

An IS Theory of Reciprocal Change

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ABSTRACT

This paper proposes an IS theory of reciprocal change. The research problem addressed in the paper is the absence of an IS theory that explains the reciprocity of change within IS. The questions that the paper answers is, what composition of constructs and their interrelationships are paramount for an IS theory of reciprocal change? And, what are possible conceptual contributions of an IS theory of reciprocal change with reference to past research? This paper is appropriately conceptual in nature and based on the academic literature. For practitioners, the proposed IS theory of reciprocal change is simple enough to be understandable yet comprehensive enough to benefit the analysis, application, and design of many IS. For researchers, the proposed IS theory of reciprocal change provides an initial basis for explaining and predicting the reciprocity of change within IS. In addition, the paper presents a process, based on the literature, for informing theory development and clarifying constructs.

CCS Concepts

• **Social and professional topics** → **Professional topics** → **Computing and business** → **Socio-technical systems.**

Keywords

Construct Clarification; Information Systems (IS) Theory; Information Technology (IT) Change; Social System Change; Theory Development; Theory Elaboration; IS Theory of Reciprocal Change.

1. INTRODUCTION

Change can be regarded as a constant. Today, many forms of change involve computer-based Information Systems (IS). This is consistent with the current ubiquity of IS. Thus, how IS relate to change is an important consideration for IS researchers and practitioners. This paper proposes an IS theory of reciprocal change. The research problem addressed in the paper is the absence of an IS theory that explains the reciprocity of change within IS. The objective of the paper is to develop such a theory that can be used for analysing, explaining, predicting, and designing and actioning IS and change [36]. As such, the paper makes an original contribution to the IS body of knowledge. Moreover, IS theory development is recognised as important for the progress of the IS field [40; 43; 36; 56; 102]. The questions that the paper answers is, what composition of constructs and their interrelationships are paramount for an IS theory of reciprocal change? And, what are possible conceptual contributions of an IS theory of reciprocal change with reference to past research? This paper is appropriately conceptual in nature and based on the academic literature.

The general context of the paper follows this introduction. Thereafter, the proposed theory is elaborated, based on an

informing framework. Subsequently, the proposed theory is viewed in relation to past research that focuses on IS/IT and change. The paper ends with concluding remarks, which indicate how the paper addressed the research problem, achieved the research objective, and answered the research questions. In addition, the paper's value for practitioners and researchers and directions for future research are offered.

2. CONTEXT

Central to this discourse is the distinction between IS and Information Technology (IT). In this paper, IT is defined as the technological systems consisting of physical devices and associated software that are used to retrieve, process, transmit and store data and information [100]. In contrast, IS are the systems that form from the interaction between social systems, comprising people, procedures, and processes, and IT, in support of individual, organisational, or societal goals [99; 57]. Thus, the paper exhibits IS research, as it investigates a dynamic phenomenon, involving change, that forms from the interaction of social systems and IT [58]. Notably, it is within IS that the proposed theory manifests.

The idea of an IS theory of reciprocal change is based on prior research, which articulates how changes made to IT subsequently cause changes to be made in the corresponding social system, which, in turn, cause changes to be made again to the IT; these causal change events iterate ad infinitum [57]. The paper proceeds to elaborate on these iterative causal change events, the dynamic phenomenon, to develop an IS theory of reciprocal change. The IS theory of reciprocal change aims to provide a conceptual handle for understanding how the social system and the IT of an IS interact in a continual state of reciprocal change.

The context of the IS theory of reciprocal change is social systems that are planning to use or using IT for a particular purpose. Notably, social systems initiate the first IT change events, after which the IT of an IS interact in a continual state of reciprocal change. In addition, social systems can stop using IT permanently, and so, cause final IT change events, after which the proposed theory does not apply. However, between the first and final IT change events, the continual and alternating cause and effect manifests.

3. THEORY ELABORATION

3.1 Informing framework

The paper proceeds by employing Weber's framework to inform the development of the theory [101]. Weber's framework provides several key aspects that require consideration, relating to both the parts and the whole of a dynamic theory. The aspects for the parts of a dynamic theory are constructs, associations, states, and events and the aspects for the whole of a theory are importance, novelty, parsimony, level, and falsifiability. The IS theory of reciprocal

change is subsequently elaborated in terms of each aspect in Weber's framework.

