



Digital Transformation

- Understanding digital transformation initiatives: case study analysis

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Introduction

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Introduction

- Digital technology-based is needed for companies to survive, especially in the academic and industry sector.
- Digital technologies creates value for their customer
- However, high risks of technology implementation failure persist despite using various simulation tools.
- This research paper aims to systematize, analyze and evaluate technological and business concept of digital transformation, in order to investigate the cases in Croatia and identify implementation in digital technology done by successful companies.

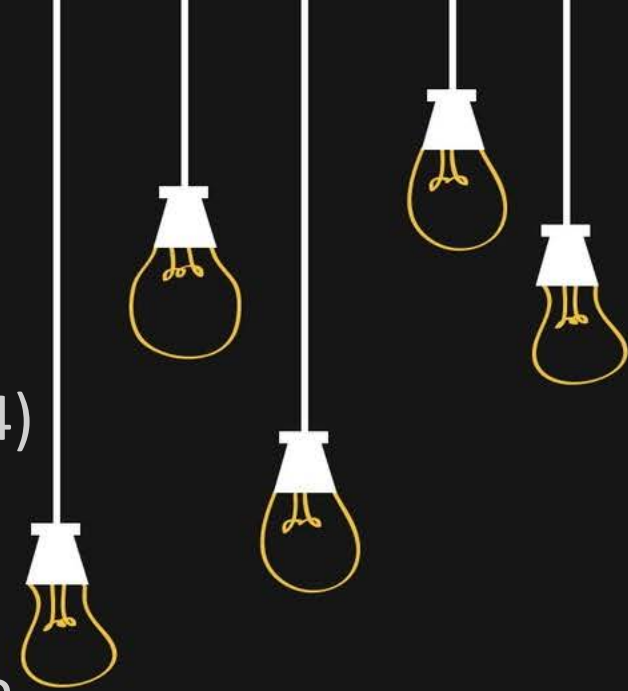


Introduction

An exploratory multiple case study-based approach (Yin , 2014) was applied. Research questions:

1. (RQ1) What is the relevance of background factors describing the context of digital transformation initiatives?
2. (RQ2) How organizations perform digital transformation initiatives; which technologies have been found in real case studies in Croatia; which business-related concepts have been aimed?

Practical goal: collect data for proposing digital transformation initiatives guidelines.



Literature Review

Literature Review

Overview of important digital transformation perspectives.

Digital initiatives - implements replacement, improvement and fundamentally redefinition or creation of a new process or product.

Digital Transformation changes all:

- Organizations
- Business models
- Business processes
- Ecosystem
- Services
- Products



Literature Review

Overview of important digital transformation perspectives.

- Intention of enterprises - provide new value to the customers where technology are the means of the offering.
- Creates a more effective and engaging digital customer experience at every touch point.
- DT frameworks guide organizations to digitally transform, by comparing different frameworks and identify the factors of interest for successful digital business transformation.



Literature Review

Digital Transformation business related concepts:

Integrate strategy-oriented DT approach by taking account the rapid technology development and its impact on business improvement.

Example of existing common trends in business improvement initiatives:

- Development of new business models
- Accomplishment of new alliances
- New ecosystems
- Creation of added value through new products or services
- Improvement of customer experience



Literature Review

Digital Transformation business related concepts:

Business model canvas enables innovation, and management and improvement of canvas elements

New ecosystems and alliances are companies which are interacting with the goal of contribution to the other complements, through one of the 3 ways:

- Reconceiving products and markets
- Redefining productivity in the value chain
- Building supportive industry clusters



Literature Review

Added value for the customer can be identified in managing customer's experience and journey, respecting principles behind great customer journey (Watkinson, 2019). Which includes:

- Strong reflection to the customer's identity
- Satisfaction of the firm's higher objectives
- Setting and meeting customers' expectations.

Digital twins represent real environments and serve as experimental scenarios, which can ease the forecasting of the new way of doing business and help in developing predictions for better decision making.





Literature Review

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Literature Review

Digital transformation technology related concepts

What is Industrial Revolution?

It is the transition to a new process of manufacturing goods.

Industry 1.0



Industry 2.0



Industry 3.0



Industry 4.0



Literature Review

Digital transformation technology related concepts

What is Industry 4.0?

- It is the next generation of technologies that can communicate with each other
- It can gather and analyze data in real time
- It will utilize Artificial Intelligence
- Some examples of these technologies are Driverless cars, Robotics, 3D printers and more



Literature Review

Digital Transformation Drivers

Drivers according to Oxford dictionary is a trigger of events or endeavours.

