A Survey of Contemporary and Emerging Research Methods in Information Systems Research

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Abstract: This paper's major goals are to present an overview of the current research trends in information systems (IS), investigate the causes of those trends, evaluate the relevance and effectiveness of those trends, and then suggest strategies to enhance IS research. The study builds a foundation for understanding information systems research. The concepts of positivism, interpretivism, qualitative, and quantitative research are discussed in this paper along with current trends in information system research methodologies. It also highlights the distinctions between qualitative and quantitative approaches and provides justification for the use of case studies in information systems. The study's methodology involved online desk research, with a primary focus on studies between 2018 and 2022.

Keywords: Information, Information Systems, Interpretive research, Information technology, Computer Based Information System, research, Information Systems research

1. INTRODUCTION

Information System

A formal sociotechnical organizational framework created to gather, process, store, and distribute information [10]. Task, people, structure (or roles), and technology make up information systems from a sociotechnical standpoint. Information systems can be characterized as the integration of elements for the gathering, storing, and processing of data, where the data is utilized to produce informational products, knowledge-contributing works, and digital goods that aid in decision-making.

Computer Based Information System

An integrated system of parts for gathering, storing, and processing data as well as for delivering information, knowledge, and digital goods [6].

Research

The systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions

Purpose of information systems research

Examining the creation, application, and effects of digital information and communication technology is the focus of the field of information systems research. i.e.

i. A concentration on digital technologies, or technologies that rely on digitization.

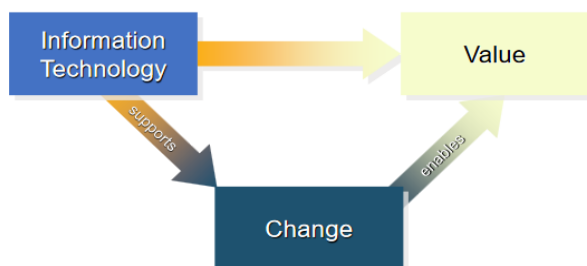ii. The investigation of production, application, and effects.

Figure 1. The Focus of IS Research

Methods for Conducting Information System Research

i. Information technology, software engineering, and computer science scholars research the technical and computational properties of digital technology as a whole.

ii. Individuals' exposure, use, appropriation, and general behaviors [within digital technology domains] are studied by behavioral, cognitive, and psychological scientists.

iii. Organizational science, management, and business scholars investigate how corporate environments shape and are shaped by digital technology.

iv. Economists investigate the broad effects of digital technology diffusion and innovation on organizations, markets, and societies.

Research Personas in Information Systems

A. Theoretical Scientist

Evolves theory, for example developing a model to explain the evolution of sustainability projects using Information Systems

B. Experimental Scientist

Primarily evaluates theory, such as developing and assessing the effects of ontological properties of certain traits on behavior

C. Engineer

Applies theory to the creation of artifacts, such as finding ideas for improving corona dashboards by using state-tracking theory

Varieties of research

A. Conceptual research

Focuses on analyzing a current issue without making any promises about potential (technologically driven) remedies.

B. Formal research

Focuses on formulating ideas in mathematical terms (to avoid any ambiguity regarding their interpretation) and giving

theorems with supporting evidence to shed further light on these ideas

C. Technological research

Focuses on creating complex software artifacts to demonstrate the viability of ideas and to analyze the relative merits and shortcomings of alternative architectural philosophies, such as Workflow Systems (YAWL) or Process Mining (Celonis)

D. Experimental research

Usually examines a small number of characteristics of a phenomenon (such as a characteristic of a technology, a person, or a process), and does so in a controlled environment. experiments in physics or medicine, for instance.

E. Empirical research

Sets out to investigate occurrences in the real world in order to develop or support ideas regarding how the phenomena came to be. can be founded on case studies, polls, action research, grounded theory, or other techniques. For instance, models of success factors and technology acceptance

2. PROBLEM STATEMENT

Information systems (IS) have been developing for more than three decades. Although various schools of thought have developed and even become well-established, there have been relatively few historical assessments of research paradigms and methodology [7].For the field of information systems to advance, theory must be applied effectively. However, little is known about the theory underpinning Information Systems (IS) research [8].A framework and method for social science study that is dedicated to philosophical and methodological approaches to comprehending social reality is called interpretive research. For the analysis and design of information systems, interpretive research designs are essential [9].There is a need to conduct studies on current and emerging research methods in information systems research in order to propose efficient research paradigms, plans, and strategies in information systems due to the lack of foundational research, effective theory application in information systems, and interpretive research.