3.2 The Parts of a Dynamic Theory

3.2.1 Constructs

The construct aspect requires that constructs of a theory be clarified. A construct refers to an abstract concept created for a specific scientific or research purpose. Many constructs are abstract or latent because they are not directly observable; instead, they are sensed indirectly. Importantly, abstract or latent constructs are indispensable to most theories [65]. Construct clarification aims for robust and theoretically relevant constructs [91]. It exposes what a construct conceptually represents and how that construct is similar and different to other constructs in its domain and related domains [65].

Particularly, construct clarification requires that a construct's definition avoids circularity, is expressed in clear, concise, and positive terms, specifies the general type of property that it represents, expresses the entity to which it applies, has simultaneously sufficient and necessary key attributes or characteristics that determine its exemplars, minimises multiple interpretations, is consistent with prior research, and exhibits an appropriate balance between specificity and generality [91; 65; 64; 11].

The paper proposes that the IS theory of reciprocal change comprises two constructs, namely social system change (SSC) and IT change (ITC). Initially, two dictionaries were referenced, namely Oxford Dictionaries [3] and Dictionary.com [1]. Both dictionaries were selected because of their authority, integrity, reliability, and online accessibility. Both were listed on RefSeek's guide to the 30 best online dictionaries, thesauri, and definition aggregators [4]. Furthermore, at the time of their use Oxford Dictionaries were published by Oxford University Press, which was a department of the University of Oxford.

Both the constructs contain the word "change". The noun form of the word "change" had several definitions, and the one synthesised as most appropriate was, change is actions through which something becomes different in form, nature, content, future course, etc. with reference to a preceding point in time.

When applied to the aforementioned term "social system", the SSC construct can be defined as actions by which social systems, comprising people, procedures, and processes, become different in form, nature, content, future course, etc. with reference to a preceding point in time.

Similarly, when the definition of change is applied to the aforementioned term "IT", the ITC construct can be defined as actions by which IT, consisting of physical devices and associated software used to retrieve, process, transmit and store data and information, becomes different in form, nature, content, future course, etc. with reference to a preceding point in time.

The general type of property that both of these constructs refer to is actions. Actions are defined by the aforementioned dictionaries as something performed or done. Thus, actions may be undertaken by the social system to alter itself in response to preceding actions undertaken on the IT, and which altered the IT. Importantly, only people can perform actions that alter the social systems and the IT, since IT cannot alter itself (yet). In addition, people who perform such actions may be different to those that are part of the social system under consideration. Additionally, these constructs

apply to a wide range of entities, that is, wherever social systems are planning to use or using IT for a particular purpose.

The simultaneously sufficient and necessary key attributes that determine the exemplars of each construct follow. For the SSC construct they are people, one or many, who are planning to use or using IT for a particular purpose, have the means to affect change to that IT in some way, and are experiencing alteration to their individual or group behaviour, procedures, and/or processes. For the ITC construct they are the previously mentioned IT components that are being used or are planned to be used by people, one or many, and whose configuration is in the process of being altered.

Exemplars of these constructs may exist in many organisational contexts, where IT is used to achieve business goals, and where there are IT changes and change requests, and procedural workarounds and process changes being implemented; a seemingly typical organisational context. Another exemplar may be any individual who uses personal computing devices to achieve personal objectives and is altering his/her behaviour to use the computing devices. However, individuals often lack a means to directly effect change to that IT. It may be that such a means is indirect and only at a collective level, where the organisations that build the personal computing devices may use focus groups or other representative methods to gather change requests from these individuals.

The preceding clarification seeks to minimise multiple interpretations and provide specificity through clear definitions, stated characteristics, and exemplars. Generality is exhibited through the wide range of situations these constructs may refer to. Furthermore, the paper defines both of these constructs as unidimensional or reflective constructs where there are no sub-dimensions or conceptually distinguishable facets.

Notably, these constructs are not clarified directly in terms of prior research since there is no IS theory that explains the reciprocity of change within IS. Nevertheless, in section 4, the proposed theory is viewed in relation to literature that focuses on IS/IT and change, for possible conceptual contributions to the IS field.