These drivers are emerge from the organization or its environment.

It can be categorized as

- The customers
- Technology
- Organizational Development Driven



Literature Review

Digital Transformation Drivers

DRIVERS

Customers

The customers may trigger the innovation from an organizations due to new needs or desires which leads to companies to innovate products, services or completely redesign them in order to satisfy their consumers

Technology

Technology driven digital transformation is due to business challenges and benefits from properties of technology. This may include Social Media Influence, Mobility, Cloud and IoT (Internet of Things)

Organisational development driven

This starts by ideas that form for organizational innovations, usually aimed for profit, lower costs, efficiency, or consumer oriented improvements

Literature Review

Digital Transformation related knowledge and competencies

Chief Digital Officer

- Organizations require a Chief Digital Officer in order to be the take on the leadership role to lead and manage all employees towards the digital transformation.
- A CDO is someone who has knowledge and skills in the organizations market, new technologies and digital knowledge
- A CDO is responsible for the preparations in future proofing the organization



Literature Review

*Digital Transformation related knowledge
and competencies*

Higher Education

- Higher education institutes also recognize the need in educating students concerning digital transformation
- Hrustek et al. (2019b) showed that Universities in Europe have recognized Digital Transformation and are adapting courses and programmes related to it.
- The SFIA (2018) changed their existing skill groups to include skills most relevant for Digital Transformation





Methodology

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Methodology

- Goal to identify and select Digital Transformation initiatives:
 1. aiming multiple organizational i.e. business improvements
 2. implementing technologies related to the 4th industrial revolution for achieving these improvements, derived from the theoretical background.



Study design

- Experts were selected based on their experience in any of their valid Digital Transformation initiative project into their own business or into the business of their clients.
- 6 Digital transformation initiatives experts within Croatia.
- Interview + Questionnaire
- Interview: face-to-face for 30-60 minutes/expert
- Questionnaire: via e-mail (a week after the first interview)
- Collected data were coded using Word and Excel spreadsheets.



Research model, research Instrument and data collection

Research Model:

- Based on the theoretical background the research model was developed combining background factors that shape the context of Digital Transformation initiatives, drivers of Digital Transformation and related knowledge and competencies of Digital Transformation experts supporting or leading Digital Transformation initiative.



Research model, research Instrument and data collection

Research Instrument:

- In view of the research objectives, projects related to Digital Transformation were selected for this study only if:
 - a) objectives are related to at least 3 business concepts listed in Table 2
 - b) digital technologies related to Industry 4.0. (Table 3) have been applied.



Research model, research Instrument and data collection

- The questionnaire was structured in 4 parts:

Part 1

- Background information about the Digital Transformation expert

Part 2

- Digital Transformation initiative (project) information, which can be considered as a successful example of Digital Transformation

Part 3

- Evaluation of business and technological concepts within the Digital Transformation initiative, and

Part 4

- Demographics of the organization where the project took place.



Research model, research Instrument and data collection

Data Collection:

- Helped to determine or confirm that the Digital Transformation initiative is valid case of Digital Transformation.
- Gather qualitative and demographic data about the included experts and their knowledge and answer the first research question (RQ1)
- determine the internal organizational factors related to Digital Transformation
- Table 1 lists background factors and domains of potential answers.

(RQ1) What is the relevance of background factors describing the context of digital transformation initiatives?

Table 1
Background Factors and Domains Describing the Context of Digital Transformation Initiatives