3. RESEARCH OBJECTIVES

i.   To learn about the most recent developments in information systems research
ii. To identify the factors impacting the current directions of information systems research.
iii. To assess the effectiveness of the existing directions in information systems research.
iv. To make suggestions for enhancing information systems research

4. RESEARCH QUESTIONS

i.   What are the most recent information systems research trends?
ii. What are the variables impacting contemporary information systems research trends?
iii. How effective are the present research trends in information systems?
iv. What steps can be taken to enhance information systems research?

5. RESEARCH METHODOLOGY

Thematic literature review methodology was used in this study. Utilizing keywords and keyword combinations relating to the subject, relevant materials were retrieved from the following databases: Google Scholar, Science Direct, Research Gate, and Academia. Second, given the goal of this article is to provide an overview of current research trends in information systems, only pertinent literatures published during the last five years were taken into account. The selection process included included manuscripts with unique techniques but published after five years.

Information Systems, Trends in Information Systems, Trends in Information Systems Research, Current Trends in Research, Current Trends in Information Systems Research, Interpretive Research, Information Technology Research, Positivism Research, Interpretivism Research, Researching qualitatively versus quantitatively, qualitative and quantitative research distinctions, case studies for information systems, case studies for information systems research, are some examples of search terms that were used to retrieve studies from the search areas.

6. LITERATURE REVIEW

In this section, research trends and methodologies are critically analyzed. It should be mentioned that selecting an effective research strategy for information systems is a challenging procedure that takes the research's goal into account, among other things.

A. Positivism

During the Enlightenment, Comte extensively popularized the positivist approach, commonly known as the scientific approach [1]. The strategy is predicated on the notion that there is a single, observable, quantifiable concrete reality. In the course of conducting research, it emphasizes experimentation, observation, control, measurement, dependability, and validity [1], [2].

On a metaphysical level, positivism holds that all phenomena under study have a single reality that is independent of the perspective of the researcher. The researchers' only responsibility in this situation is gathering and analyzing data. [1].

Positive epistemology maintains that empiricism is the preferred method of inquiry. In this method, research proceeds objectively through hypotheses and deductions. It contends that generalizable knowledge should be sought for and should permit verification or falsification. In order to determine things objectively, positivism employs quantitative techniques like structured questionnaires, surveys, and other statistical data [1], [2].

B. Intrepretivism

According to the interpretive perspective, reality is arbitrary, layered, and socially produced. Since interpretive research is realistic from an ontological perspective, it is best investigated in the context of its social and historical setting [1], [2].

According to the interpretative research epistemology, humans build knowledge as they make sense of their experiences in and with the world. As a result, the researcher participates in the research, interprets the data, and as a result, neither the researcher nor the research can be objective [1].

An emphatic grasp of how norms and values affect perception and action is made possible by the interpretive approach, which offers a strong, consistent logical structure [2].

C. Comparison between positivism and interpretivism

The two approaches can be compared as discussed in Table 1 below

Table 1: Comparison between Positivism and interpretevism

Positivism	Interpretivism
Relationship between society and the Individual	
Society shapes the individual Society consists of social facts which exercise coercive control over individuals Peoples actions can be explained by the societal norms they have been exposed to through socialism	Individuals have consciousness and are not just puppets who react to external social forces as positivists
General Focus of social research	
The point of research is to uncover the laws that govern human behavior just as scientists have discovered the laws that govern the physical world Prefer quantitative methods which allows the researcher to remain detached from the respondents	The point of research is to gain in-depth insight into the lives of the respondents to gain an emphatic understanding of why they act in the way they do. Prefer qualitative methods which allow for close interaction with the respondents
Preferred research methods	
Quantitative Requires research to be valid, reliable and representativeness	Qualitative Prepared to sacrifice reliability and representative for greater validity

D. Qualitative approach

A "naturalistic, interpretive multimethod science," qualitative research involves gathering and evaluating non-numerical data to comprehend certain research topics [3]. In order to analyze social and cultural phenomena, research relies on non-numerical first-hand data collected from observation, interviews, questionnaires, and focus groups. Data gathered using this methodology has a significant capacity for revealing study complexity [3, 4]. There are five methods for conducting qualitative research on information systems [3], [5];

- Grounded theory, which entails data gathering for the formulation of new theories
- Ethnography, which entails direct and active observation to fully comprehend social and cultural processes
- Narrative research, which entails conceiving and examining the experiences of a people as they are expressed in written form. Its fundamental objective is to have a thorough understanding of the meaning that individuals attribute to their experiences and perceptions.
- Phenomenological study, which entails examining phenomena through people's actual experiences in an effort to comprehend and characterize the fundamental nature of that specific phenomenon.
- Action research, a participative and cooperative methodology that connects theory and practice to promote social change.