3.2.2 Associations, States, and Events

The associations between the two constructs involve change events, being the dynamic phenomenon. To depict this, arrows arc from each construct to the other, representing direction of causality and a time relationship. The arrows can additionally depict that a difference in the values of one construct's indicators cause a difference in the values of the other construct's indicators. Depending on the indicators this may be a positive or negative relationship, and may or may not be linearly related. The development of measurement indicators for the constructs is outside the scope of this paper.

In addition, a state refers to a quantitative value that a construct can exhibit [101]. Closely related to a state is an event, which refers to a construct that undergoes an alteration from a before state value to an after state value [101]. Since the paper does not develop indicators for measuring these constructs quantitatively, the complete space of states and events cannot be specified. Moreover, the inside-boundary and outside-boundary states and events cannot be specified.

However, the paper provides the basis for subsequent measurement articulation, for researchers to develop insights about the various types and degrees of SSC in relation the various

types and degrees of ITC. Such insight has value for understanding this unique and dynamic phenomenon that occurs in the IS field.

Figure 1 below is a depiction of the elaborated IS theory of reciprocal change. It shows the two constructs, namely SSC and ITC, of an IS interacting in a continual state of reciprocal change or continual and alternating cause and effect involving change.

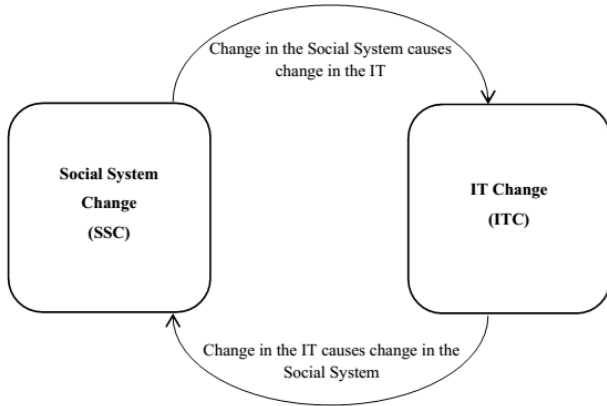


Figure 1: IS theory of reciprocal change

3.3 The Whole of a Dynamic Theory

3.3.1 Importance

The proposed theory is important for research and practice. For research, the theory provides a conceptual handle for understanding how the social system and the IT of an IS interact in a continual state of reciprocal change. The literature does not provide such a theory. The proposed theory is developed to promote research for analysing, explaining, predicting, and designing and actioning IS and change. For practitioners, especially in organisational environments, such a theory exposes the pattern of social system and IT change. This provides necessary insight for decision making, resource allocation, and planning in environments of continual change.

3.3.2 Novelty

The proposed theory, while based on prior research [57], is an original theoretical conception. Such a conception has not been presented in the IS literature. Thus, the proposed IS theory of reciprocal change is an original contribution to the IS body of knowledge. In addition, the paper provides a novel conceptualisation of the proposed theory's constructs and their associations. Such novelty offers a foundation for thinking about IS and change in new ways, for new avenues of research, and for new ways of managing IS.

3.3.3 Parsimony

The proposed theory is parsimonious. It has two focal constructs and two associations. This has the benefit of limiting the conceivable state and event space [101], which promotes research

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precision and efficiency.

3.3.4 Level

The proposed theory can be regarded as a macro-level theory because it is general enough to apply to many different situations involving IS and change, from individuals to large organisations. This macro-level theory aims to provide valuable explanatory and/or predictive power to benefit the IS field.

3.3.5 Falsifiability

Falsifiability is paramount for a scientific theory. Falsifiability requires that a theory be specified precisely enough that empirical tests can be undertaken in an attempt to falsify or fail the theory. Only if a theory does not fail after many attempts and assists to explain new evidence, can it be regarded as a valuable theory. Further research is required to define the proposed theory in quantitative terms, especially the states and events, in order to empirically test and falsify the theory. Indicator development and validation is essential. Initial candidates for SSC indicators may include measuring the number of process steps required to complete a task or the amount of time required to complete a task. An initial candidate for an ITC indicator may include measuring function points.