Code	Background information about the expert participating in the Digital Transformation initiative	Domains of possible options
BGR1	Main sources for acquiring knowledge on Digital Transformation	a) Through formal education; b) through non-formal lifelong learning programs; c) through his own experience on similar projects; d) something else.
BGR2	Core competencies' focus in Digital Transformation projects	a) focused on technological aspects; b) focused on business concepts; c) focused on both, technological and business concepts; d) something else
BGR3	Work experience in ICT or digital technology implementation projects	a) less than 5 years; b) 5 to 10 years; c) 10 to 20 years; d) more than 20 years.
Code	Digital Transformation initiative information	Domains of possible options
BGR4	Short description of the specific Digital Transformation initiative	Free entry
BGR5	Expert's role in the specific Digital Transformation initiative	a) a project manager / associate based on the function in the organization (CDO, CIO, CXO); b) a project manager / associate working as an external consultant; c) something else
BGR6	Specification of drivers which influenced the decision to start the Digital Transformation initiative	Free entry
BGR7	Most important results of the Digital Transformation initiative	Free entry
BGR8	Main or critical success factors (3-5) for the specific Digital Transformation initiative	Free entry
BGR9	Existing technologies or systems relevant to the Digital Transformation initiative (multiple choice allowed)	Enterprise Resource Planning Systems (ERP); Customer Relationship Management (CRM); Mobile technologies; Cloud technologies; Reference models; Supply Chain Management (SCM); Data Warehouse (DW); Business Process Management (BPM); Performance Management Systems (PMS); Something else
Code	Enterprise demographics	Domains of possible options
BGR10	Enterprise size	Micro (less than 50); Small (between 50-249); Mid-sized (between 250-1000); Large (more than 1000)
BGR11	Estimated sales income	Up to and including € 10 million; € 10 to € 50 million inclusive; more than € 50 million
BGR12	Operating industry	Entry according to NACE classification
BGR13	Ownership structure	State enterprise; Public administration; Domestic private enterprise; Foreign private enterprise

Source: Author's work

Research model, research Instrument and data collection

- To answer the second research question (RQ2), according to theoretical background concepts researched were tested and their relationship was examined.
- Two categories of business and technology concepts related to Digital Transformation initiatives were systemized.
- The literature sources (Tables 2 and 3) systemize the concepts explored in RQ2 about business and technology related concepts in Digital Transformation.

(RQ2) How organizations perform digital transformation initiatives; which technologies have been found in real case studies in Croatia; which business-related concepts have been aimed?

Table 2

Business Related Concepts in Digital Transformation

Code	Business Related Concept	Example and Source
BRC1	Improvements, Increased Effectiveness/Efficiency	McKinsey 2018; Uhl et al., 2014
BRC2	Sharing economy	Schwab, 2017; Frenkena et al., 2017
BRC3	Green technologies and digital footprint	Murphy, 2018; Petrova et al., 2019
BRC4	New Business Models	Business Model Canvas Osterwalder 2014; Loonam et al., 2018
BRC5	New services, New products	Osterwalder 2014; Schalmo et al., 2017
BRC6	Customer experience, Journey	Watkinson, 2019; Vial, 2019
BRC7	New alliances/ Digital ecosystems	de Reuver et al. 2017; Vial, 2019
BRC8	Digital twins	Bolton et al., 2018; Boschert et. al., 2016; Petrova et al., 2019
BRC9	Digital competencies, skills	Kutnjak et. al., 2019a; Pejić Bach et. al., 2018

Source: Author's work

Table 3

Technology Related Concepts in Digital Transformation

Code	Technology Related Concept	Example and Source
TRC1	SMART/ Wearable (mobile) Digital Devices	Wearable Internet (Schwab, 2017); Mobile computing (Roedder et al., 2016.)
TRC2	Implantable devices	Implantable technologies (Schwab, 2017); Biochips (Gartner, 2019)
TRC3	Artificial intelligence and Knowledge Management	Artificial intelligence and decision making (Schwab, 2017); Edge and explainable artificial intelligence (Gartner, 2019)
TRC4	Internet of things	Internet of and for things (Schwab, 2017); Sensors (Roedder et al., 2016.)
TRC5	Bio Tech	Neurotechnologies (Schwab, 2017); Biotech artificial tissue (Gartner, 2019)
TRC6	Big data / Data analytics	Big data for decisions (Schwab, 2017); Big data (Roedder et al., 2016.); Machine Learning (Gartner, 2019)
TRC7	Autonomous systems	Driverless cars (Schwab, 2017); Autonomous driving (Gartner, 2019)
TRC8	Robotics	Robotics and services (Schwab, 2017); DigitalOPS (Gartner, 2019)
TRC9	Blockchain	Bitcoin and the blockchain (Schwab, 2017); Blockchain (Roedder et al., 2016.)
TRC10	Drones	Light cargo delivery drones, Flying autonomous vehicles (Gartner, 2019)
TRC11	Virtual / Augmented Reality and Gamification	Augmented Intelligence (Gartner, 2019); Gamification (Hosseini et al., 2020)
TRC12	3D / 4D printing	3D printing (Schwab, 2017); 3D nanoscale printing (Gartner, 2019)
TRC13	Social Media and Platforms	Chatbot Social Networks (McKinsey 2018); (Bhimania et al., 2019)
TRC14	Cloud / Everything as a service	Ubiquitous computing (Schwab, 2017); On demand computing (Roedder et al., 2016.); 5G (Gartner, 2019)

