

Canvas for IT/IS - A Literature Review and A Framework

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ABSTRACT

After the seminal proposal of the BMC (Business Model Canvas), the concept of canvas has been applied in several areas, with Information Technologies (IT)/Information Systems (IS) being one of the most prolific. Although its usefulness as a management tool is widely recognized in the business domain, organized information about canvases within the scope of IT/IS is scarce and in need of more research. Aiming to contribute to a better understanding of these tools for supporting technical and managerial IT/IS activities, this paper presents a framework of IT/IS canvases resulting from a literature review. The framework identifies sixteen canvases, organizing them into the categories of data science, digital transformation, software engineering, project management, and others. The framework not only raises researchers' awareness about canvases and further development opportunities, but it is also an important tool for helping practitioners select canvas tools for their daily practice.

Keywords: Canvas, business model canvas, information systems, information systems management, management tools.

INTRODUCTION

Given the increasingly dynamic and complex business environment, the importance of decision-making is amplified, instigating firms to seriously invest in management tools to support core management activities, which are required to identify, analyze, and resolve problems, explore opportunities, and organize, assess, and interpret information (Shahin, 2010).

One of the most notorious management tools is the Business Model Canvas (BMC) proposed by Osterwalder and Pigneur (2010). BMC enables the visualization of an organization's value propositions and contextual aspects on one page. Pigneur and Fritscher (2014) describe it as a visual modeling method used to capture the business model of a company by defining nine building blocks. The canvas tool was developed to create a shared understanding of the business, thus increasing the effectiveness of teams (Hurni, 2017). Due to the ability of canvases to organize information and bring innovation, numerous authors followed the steps of BMC, becoming a popular topic of development. The result is a significant number of new canvases focused on different areas.

One of those areas is the Information Technologies (IT)/Information Systems (IS) domain. Due to the potential business outcomes inherent to adopting new IT/IS, investments in this area are increasingly higher (Ngereja et al., 2024), and so is the importance of finding appropriate management tools capable of supporting IT/IS activities. However, although organizations recognize the canvas as a meaningful tool, there is little research focused on the particular case of canvases for supporting IT/IS activities. Moreover, to the best of our knowledge, there is no model for organizing the existing canvases, which hinders their overall understanding, adoption, and use.

This research aims to help fill this gap by reviewing the existing canvases, focusing on the ones related to IT/IS activities. The purpose is to identify, describe, and organize the extant canvases in a new framework targeted at both researchers and practitioners.

The paper is structured as follows. In the next section, we present the background of the study by exploring relevant concepts in order to establish a common understanding. In the third section, the research method is described. In the fourth section, the IT/IS canvas framework is presented, and each identified canvas is briefly presented. Finally, some concluding remarks and research avenues are presented.

BACKGROUND

Aiming to enhance organizational performance, companies have been focusing their attention on different management tools and techniques. Mohammed Shahadar and Masjuki (2003) argue that good management cannot be guaranteed without the

appropriate application of these tools and techniques and that, without adequate implementation, businesses cannot benefit from their usage.

The canvas as a management tool was developed to create a common understanding between stakeholders, thus increasing the effectiveness of work (Hurni, 2017). Van Capelleveen et al. (2019) explain that canvas is a visual template that helps create or document conceptual structures to address design problems. Additionally, the same authors highlight the significance of canvas utilization, stating that presenting a difficult concept with its attributes in a canvas structure provides good support for understanding. Tranquillo et al. (2016) share a similar vision, describing canvas as frameworks systematized into conceptual boxes with the intent of helping the user to "collect, organize, and understand" critical information to achieve objectives.

The most notorious canvas to date is the Business Model Canvas (BMC) by Osterwalder and Pigneur (2010), which enables visualize the organization's value propositions and contextual aspects on one page, supporting the generation of a shared language, both theoretical and practical. The BMC focuses on capturing the business logic of an organization and has been the base for all the other canvases developed afterward.

According to its creators, BMC allows companies and other entities to describe, challenge, invent, and pivot their business models. Pigneur and Fritscher (2014) describe it as a visual modeling method, defined by nine building blocks, used to capture the business model of a company.

After the BMC, numerous other authors followed its steps (Amoussouhoui et al., 2022; Jin et al., 2022), becoming a popular topic of research and development. The Value Proposition Canvas (Osterwalder et al., 2014), the Service Model Canvas (Lüftenegger, 2012), and Lean Canvas (Maurya, 2010) are some examples of canvases emerging following the BMC. Tranquillo (2016) states that the appearance of new canvases is expected since the BMC does not reach all aspects involved in generating and delivering products and services. Consequently, some canvases are being developed to assist other areas of business.