4. THE PROPOSED THEORY IN RELATION TO PAST RESEARCH

4.1 Selection of Past Research

The proposed theory is viewed in relation to the following selected literature that focuses on IS/IT and change, for possible conceptual contributions to the IS field. Articles were gathered from the eight journals that form the “College of Senior Scholars” basket of journals [6]. These journals were regarded as the top journals in the IS field. Thus, both relevance and quality were provided for by this selection. These eight journals, in alphabetical order, were the European Journal of Information Systems (EJIS), Information Systems Journal (ISJ), Information Systems Research (ISR), Journal of the Association for Information Systems (JAIS), Journal of Information Technology (JIT), Journal of Management Information Systems (JMIS), Journal of Strategic Information Systems (JSIS), and MIS Quarterly (MISQ).

Scopus [5] and EBSCOhost [2] databases were used to obtain lists of all the articles published in each journal since each journal's inception date until the 31 December 2015, being the end of the most recent full calendar year. Thereafter, the word “change” was searched for in the title field of each list. The results of this search were scrutinised and only those articles that involved IS/IT and change relevant to the proposed theory were retained, analysed, and presented in the next sub-section.

4.2 Possible Conceptual Contributions

Possible conceptual contributions to the IS field in relation to the selected literature follow in tables 1 to 8. Each table contains articles from one of the eight selected journals only, and each journal has its own table.

Table 1. Possible conceptual contributions within the European Journal of Information Systems (EJIS)

| Citation | Organisation / Individual level | Possible Conceptual Contribution |
|----------|---------------------------------|--|
| [66] | Organisation | The IS theory of reciprocal change as a theoretical lens |

| Citation | Organisation / Individual level | Possible Conceptual Contribution |
|----------|---------------------------------|---|
| [46] | Organisation | How misalignment affects the rate of reciprocal change |
| [61] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [41] | Organisation | How IS development (ISD) affects and is affected by the reciprocal relationship between SSC and ITC |
| [59] | Organisation | How IS development project (ISDP) team flexibility affects and is affected by the reciprocal relationship between SSC and ITC |
| [94] | Organisation | How business agility affects and is affected by the reciprocal relationship between SSC and ITC |
| [75] | Organisation | How adaptive usage affects and is affected by the reciprocal relationship between SSC and ITC |
| [62] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [70] | Organisation | How business change and alignment affect and are affected by the reciprocal relationship between SSC and ITC |
| [21] | Organisation | How changes in learning and work practices affect and are affected by the reciprocal relationship between SSC and ITC |
| [71] | Organisation | How intra-organizational alliances affect and are affected by the reciprocal relationship between SSC and ITC |
| [54] | Organisation | How IS change reasons-types affect and are affected by the reciprocal relationship between SSC and ITC |
| [32] | Organisation | How culture affects and is affected by the reciprocal relationship between SSC and ITC |
| [69] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [77] | Organisation | The IS theory of reciprocal change as a theoretical lens |

Table 2. Possible conceptual contributions within the Information Systems Journal (ISJ)

| Citation | Organisation / Individual level | Possible Conceptual Contribution |
|----------|---------------------------------|---|
| [46] | Organisation | How misalignment affects the rate of reciprocal change |
| [61] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [41] | Organisation | How IS development (ISD) affects and is affected by the reciprocal relationship between SSC and ITC |
| [59] | Organisation | How IS development project (ISDP) team flexibility affects and is affected by the reciprocal relationship between SSC and ITC |
| [94] | Organisation | How business agility affects and is affected by the reciprocal relationship between SSC and ITC |
| [75] | Organisation | How adaptive usage affects and is affected by the reciprocal relationship between SSC and ITC |
| [62] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [70] | Organisation | How business change and alignment affect and are affected by the reciprocal relationship between SSC and ITC |
| [21] | Organisation | How changes in learning and work practices affect and are affected by the reciprocal relationship between SSC and ITC |
| [71] | Organisation | How intra-organizational alliances affect and are affected by the reciprocal relationship between SSC and ITC |
| [54] | Organisation | How IS change reasons-types affect and are affected by the reciprocal relationship between SSC and ITC |
| [32] | Organisation | How culture affects and is affected by the reciprocal relationship between SSC and ITC |
| [69] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [77] | Organisation | The IS theory of reciprocal change as a theoretical lens |

| Citation | Organisation / Individual level | Possible Conceptual Contribution |
|----------|---------------------------------|---|
| [63] | Organisation / Individual | How the internetwork computing architecture (InterNCA) affects and is affected by the reciprocal relationship between SSC and ITC |
| [45] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [48] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [98] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [9] | Organisation | How ICT innovation affects and is affected by the reciprocal relationship between SSC and ITC |
| [20] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [86] | Organisation | How systems development methodology types affect and are affected by the reciprocal relationship between SSC and ITC |
| [31] | Organisation | The IS theory of reciprocal change as a theoretical lens |