Source: Author's work



Results – Case Studies: Analysis and Findings

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Analysis and Findings

- This section will be discussing about the findings regarding the first research question about background factors with the description of context of the digital transformation initiatives.
- We'll be showing you a table that shows the background of the expert in each organization and the findings of how Digital Transformation is initiated in the organization



Organization A

Code	Background information about the expert	Context of Digital Transformation Initiatives
BGR1	Main sources for acquiring knowledge on Digital Transformation	through formal education, non-formal lifelong learning programs and own experience on similar projects
BGR2	Core competencies' focus in Digital Transformation projects	focused on both, technological and business concepts
BGR3	Work experience in digital technology implementation projects	5 to 10 years
BGR5	Expert's role in the specific Digital Transformation initiative	a project manager / based on the function in the organization (CDO, CIO, CXO)
BGR9	Existing technologies relevant to the Digital Transformation initiative	ERP, CRM, Mobile and Cloud tech., SCM, DW, BPM, PMS

Organization A primarily focused on updating their existing application to better fit into the digital life. This alongside with optimizing End-to-End process by introducing modern technological concepts

- The project resulted in the following:
- The simplification of the concept of service for end-users as well as
- Services for internal users
- Improvement of IT tools needed for running operational activities at the desired performance level

The success factors of the initiative were addressing:

- project sponsorships
- Sufficient financial means
- Outsourcing with necessary know-how that was not available internally

Organization B

Code	Background information about the expert	Context of Digital Transformation Initiatives
BGR1	Main sources for acquiring knowledge on Digital Transformation	through formal education and hands-on experience on similar projects; robotic process improvements
BGR2	Core competencies' focus in Digital Transformation projects	focused on both, technological and business concepts
BGR3	Work experience or digital technology implementation projects	Less than 5 years
BGR5	Expert's role in the specific Digital Transformation initiative	external mobile robot software integration team leader
BGR9	Existing technologies relevant to the Digital Transformation initiative	ERP, CRM, Mobile tech., Reference Models, SCM, DW, BPM, PMS

The Digital Transformation initiative for organization B was aimed to introduce warehouse process robotization. This is driven by digital technologies and the organization goal of workload optimization, raising competitiveness and response to increase of demand. This includes the use of autonomous robotic industrial vehicles that can operate based on tasks given by employees which works in 3 shifts:

- Locate payloads
- Pickup and drop payloads
- Delivering payload to set location

Robotic vehicle automation influence the success of the initiative in the business and management support. This helps with:

- Speed and time management
- Flexibility
- Accuracy and safety

Organization C

Code	Background information about the expert	Context of Digital Transformation Initiatives
BGR1	Main sources for acquiring knowledge on Digital Transformation	through formal education and experience on similar projects
BGR2	Core competencies' focus in Digital Transformation projects	focused on business concepts
BGR3	Work experience or digital technology implementation projects	5 to 10 years
BGR5	Expert's role in the specific Digital Transformation initiative	external member of the project delivery team
BGR9	Existing technologies relevant to the Digital Transformation initiative	DW, internal custom made solutions

Organization C takes Digital Transformation initiative in a form of new IT services. These services addresses crime prevention in a public sector organization. The project aims to provide users on:

- Efficiently protecting the user from cyber attacks
- Providing security measures and scan reports
- Risk assessments on computers and servers

The main driving element of this project was the need for compliance with standards wihtin the operating industry

Organization D

Code	Background information about the expert	Context of Digital Transformation Initiatives
BGR1	Main sources for acquiring knowledge on Digital Transformation	through knowledge acquired by tracking and setting digital business transformation trends
BGR2	Core competencies' focus in Digital Transformation projects	Business improvements, in which technology acts as an enabler
BGR3	Work experience or digital technology implementation projects	5 to 10 years
BGR5	Expert's role in the specific Digital Transformation initiative	external consultant in the design phase of the Digital Transformation
BGR9	Existing technologies relevant to the Digital Transformation initiative	Mobile and Cloud tech., BPM, Central dispatch system

Organization D triggered the Digital Transformation initiation by providing on-demand transportation niche. The organization rethink and reinvent its business model to gain ahead of competitors by adding digital technologies to on-demand services

The main driving aspects were recognized in the customer perspective, namely in the decrease of demand, in disruptive competition, which was taking over clients, and in an outdated business model.