Due to the current high number and diversity of canvases, it is important to carry out a literature review of the current proposals aiming at identifying and organizing the available tools. This is the focus of our work, as presented in the next sections.

METHOD, DATA SOURCES AND RESEARCH STRATEGY

A literature review was carried out to identify the currently available canvases for supporting IT/IS activities. We followed a systematic and reproducible method with the purpose of determining, evaluating, and synthesizing the current body of completed and documented work produced by researchers, scholars, and practitioners (Fink, 2020). The literature search was conducted using the Scopus and Web of Science databases since they have a wide range of scientific outlets. Alongside, and to cover a wider spectrum of sources, a Google search with the expression "canvas visual template" was performed, having revealed itself as crucial to complete this study since the results derived from this search gave rise to important additional findings.

Two researchers carried out the literature selection process. The following activities were performed: definition of the search constraints; search in databases; selection of references; analysis of references; categorization by canvas focus; and reporting of the results.

The search term in Web of Science and Scopus was "canvas" and some logical restrictions were applied. Firstly, the subject area "Arts" was excluded from this search since, in arts, a canvas represents a surface intended for painting. Medicine was also left out due to the meaning of the word "canvas" within this field, which represents the acronym for "Cerebellar Ataxia Neuropathy and Vestibular Areflexia Syndrome".

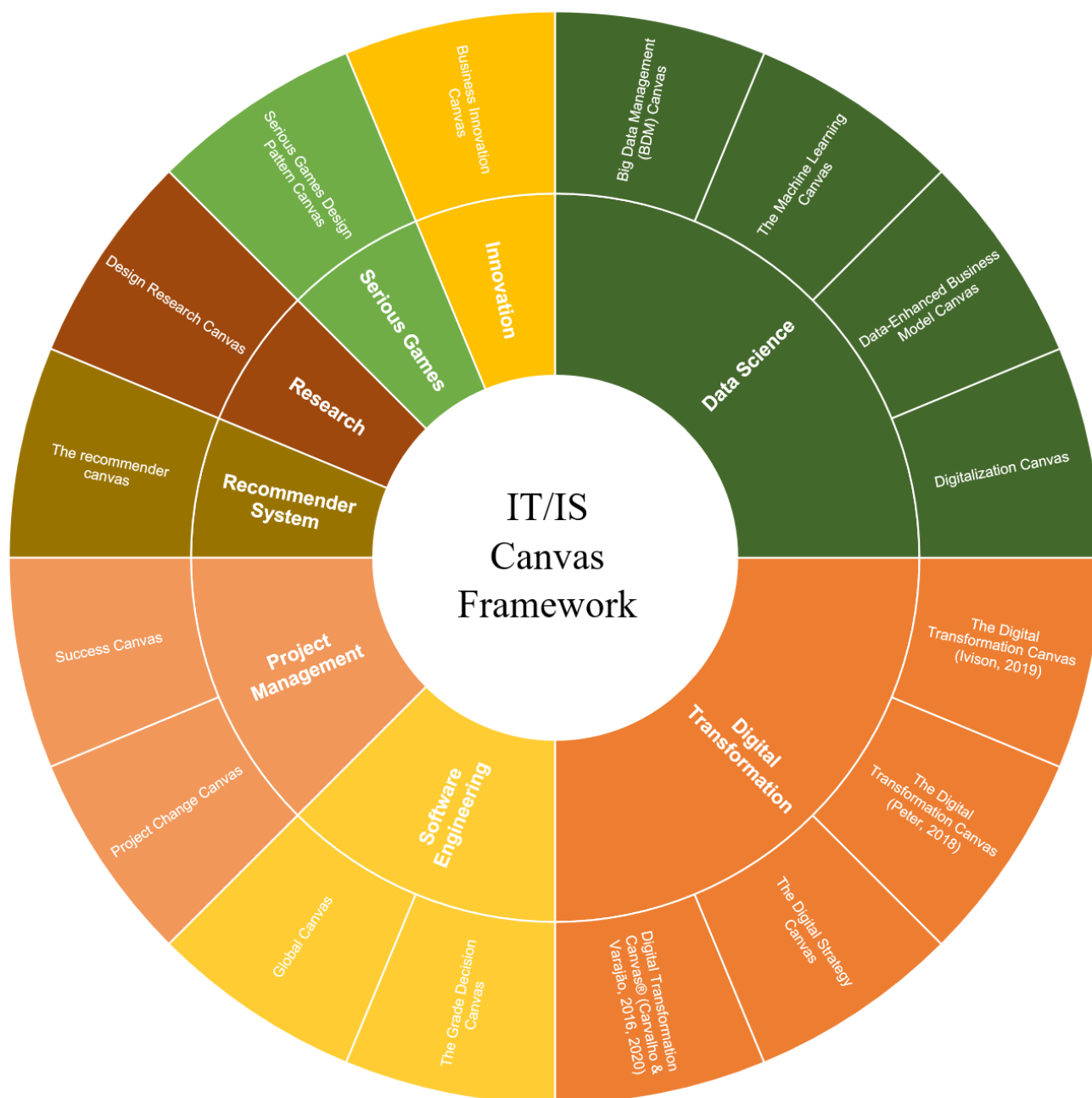
Furthermore, a filter by subject area was applied to include the most relevant fields to the context of this study, including "Computer Science"; "Engineering"; "Business Management and Accounting"; "Materials Science"; "Social Sciences"; "Economics, Econometrics, and Finance"; "Mathematics"; "Multidisciplinary and Undefined". The search was also restricted to journal articles and conference papers. Although the importance of other sources is acknowledged, the main interest lied in mapping the peer-reviewed literature that identifies the relevant canvas.