Table 3. Possible conceptual contributions within the Information Systems Research (ISR)

| Citation | Organisation / Individual level | Possible Conceptual Contribution |
|----------|---------------------------------|--|
| [88] | Organisation | How systems designer agency affects and is affected by the reciprocal relationship between SSC and ITC |
| [73] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [18] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [72] | Individual | The IS theory of reciprocal change as a theoretical lens |

Table 4. Possible conceptual contributions within the Journal of the Association for Information Systems (JAIS)

| Citation | Organisation / Individual level | Possible Conceptual Contribution |
|----------|---------------------------------|---|
| [78] | Organisation | How flexibility affects and is affected by the reciprocal relationship between SSC and ITC |
| [81] | Organisation | How shared understanding affects and is affected by the reciprocal relationship between SSC and ITC |

Table 5. Possible conceptual contributions within the Journal of Information Technology (JIT)

| Citation | Organisation / Individual level | Possible Conceptual Contribution |
|----------|---------------------------------|--|
| [7] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [55] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [103] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [30] | Organisation | How diffusion affects and is affected by the reciprocal relationship between SSC and ITC |
| [87] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [17] | Organisation | How IS strategy affects and is affected by the reciprocal relationship between SSC and ITC |
| [33] | Organisation | How business process redesign (BPR) affects and is affected by the reciprocal relationship between SSC and ITC |
| [39] | Organisation | How organizational politics affects and is affected by the reciprocal relationship between SSC and ITC |
| [52] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [85] | Organisation | How IS evaluation affects and is affected by the reciprocal relationship between SSC and ITC |
| [82] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [68] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [23] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [27] | Organisation | How institutional isomorphism affects and is affected by the reciprocal relationship between SSC and ITC |
| [105] | Organisation | How the business/IT boundary affects and is affected by the reciprocal relationship between SSC and ITC |
| [47] | Organisation | How organisational routines affect and are affected by the reciprocal relationship between SSC and ITC |
| [104] | Organisation | How social structures affect and are affected by the reciprocal relationship between SSC and ITC |
| [42] | Organisation | The IS theory of reciprocal change as a theoretical lens |

Table 6. Possible conceptual contributions within the Journal of Management Information Systems (JMIS)

| Citation | Organisation / Individual level | Possible Conceptual Contribution |
|----------|---------------------------------|--|
| [25] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [83] | Organisation | How business reengineering affects and is affected by the reciprocal relationship between SSC and ITC |
| [90] | Organisation | How business process redesign (BPR) affects and is affected by the reciprocal relationship between SSC and ITC |
| [95] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [19] | Organisation | How competitiveness affects and is affected by the reciprocal relationship between SSC and ITC |
| [37] | Organisation | How business process change (BPC) affects and is affected by the reciprocal relationship between SSC and ITC |
| [93] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [13] | Organisation | How organizational coping affects and is affected by the reciprocal relationship between SSC and ITC |
| [80] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [84] | Organisation | How business process change (BPC) affects and is affected by the reciprocal relationship between SSC and ITC |
| [24] | Organisation / Individual | The IS theory of reciprocal change as a theoretical lens |
| [92] | Organisation / Individual | The IS theory of reciprocal change as a theoretical lens |
| [16] | Individual | How social networks affect and are affected by the reciprocal relationship between SSC and ITC |
| [34] | Organisation | The IS theory of reciprocal change as a theoretical lens |