E. Quantitative approach

In a quantitative research approach, numerical data is gathered and analyzed to describe a phenomenon, discover correlations, or test hypotheses. To collect numerical data from a population sample, this method uses survey designs and experiments [3], [4]. In order to manage and explain a phenomenon, this technique focuses on the measurement of "how many," "how often," and "to what extent" [4]. Statistical principles are critically important for the examination of quantitative data.

F. Comparison between Quantitative and Qualitative approach

The use of qualitative and quantitative methods can coexist. As shown in tables 2 and 3, respectively, they can be compared in terms of concepts, processes, and analysis as well as strengths and weaknesses [4].

Table 2: Strengths and weaknesses of qualitative and quantitative research

Method	Strength	Weaknesses
Qualitative	The qualitative analysis allows a complete, rich and detailed description	Qualitative data is difficult to analyze and needs a high level of interpretive skills
	Can be faster when compared to quantitative methods	Good chance of bias
	Does not reduce complex human experiences to numerical form and allows a good insights into a person's experiences and behavior	Hard to draw brief conclusions from qualitative data
	Qualitative methods can be	Qualitative data faces difficulties in terms

	cheaper than quantitative research	of
	Ambiguities, which are inherent in human language can be recognized in the analysis	Low level of accuracy in terms of statistics
Quantitative	Quantitative analysis allows for the classifying of features, counting them, and constructing more complex statistical models in an attempt to explain what is observed.	Pictures of data which emerge from quantitative analysis lacks richness of details compared with data from qualitative analysis reduced to numerical form
	Findings can be generalized to a larger population	Quantitative implementation slow, and needs time compared with qualitative
	Allows researchers to analyze more easily because quantitate data is in numerical form	Can be expensive
	Provides a higher level of accuracy	Low response rates
	Compare measures of dispersion	Not simple to implement
	Allows to present analysis graphically	Quantitative always requires computer analysis

Table 3: Comparison between qualitative Research and Quantitative Research

Qualitative Analysis	Quantitative Analysis
The language is informal, and the method is frequently inductive.	Deductive reasoning and formal language are used.
may be quicker and less expensive than quantitative research	May be more expensive and comparatively slower than qualitative
Concepts take the shape of taxonomies, themes, and motifs.	Concepts take the shape of unique variables.
As the analysis moves forward, themes or generalizations are drawn	As the analysis moves on, statistics, tables, or charts are used.

from the evidence and the facts are organized to provide a clear picture.	
Procedures are specific, and replication is challenging	Replication is presumed and procedures are standardized.

7. FINDINGS

i. Qualitative research, using positivism or interpretivism methods depending on the situation, is typically favored in information systems research.

ii. Factors influencing research in IS include:
- Research Focus e.g. on digital technologies or development
- Research Characters e.g. Theoretical Scientist or Engineer
- Research Type e.g. Conceptual research or Technological research
- Research Domain e.g. information technology, software engineering, and computer science or organizational science, management, and business study

iii. While positivist quantitative research is the least effective, interpretive qualitative research is the most successful research trend in information systems.

iv. Interpretivism is suggested as the ideal paradigm for doing information system research since it is in line with the ideas and tenets of information system analysis, design, and application. Since information systems were developed by people for people, they must

8. CONCLUSION

Researchers in the field of information systems (IS) have investigated a variety of research approaches; each methodology has its own presumptions, approach to gathering data, and procedures for achieving the goals of the study. The selection of the most appropriate approach for data gathering and analysis is at the heart of research methodology. On the other hand, research technique is a method for concentrating on learning about issues and coming up with sensible answers. This report provided a summary of information systems research methodologies, including the examination of models for interpretative information systems research. The study then discussed how positivism, interpretivism, and interpretive IS research differ from qualitative method and quantitative approach while also highlighting both types' advantages and disadvantages.

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