The filtering process, as well as the reading of the titles and abstracts of the obtained references, led to reducing the initial results of 3417 references to 145, which were analyzed fully. From this examination, 118 references were ruled out since they did not suit this study by not including canvases as frameworks. The Google search resulted in the identification of some additional canvases added to this study.

This analysis revealed 46 potentially pertinent canvases that were organized into five different categories: management, business, education, IT/IS, and others. Since our study is focused on the IT/IS category, 16 canvases were taken into consideration in total. In order to organize the identified canvas, each one was analyzed, and its focus was identified. Primarily, a grouping was formed into general categories and, later on, divided into respective subcategories. This process was carried out independently by two researchers. Subsequently, a workshop was held with the participation of most authors to present, confront, and review results, aiming at achieving concordance regarding classifications.

IT/IS CANVAS FRAMEWORK

Figure 1 shows the IT/IS Canvas Framework resulting from the literature review. To note that IT and IS often appear as two broader and related areas. Land (1985) and Symons (1991) perceive IS as a social system resulting from the embedding of IT. Paul (2007) defines IS as strongly relying on IT as its main contributor. IT is conceived by Bakos (1985) as a set of non-human resources dedicated to the storage, processing, and communication of information and how these resources are organized into a system capable of performing a set of tasks. Thus, IT/IS were considered together, and the identified canvases were organized into the following categories: data science, digital transformation, software engineering, project management, and others (innovation, recommender system, research, and serious games).



Source: This study.

Figure 1: IT/IS Canvas Framework

A brief description of each canvas is presented in the next sections. Note that the figures of the canvases are included only for illustrative purposes. For full reference, the original sources should be consulted.

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Design Research Canvas (Nagle, 2016)

The Design Research Canvas (Figure 4) aims to help answer questions related to the most common discussions evolving the research process, such as: business and academic impact; defining, designing, building, and evaluating the problem at hand; the worth and value of the project; the organization of the project data and artifacts; as well as the outcomes of the research (Nagle, 2016).

Practitioner		Researcher	
Artefact:	No of Iterations:	Study Title:	
Business Impact So What (for business)? Local impact? Industry impact?	Worth Solving? What is the practical significance of the problem? What is the scope of the problem?	Problem Problem Statement	Worth Researching? What is the research significance of the problem? Is there a call for the research or identification of a research gap?
	Well Organised? What were the project steps, iterations and timeline? What design and development frameworks/tools were used and how?	Design & Build Mapping of project and research approach	Well Documented? Adherence to research methodology? Use of theories/existing research?
	Role of artefact in problem solution? Did the artefact solve intended/unintended problem? Was the artefact of good quality?	Evaluation Demonstration of Artefact	Learnings from the study? What were the learnings from the research process and methods? What were the learnings from the artefact development and use?

Source: Nagle (2016)

Figure 4: Design Research Canvas.

The Grade Decision Canvas (Cicchetti, 2017)

The Grade Decision Canvas (Figure 5) is aligned with a specific taxonomy named GRADE, meant for building and implementing the essential elements of the "vocabulary for assessing and choosing architectural assets in the development of software-intensive systems" (Cicchetti, 2017). This tool is used as a template that is directed to practitioners to examine and document architectural decisions and carry out discussions.