Table 7. Possible conceptual contributions within the Journal of Strategic Information Systems (JSIS)

| Citation | Organisation / Individual level | Possible Conceptual Contribution |
|----------|---------------------------------|--|
| [44] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [49] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [89] | Organisation | The IS theory of reciprocal change as a theoretical lens |

| Citation | Organisation / Individual level | Possible Conceptual Contribution |
|----------|---------------------------------|--|
| [51] | Organisation | How business process redesign (BPR) affects and is affected by the reciprocal relationship between SSC and ITC |
| [38] | Organisation | How value creation affects and is affected by the reciprocal relationship between SSC and ITC |
| [14] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [76] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [97] | Organisation | How knowledge management affects and is affected by the reciprocal relationship between SSC and ITC |

Table 8. Possible conceptual contributions within MIS Quarterly (MISQ)

| Citation | Organisation / Individual level | Possible Conceptual Contribution |
|----------|---------------------------------|---|
| [50] | Organisation | How users' assessments affect and are affected by the reciprocal relationship between SSC and ITC |
| [74] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [28] | Organisation | How reengineering affects and is affected by the reciprocal relationship between SSC and ITC |
| [67] | Organisation | How change agents affect and are affected by the reciprocal relationship between SSC and ITC |
| [35] | Organisation | How adoption, user acceptance, and use affect and are affected by the reciprocal relationship between SSC and ITC |
| [53] | Organisation | How business process reengineering (BPR) affects and is affected by the reciprocal relationship between SSC and ITC |
| [22] | Organisation | How change-readiness affects and is affected by the reciprocal relationship between SSC and ITC |
| [26] | Organisation | How IT development creativity affects and is affected by the reciprocal relationship between SSC and ITC |
| [10] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [29] | Organisation | The IS theory of reciprocal change as a theoretical lens |

| Citation | Organisation / Individual level | Possible Conceptual Contribution |
|----------|---------------------------------|--|
| [96] | Organisation | How affordances affect and are affected by the reciprocal relationship between SSC and ITC |
| [60] | Organisation | How shared affordances affect and are affected by the reciprocal relationship between SSC and ITC |
| [8] | Organisation | The IS theory of reciprocal change as a theoretical lens |
| [12] | Organisation | How job demands and job control affect and are affected by the reciprocal relationship between SSC and ITC |

5. CONCLUSION

Indeed, the proposed IS theory of reciprocal change may be regarded as an extension of a more general theory relating to human existence and its survival and adaption in an environment of physical objects. Physical objects are typically fashioned for a certain survival purpose or aim, e.g. the velocipede for transport in the early nineteenth century. These fashioned objects then result in altered behaviour by the people using them to achieve their survival aims, e.g. a new running and balancing motion. This, in turn, results in the fashioning of more modern versions of those objects, e.g. the mountain bike today, and so on. However, IT is a significantly unique type of physical object [79], especially because it comprises software, which has inherent properties unlike other physical objects, namely complexity, conformity, changeability, and invisibility [15]. Thus, IT can undergo significant alteration without any alteration to its hardware; this is unlike other physical objects. This uniqueness necessitates a unique theory for understanding the dynamic phenomenon that is the social system and the IT of an IS interacting in a continual state of reciprocal change.

The paper has addressed the research problem by elaborating an IS theory of reciprocal change to explain the reciprocity of change within IS. Such a theory presents opportunities for analysing, explaining, predicting, and designing and actioning IS and change, this was the objective of the paper. The research questions have been answered through elaboration of the constructs and their interrelationships, and provision of possible conceptual contributions of the IS theory of reciprocal change with reference to past research.

For practitioners, the proposed IS theory of reciprocal change is simple enough to be understandable yet comprehensive enough to benefit the analysis, application, and design of many IS. Understanding that changes to a social system always result in changes to the corresponding IT, and vice versa, promote particular monitoring, management, and inclusion of such changes in IS design to promote intended changes instead of undesirable and unintended consequences. For example, the proposed theory may provide the necessary understanding of work routine changes resulting from IT changes for successful implementations and return on investment.

For researchers, the proposed IS theory of reciprocal change provides an initial basis for explaining and predicting the reciprocity of change within IS. The proposed theory offers a

foundation for thinking about IS and change in new ways and for pursuing new avenues of research. In addition, the paper has presented a process, based on the literature, for informing theory development and clarifying constructs. Nevertheless, further research is required to define the measurable space of states and events and develop quantitative indicators. Thereafter, research is necessary to falsify the theory in many different contexts. If the theory survives it may be regarded as a valuable theory for the IS field.

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