1-3]; which could lead to loss of expected services [4].

Therefore, this report’s purpose aims to recognize considerations on why IS can fail. Additionally, whilst not all failures can be accounted for within the operational use of an IS, a variety of approaches discussed below that – if conducted – help to aid in prevention of failures when executing information systems development. Additionally, this report will also show some practices on how systems failures could be mitigated.

# Key Factors for failure

There are many nuances that can contribute to effects resulting in failure within a IS. Although not all factors captured within this report, an endeavour is to provide a sample of elements that would have an impact to a system not functioning as intended.

## Systems Analysis

One main factor that can lead failure relates to improper systems analysis; where lacking or inadequate tasks where not covered within the organisation before system application - such as identifying requirements for the system as well as fact-finding exercises to gain what is needed from key stakeholders in an organisation, or feasibility studies establishing what is expected is possible [7-8]. Without effective practice in this area, this can expose a system to downstream failures including poor system design, lack of user acceptance or unrealistic system expectations [7].

An example of what is reflected above comes from Beynon-Davis and Flowers [9,13] regarding the Taurus settlement system case study, where the design was flawed, poor communication and conflicted political interests lead to increased time and cost. Another example raised by Beynon-Davis [9] relates to the Confirm reservation system, where lack of professional conduct and ethics within IS development and not expressing the limitations of the systems they develop.

## Data

Data are raw facts or observations with little value on their own until context applies [10]. One aspect of systems development that can cause failures is overlooking data fed into the IS. One could argue that a IS produced as intended, leads to system failures due to incorrect or incorrect data, data imported with little regard to recognized procedures is applied to the IS [11], poor data design or poor data management [12].One implication of data as a systems failure can be inefficient data processing procedures into useful information that the organisation can use in the IS [10]; having downstream effects such as confusion by users of the IS purpose which may lead to less desire from the organisation to use such a IS, missing valuable insights for the organisation from the lack of processing data into contextual information[10]. Another implication of this is the potential of breaching standards, policies set by the business and legislation - which in turn – leading the system to not be usable from both organisational, ethical and legal perspective.

## Management

Not all systems failures are due to a technical fault or design flaw, but can also come from how the systems development is managed, One example as described by Beynon-Davies [9], where a systems failure can occur by the IS development management when the design objectives are evaluated against the system created, and it not meeting those objectives, leads to failure of the systems intended purpose. One example from Flowers [13] with a case study from The Performing Right Society Downsizing project - showing lack of understanding on the information, inappropriate approach to system construction. Again, a case study shared by Flowers and Beynon-Davis [9,13] on The Taurus Project at the London Stock Exchange where poor management lead to missing deadlines and being over budget.

## Education

The failures of a system can also relate to how the system is presented to its stakeholders and users or how the organisation provided guidance on how said system works. Failures can be contrived if the system is deemed as unusable due to complexity, lack of training, or lack of awareness of system presence and documentation. Flowers [13] provide examples based on case studies from The London Ambulance Service Computer-Aided Dispatch System and The Field System at the Department of Employment, where lack of training of the system and user involvement was noted.

# Improvements to aid in preventing system failure

Now that the different factors which can contribute towards system failure within a IS, several practices below are suggested on how an organisation could reduce chances of a system failure occurring.

## Agile Methodology Implementation in Systems Development

One practice to follow when creating an IS for an organisation is the use of an Agile methodology – with Scrum when compared with the standard waterfall approach. Scrum is an iterative approach to systems development [14-15]. The benefits received could combat potential complexities in management of a systems development project, including keeping users involved and educated with development, frequent opportunities to provide feedback - giving development teams chances to redefine requirements and revise changes as required [14-16] - with work carried out in one month or less intervals known as sprints [14-16] to work on a backlog of tasks needed to produce for the system before going further. Based on above, this could alleviate ailments such as user inclusion and engagement,. project transparency and documentation, along with quicker development times with an ability to be less exposed to other system failures if implemented efficiently [17].

However, an argument can be made, that Scrum is not the only approach and could not be effective if not endorsed by the management team or ineffective teamwork within of an organisation and is something to keep in mind when going with this approach [17].

## Necessary IS Development Resource

Another component to consider helping improve mitigation of IS failure, is to ensure correct resources applied to it. One study by Rouse [18] suggests the use of different mechanisms to establish the right people with the right training, the right equipment, for the right job, and providing feedback to improve performance. Whilst this approach is not fault-proof, it could at least provide a guideline of ensuring the most potential out of the employees at a organisations disposal for any system development needs. As well as above, it is important to consider the resource for both inside and outside the systems development sphere, such as the right resource to communicate with external parties, to manage the project undertaken as well as the implementation of the system itself.

# Conclusion

System failures within information system development will – in one form or another- have a chance to present, with many factors to account for including resource, strategy and organisational constraints. However tackling some of the main areas of failure – systems analysis, the appropriate use of data, management of systems development, and education could help to alleviate many of the expected failures that may arise. Additionally, the incorporation of a Agile system development methodology could prove fruitful in mitigating against these failures further, providing it is implemented successfully. Furthermore, ensuring appropriate resource has been applied in all aspects of the systems development is a key element to consider reducing this risk and potential improvements.

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