[illegible]

Source: Cicchetti (2017)

Figure 5: GRADE decision canvas.

Digitalization Canvas (Heberle, 2017)

The Digitalization Canvas (Figure 6) focuses "on digitalization use cases and user stories", respective value proposition, and their employment and application in factual projects (Heberle, 2017). Heberle (2017) defined four dimensions of the canvas: Digital Vision of the Company; Improvements through Digitalization; Data Sources; Project Portfolio.

Digital Vision of the Company		
Value Proposition	Threats and Issues	
Improvements through Digitalization		
(Just) Implementation	Data Science	Digital Business
Data Sources (including Data Privacy and Protection Obligations)		
Project Portfolio		
Quick Wins	Implementation Projects	Strategic Projects

Source: Heberle (2017)
Figure 6: Digitalization Canvas.

Success Canvas (Varajão, 2016, 2021)

The Success Canvas® (Figure 7) (or Project Management Success Map®) is a one-page overview that lays out what means "success" in a project and what is relevant to achieving it, highlighting success factors, expected benefits, and criteria for evaluating success (Varajão, 2016). It is an excellent tool for creating the basis for implementing Success Management in projects (Varajão et al., 2022).

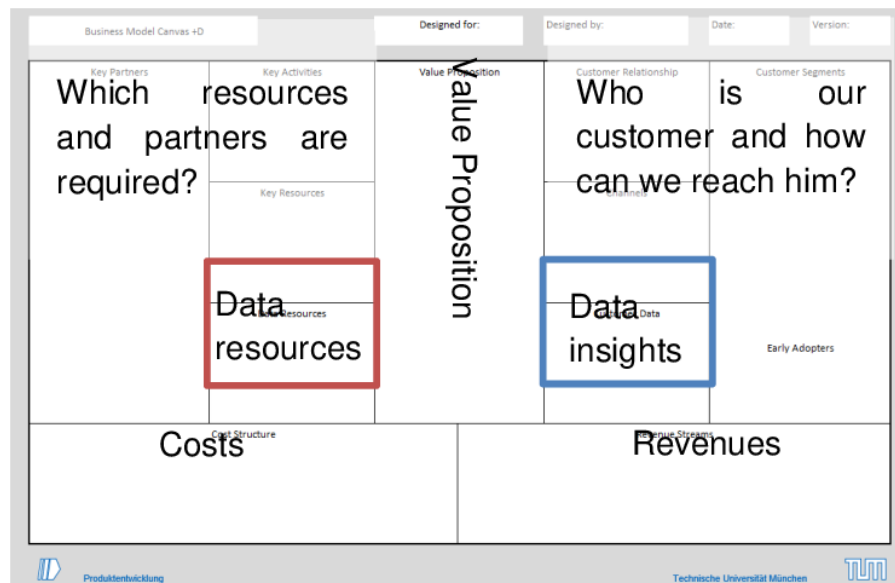
(I.a) Project		(I.b) Participant(s)		(I.c) Date	
(II) What means "success" in your project?					
Success Canvas® Project Management Success Map®					
(III) Objectives/Motivations (O)		(IV) Stakeholders (S)		(V) Deliverables (D)	
What are the project's objectives/motivations?		Who are the project's stakeholders?		What are the project's deliverables?	
ID	Objective/Motivation	ID	Stakeholder	ID	Deliverable
O1		S1		D1	
O2		S2		D2	
O3		S3		D3	
O4		S4		D4	
O5		S5		D5	
(VII) Criteria (C)		(XII) Time frames		(VI) Impacts/Outcomes/Benefits (I)	
How success can be measured?				What are the expected impacts/outcomes/benefits?	
ID	Criterion			ID	Impact/Outcome/Benefit
C1				I1	
C2				I2	
C3				I3	
C4				I4	
C5				I5	
(VIII) Dependencies (D)		(IX) Success Factors (F)		(XI) Barriers/Obstacles/Challenges (B)	
What are the external dependencies?		What are the success factors?		What are the barriers/obstacles/challenges?	
ID	Dependency	ID	Success Factor	ID	Barrier/Obstacle/Challenge
D1		F1		B1	
D2		F2		B2	
D3		F3		B3	
D4		F4		B4	
D5		F5		B5	
(IX) Success Factors (F)		(X) Ethical/Legal Concerns (E)		(XI) Barriers/Obstacles/Challenges (B)	
What are the success factors?		What are the ethical or legal concerns?		What are the barriers/obstacles/challenges?	
ID	Factor	ID	Concern	ID	Barrier/Obstacle/Challenge
F1		E1		B1	
F2		E2		B2	
F3		E3		B3	
F4		E4		B4	
F5		E5		B5	
(X) Ethical/Legal Concerns (E)		(XI) Barriers/Obstacles/Challenges (B)		(XII) Notes (N)	
What are the ethical or legal concerns?		What are the barriers/obstacles/challenges?		What are the notes?	
ID	Concern	ID	Barrier/Obstacle/Challenge	ID	Note
E1		B1		N1	
E2		B2		N2	
E3		B3		N3	
E4		B4		N4	
E5		B5		N5	