Organization E

Code	Background information about the expert	Context of Digital Transformation Initiatives
BGR1	Main sources for acquiring knowledge on Digital Transformation	through formal education and experience on similar projects
BGR2	Core competencies' focus in Digital Transformation projects	focused on both, technological and business concepts
BGR3	Work experience or digital technology implementation projects	more than 10 years
BGR5	Expert's role in the specific Digital Transformation initiative	external consultant on the project
BGR9	Existing technologies relevant to the Digital Transformation initiative	ERP, Mobile tech., SCM

Organization E achieves Digital Transformation Initiative by setting two goals:

1. Introducing smart phone payment
2. Developing new services for card payments

As smart phones are becoming common tool to do anything, digital payment is provides a quick and easy way for users to do transactions with less steps to provide more convenience than writing on paper such as checks and money order

Card payment services focus on making digital payment more available in many services online so that the option to do digital transaction more accessible.

Organization F

Code	Background information about the expert	Context of Digital Transformation Initiatives
BGR1	Main sources for acquiring knowledge on Digital Transformation	through work experience on similar projects
BGR2	Core competencies' focus in Digital Transformation projects	focused on business concepts
BGR3	Work experience or digital technology implementation projects	10 to 20 years
BGR5	Expert's role in the specific Digital Transformation initiative	external delivery team member
BGR9	Existing technologies relevant to the Digital Transformation initiative	ERP, Cloud tech

The project in organization F enabled the transition to a Digital Transformation of design completion, submitting and validating a client documentation for issuing certificates in a public sector by implementing a workflow management for a complex business process and standardizing procedures and rules.

These resulted in the followings:

- Process duration was reduced
- Unified control assurance of the issuing process was introduced
- Cost reduction for all process actors was potentiated

During the implementation, several main influence factors were identified, such as:

- Top management involvement
- Focus on achieving planned results
- Competencies of project team members
- Availability of financial means and technologies.



Discussion

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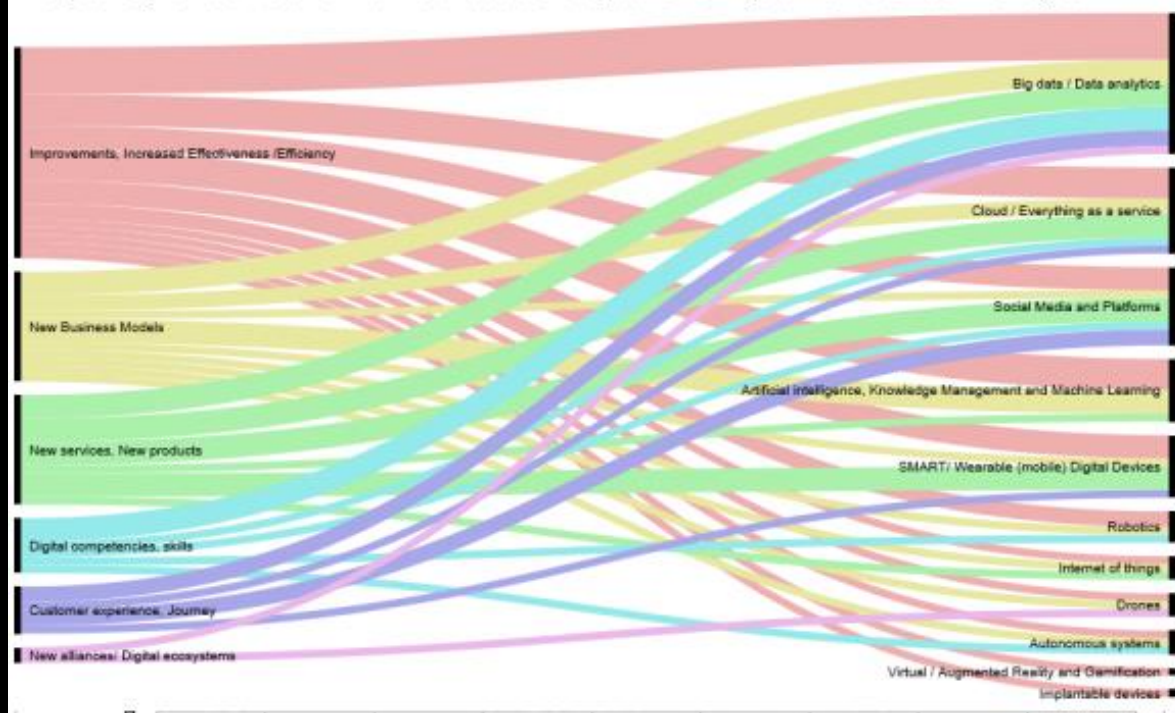
Business and Technology Related Concepts