J. Varajão, Project Management Success Map / Success Canvas, V1 (2016) – V4 (2021), Department of Information Systems, University of Minho, 2021.
J. Varajão (2021), Success Canvas / Project Management Success Map (Version 4), Zenodo, <https://doi.org/10.5281/zenodo.8609782>
Trademarks: Project Management Success Map® and Success Canvas® are trademarks of University of Minho (J. Varajão).

Source: Varajão (2016); Varajão (2021)
Figure 7: Success Canvas.

Data-Enhanced Business Model Canvas (Benta, 2017)

The Data-Enhanced Business Model Canvas (Figure 8) aids in improving the outline of data requirements in business models, constructing the crucial phases in order to generate data-driven business models. It provides a clearer vision of the data perspective and can also guide to new ideas (Benta, 2017).

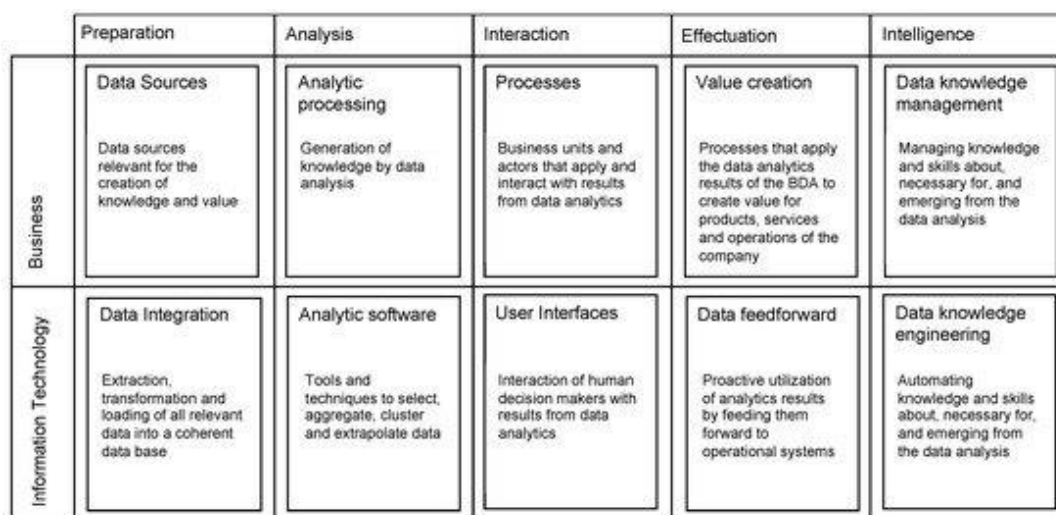


Source: Benta (2017)

Figure 8: Data-Enhanced Business Model Canvas.

Big Data Management (BDM) Canvas (Hemmje et al., 2017)

The Big Data Management Canvas (Figure 9) grants a visual chart capable of being utilized in workshops interactively in order to establish strategies to generate value from data or as a project planning and project progress reporting tool, as described by Hemmje *et al.* (2017). Mainly, the goal of this canvas is to provide a "reference for big data processing information systems that are integrated with business value creation", as it can be used to describe current big data systems or design new big data applications (Kaufmann, 2019).

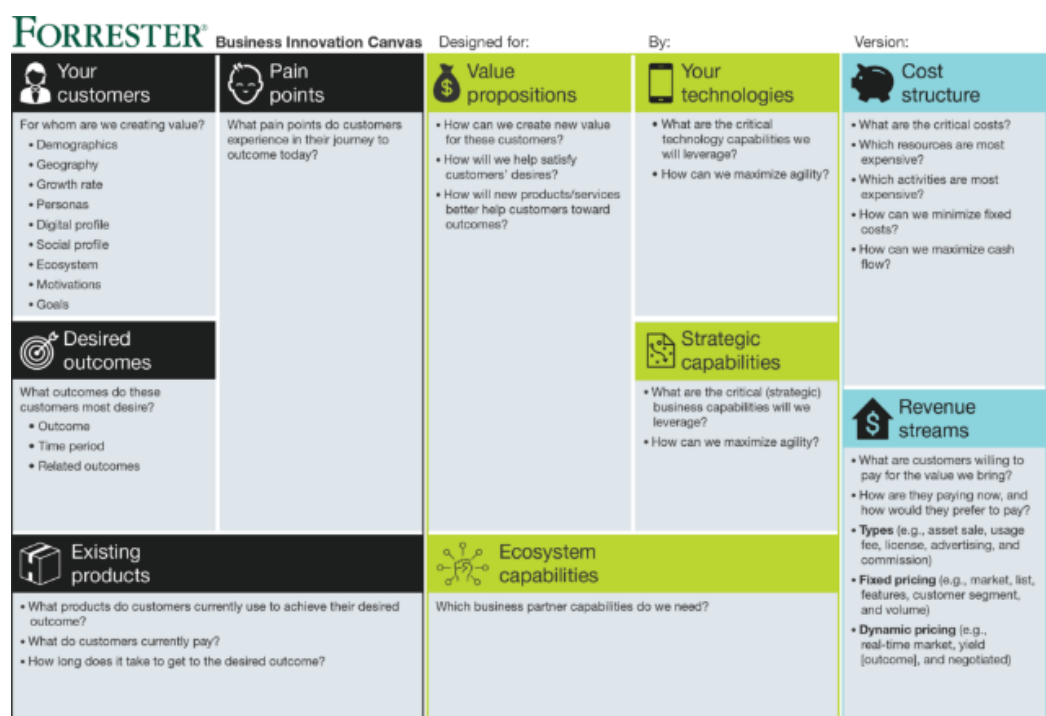


Source: Hemmje et al. (2017)

Figure 9: Big Data Management Canvas.

Business Innovation Canvas (Forrester, 2018)

The Business Innovation Canvas (Figure 12) is a framework created to promote and support the reshaping of a team's rationale around how a company will apply emerging technologies to deliver customer outcomes in new and unique ways (Forrester, 2018). This framework was developed using a design-thinking approach to develop the framework, and it is divided into ten blocks.

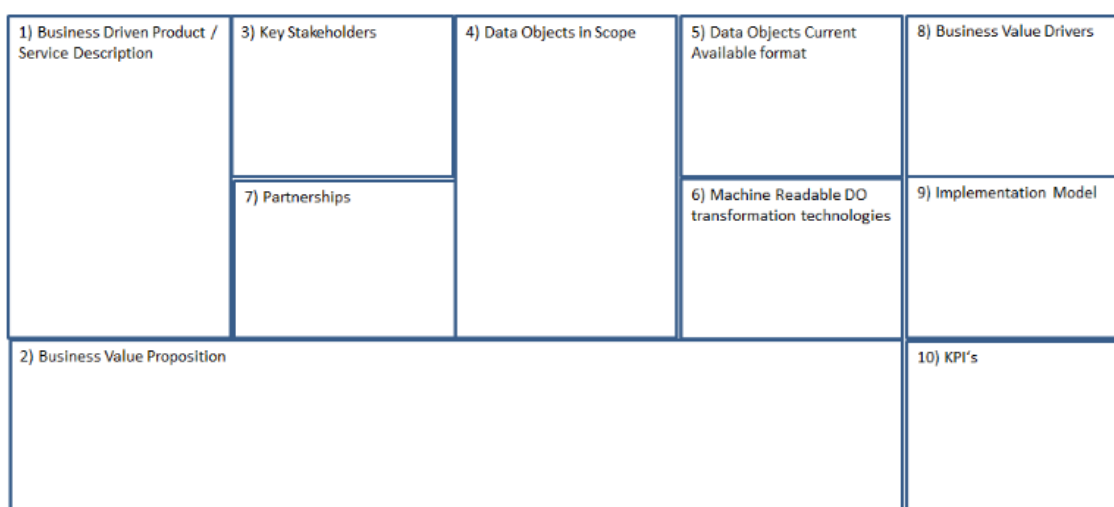


Source: Forrester (2018).

Figure 12: Business Innovation Canvas.