- In relation to RQ2, the relevant findings about how organizations perform Digital Transformation initiatives are showed and explained
- From our understanding of case studies in Croatia regarding technologies and business-related concepts have been aimed

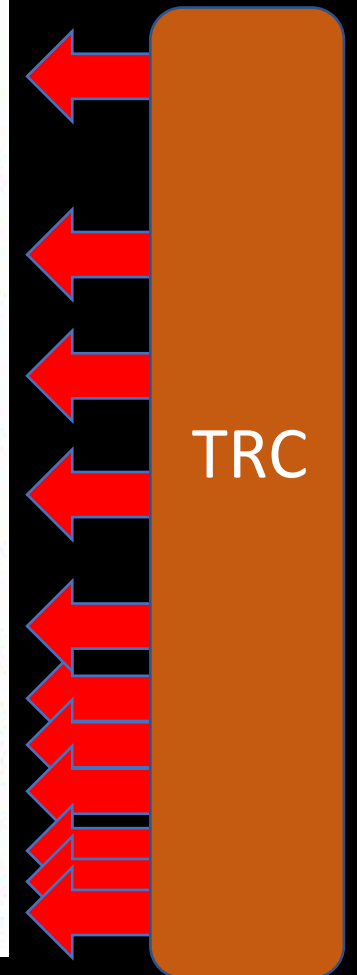
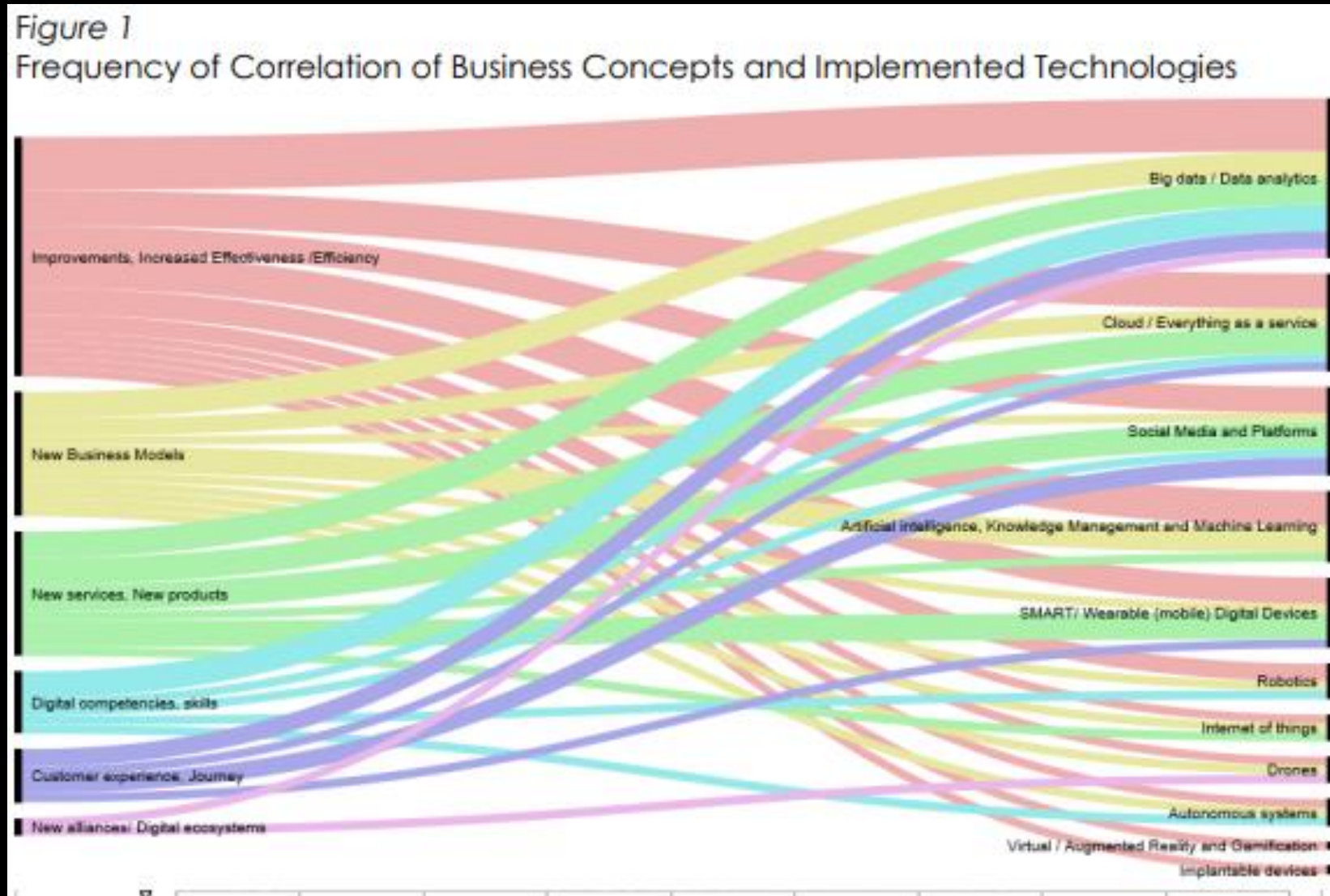
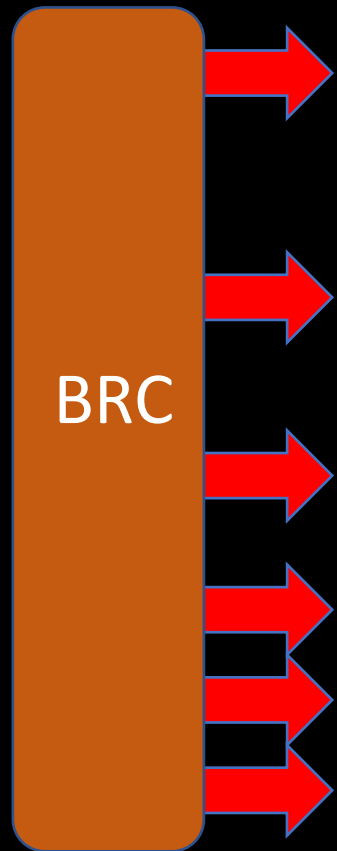
- With the implementation of technologies into business concepts, this figure shown is the Author's illustration of frequency and data sheet.