The Digital Transformation Canvas by Ivison (Ivison, 2019)

The Digital Transformation Canvas (Figure 13) proposed by Ivison (2019), consisting of ten distinct blocks, aims to capture the scope and value of projects by bringing transparency to the process before investments are made. According to its creator, the canvas can be used to establish a common view across different initiatives coming from different parts of the organization.

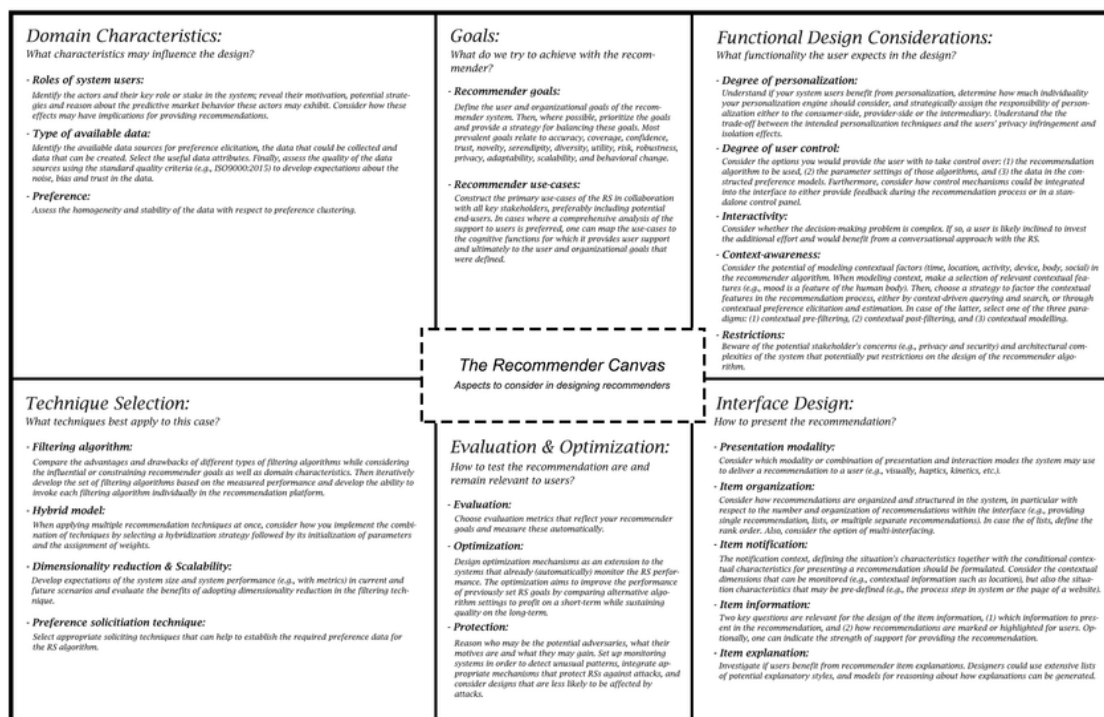


Source: Ivison (2019)

Figure 13: Digital Transformation Canvas by Ivison (2019).

The Recommender Canvas (Van Capelleveen et al., 2019)

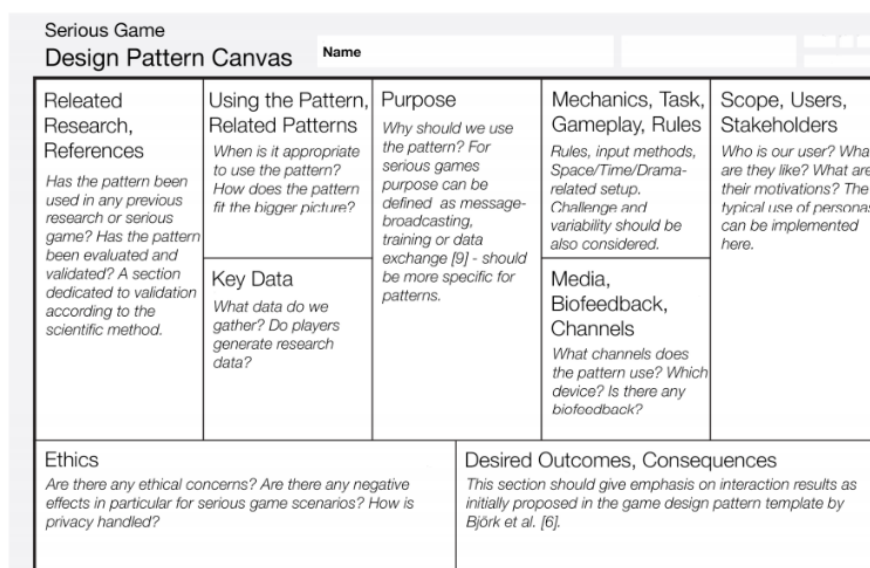
A recommender system, mostly adopted in commercial applications, consists in an information filtering system aiming to predict preferences, inclinations, and ratings of users for a specific item. The undertaking of designing a recommender system is defined as a convoluted process. The Recommender Canvas (Figure 14) contributes to a better understanding and serves as a guide to this system design (Van Capelleveen et al., 2019).



Source: Van Capelleveen et al. (2019)
Figure 14 - The Recommender Canvas.

Serious Games Design Pattern Canvas (Zavcer et al., 2014)

The Serious Games Design Pattern Canvas (Figure 15) acts as a visual chart containing various components unfolding a pattern's "purpose, mechanics, audience, consequences, collected data, related research, and ethical considerations" (Zavcer et al., 2014).



Source: Zavcer et al. (2014)
Figure 15 - The Serious Games Desing Pattern Canvas.

Project Change Canvas (Ferreira et al., 2024)

The Project Change Canvas (Figure 16), or PM Change Canvas, enables the identification of the impacts of changes to a project. By filling in the Canvas, whenever a change is required in a project, it is possible to reflect on the potential impacts caused without any area of the project being overlooked (Ferreira et al., 2024a).

The PM Change Canvas form is a structured template for documenting project changes. It includes fields for Project ID, Project Name, Priority (Urgent, High, Medium, Low), and Request Date. The main body is divided into several sections: Change Request (Description, Origin, Justification), Stakeholders, Goals, Scope (Requirements, Deliverables), Observations, Quality, Schedule (Milestones), Resources, Procurement, Implementation (Recommendations), Decision (Name, Date, Approved/Rejected/Deferred), Evaluation (Name, Date), Success, Risk, Communication, and Cost. Arrows indicate the flow of information between these sections.

Source: Ferreira et al. (2024a); Ferreira et al. (2024b)
Figure 16 - Project Change Canvas.

The Machine Learning Canvas (Marin, 2019)

The main purpose of The Machine Learning Canvas (Figure 17) is to design better machine learning systems by working as a communication tool, keeping teams of scientists, engineers, and managers focused on the same goals and helping align their activities (Marin, 2019). This canvas is intended to be used in the design and development of machine learning components into an existing product, considering working alongside remote teams.

The Machine Learning Canvas (v0.4) is a template for designing machine learning systems. It includes fields for Designed for, Designed by, Date, and Iteration. The main body is divided into several sections: Decisions (How are predictions used to make decisions that provide the proposed value to the end-user?), ML task (Input, output to predict, type of problem?), Value Propositions (What are we trying to do for the end-user(s) of the predictive system? What objectives are we serving?), Data Sources (Which raw data sources can we use internal and external?), Collecting Data (How do we get new data to learn from inputs and outputs?), Making Predictions (When do we make predictions on new inputs? How long do we have to featureize a new input and make a prediction?), Offline Evaluation (Methods and metrics to evaluate the system before deployment), Features (Input representations extracted from raw data sources), Building Models (When do we create/update models with new training data? How long do we have to featureize training inputs and create a model?), and Live Evaluation and Monitoring (Methods and metrics to evaluate the system after deployment, and to quantify value creation).

Source: Marin (2019)
Figure 17 - The Machine Learning Canvas.

CONCLUSION

By analyzing the IT/IS Canvas Framework, it is possible to notice that "trendy" topics, such as data science and digital transformation, have a high number of canvases, probably due to the high demand for tools to cover these popular areas. In fact, these two areas together represent about 50% of the total identified canvases. On the one hand, we reported an important set of canvases to support IT/IS. On the other hand, there are still many IT/IS activities where new canvases can be of good value, and it configures opportunities for further development.

This study contributes both to theory and practice by presenting the state-of-the-art of IT/IS canvases and proposing a new framework for organizing them. This framework enables practitioners to discover, understand, and select appropriate tools for their activities.

As a limitation, and considering the large IT/IS body of knowledge, this study might not include all the existing canvases, namely those presented in languages other than English. Notwithstanding, the literature review was rigorous, and, as far as we know, it covers the current canvases that are publicly available.

As this area is constantly evolving and expanding, it is recommended that this study is updated periodically with replication studies. It would also be important to carry out case studies to explore the benefits/limitations of these canvases in practice as well as the associated processes since the literature is scarce regarding this.

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