- These diagrams show that technologies are meant to support possibly achieving business goals.
- One business goal could be addressed with one or more technologies.

Figure 1
Frequency of Correlation of Business Concepts and Implemented Technologies



	BRC1	BRC2	BRC3	BRC4	BRC5	BRC6	BRC7	BRC8	BRC9
TRC1	3			1	3	1			
TRC 2	1								
TRC 3	4			3	1				
TRC 4	1			1	1				
TRC 5									
TRC 6	6			3	3	2	1		3
TRC 7	1			1					1
TRC8	2			1					1
TRC 9									
TRC 10	1			1			1		
TRC 11	1								
TRC 12									
TRC 13	3			1	3	2			1
TRC 14	4			2	3	1			1



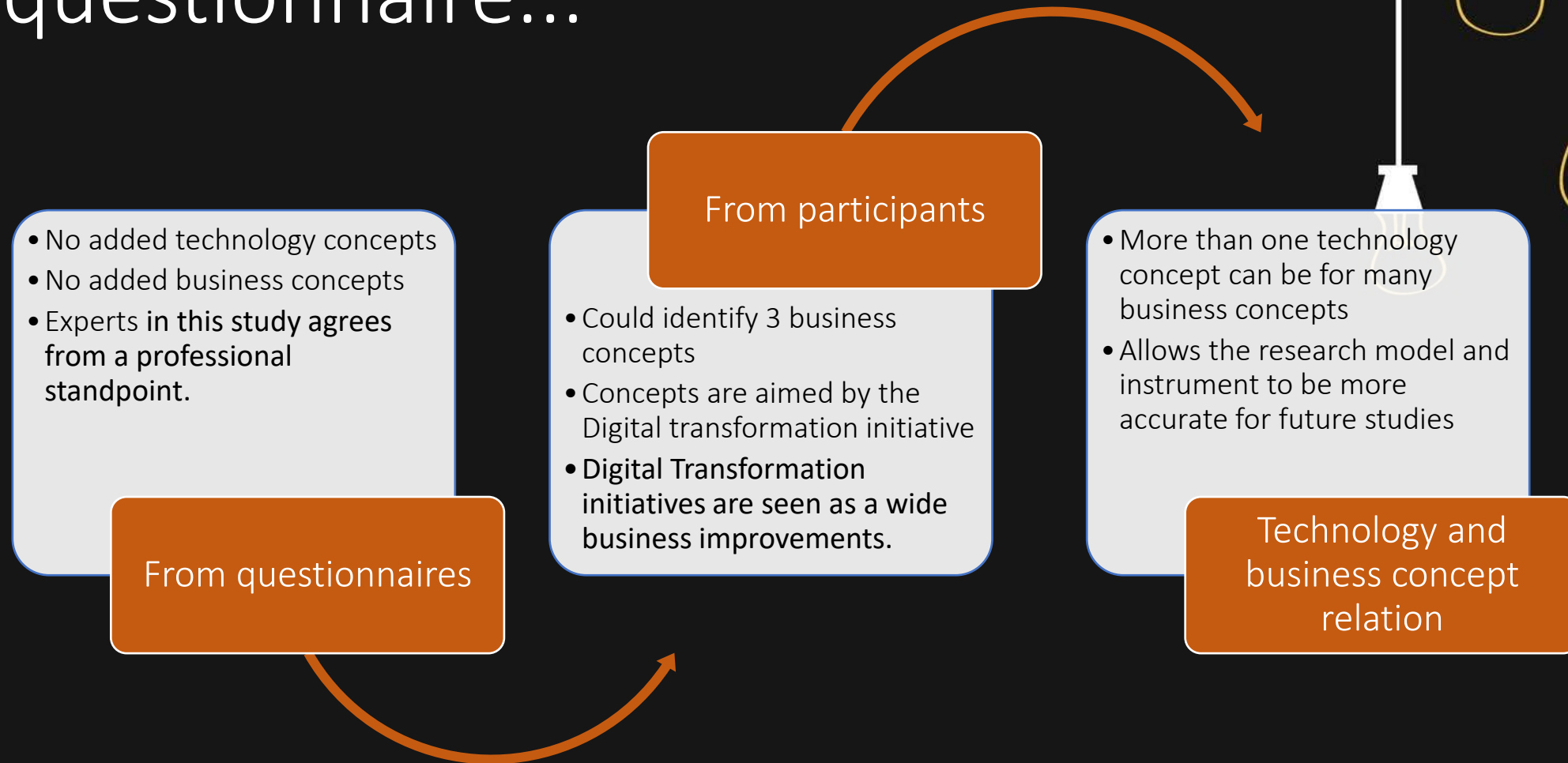
	BRC1	BRC2	BRC3	BRC4	BRC5	BRC6	BRC7	BRC8	BRC9
TRC1	3			1	3	1			
TRC 2	1								
TRC 3	4			3	1				
TRC 4	1			1	1				
TRC 5									
TRC 6	6			3	3	2	1		3
TRC 7	1			1					1
TRC8	2			1					1
TRC 9									
TRC 10	1			1			1		
TRC 11	1								
TRC 12									
TRC 13	3			1	3	2			1
TRC 14	4			2	3	1			1



	BRC1	BRC2	BRC3	BRC4	BRC5	BRC6	BRC7	BRC8	BRC9
■ TRC1	3			1	3	1			
■ TRC 2	1								
■ TRC 3	4			3	1				
■ TRC 4	1			1	1				
■ TRC 5									
■ TRC 6	6			3	3	2	1		3
■ TRC 7	1			1					1
■ TRC8	2			1					1
■ TRC 9									
■ TRC 10	1			1			1		
■ TRC 11	1								
■ TRC 12									
■ TRC 13	3			1	3	2			1
■ TRC 14	4			2	3	1			1

	BRC1	BRC2	BRC3	BRC4	BRC5	BRC6	BRC7	BRC8	BRC9
■ TRC1	3			1	3	1			
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■ TRC 3	4			3	1				
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■ TRC 5									
■ TRC 6	6			3	3	2	1		3
■ TRC 7	1			1					1
■ TRC8	2			1					1
■ TRC 9									
■ TRC 10	1			1			1		
■ TRC 11	1								
■ TRC 12									
■ TRC 13	3			1	3	2			1
■ TRC 14	4			2	3	1			1

As a result from the questionnaire...



Conclusion

In high profile people

- More towards traditional route to handle projects
- Will implement digital transformation in projects when they can

Experts / Project members

- Strongly relies on outsourcing

Drivers and results notable by experts

- Drivers and expectations are categorized as organizational
- Customer and technology are initiatively driven

Frequency of implemented business related concepts

- BCR1 achieves business improvements and increasing effectiveness
- BCR4 introduces new business models which is aligned with other research

Conclusion

Lastly,

the limitations of this study in the business orientation perspective is in analysed cases, due to the significant business focus of participating examinees and a relatively small number of case studies and as well as its local coverage.

THANK YOU 😊

