The Capstone Project:

Increasing of cost efficiency of software development at creation of self-services channels at commercial bank.

Phase I: Preliminary Analysis and Approval of the Project Charter
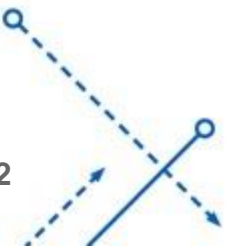
Author: Igor Dmitriev

Agenda

Topics of presentation:

- Project Background

- Project Charter

- Project Gantt-Chart

- Business Case

- Appendix

Our project is about

efficiency of processes and about people in these processes.

Project Background – Mortgage Business
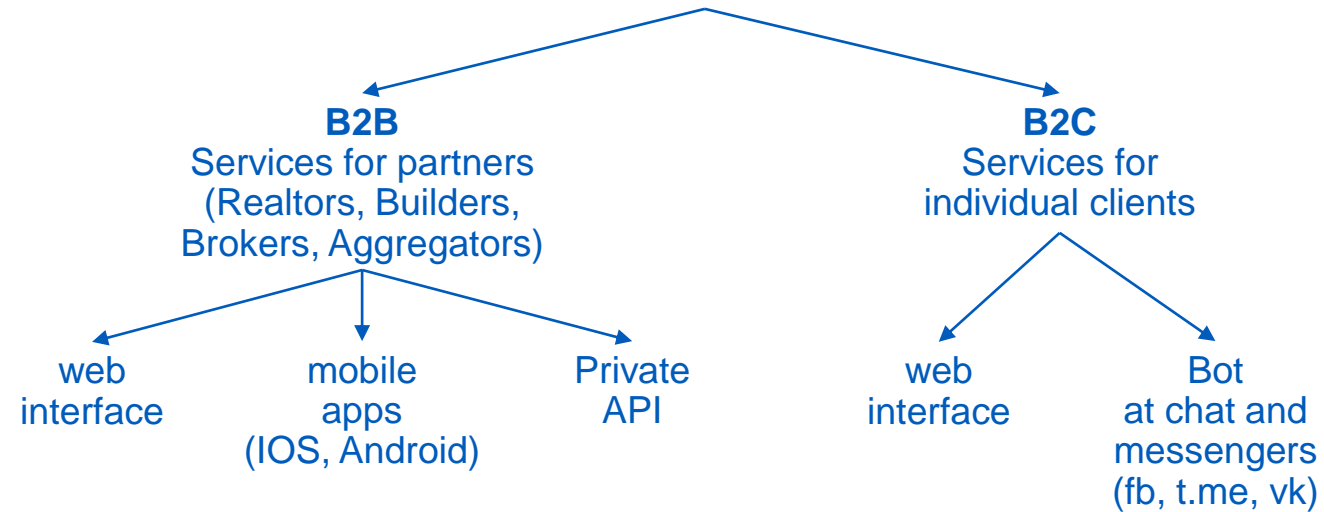
Worldwide Banking Group. France. Paris.

Mortgage & Real Estate Ecosystem Business Line

Igor Dmitriev
Head of Products, Marketing, Digital Business. Chief Digital Officer.

Agile Mortgage Development Team

Sales Self-services teams: B2B & B2C

Sales Self-services teams and channels

B2B
Services for partners (Realtors, Builders, Brokers, Aggregators)

- web interface
- mobile apps (IOS, Android)
- Private API

B2C
Services for individual clients

- web interface
- Bot at chat and messengers (fb, t.me, vk)

Common mortgage process

Lead → Consultation → Application → Pre-approval → Documents Collecting → Final Approval → Real Estate Choosing

Collateral underwriting → Collateral appraisal → Insurance → Deal Preparing → Deal → Gov. registration → Service stage

Project Background – Development process

1 d

Creation of ideas
- Work-shop about design, goals, requirements

Ideas validation
- Data analysis
- Users interview

1 d

1 d

Ideas prioritization
- Cost calculating
- Resource approval

Business analysis
- Preparing of Business Requirements Document

3 d

1 d

Prototyping
- Preparing a prototype of design
- Approval

System Analysis
- Preparing of technical requirements document

3 d

5 d

Development
- Software development stage

Testing
- Auto and manual testing

1 d

3 d

Launching
- Deployment at clients zone
- Testing at some users

Roll-out
- Roll-out for all users

1 d

1 d

Monitoring
- Monitoring of usage and stability

Support
- Minor improvements and bugs-fix

permanent

4

The example task: additional mortgage program at product calculator. Total time to market: 21 days

Capstone Project Charter

Project Name	Increasing of cost efficiency of software development at creation of self-services channels at commercial bank.
Project Sponsor (Company)	
Project Manager (you)	Igor Dmitriev
Submission Date	13th Sep 2020

Approval Date & Initials

I. Project Description and statement

Goal of the project is increasing of cost efficiency and speed of "time to market" for processes of product and software development at creation of self-services for clients and partners at Digital B2C and Digital B2B teams of Mortgage and Real Estate Ecosystem Business Line

I. Scope

Process Scope: Product and software development
Organizational Scope: Digital B2C Team, Digital B2B Team
RUN/Change Processes: Analysis of both run and change processes
Dimension of analysis: Project frameworks, engineering practices, customer development practices, product development practices, management practices.
Timeline of project: 6 months
Project Tools: Lean 6 Sigma tools (including analysis of all types of wastes), Engineering Management tools.

I. Objectives & Goals / Expected Outcomes / Deliverables

1) 5% Increasing of cost efficiency of processes, equal to 150 000$ decreasing of total cost for 2 years,
2) 10% Increasing of speed of time to market = 2.1 days (in comparison with an etalon task "Additional mortgage program at product calculator" with 21 days of total time to market)

I. Required Resources

HR Resources: Around 15 000$ (HR Cost), 6 months
- 10 workshops with teams members
- Work of Leaders of projects 6 months part-time
- Field Research 2 weeks

•Risk Assessment

Type of Risk	Level of risk	Risks mitigation
Risk of defocus	Middle	Set of block-point at work schedule for participation
Risk of breaking of deadlines	Middle	Prioritization, Escalating to the project committee
Risk of wrong estimation of cost and timeline	Middle	Escalating to the project committee

Alignment with Strategic Goals
Strong. Mortgage Strategy for 2021-2025 require of total cost decreasing by 7% per year.

Additional Information

Project Team:
Project Sponsor: Igor Dmitriev, Head of Mortgage Agile Team, Head of Products and Digital
Project Manager: Igor Dmitriev, Head of Mortgage Agile Team, Head of Products and Digital
Project Participants:
1) IT Area Leader
2) Product Owner of B2B Team
3) IT Head of B2B Team
4) Product Owner of B2C Team
5) IT Head of B2C Team
6) Agile Coach:,
7) Members of B2B and B2C teams.
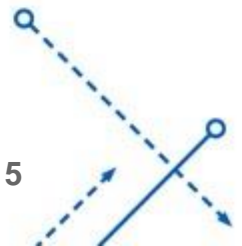
Project Background – Financial Review

B2B

FTE=14	FTE	2020	2021	2022
TOTAL COSTS TO BE	14	-57,7	-66,9	0,0
BENEFITS		18,2	47,0	96,2
FINANCIAL RESULT CUMULATIVE Cash view		-39,5	-59,3	36,9
RONE	27,25%			

B2C

FTE=10	FTE	2020	2021	2022
TOTAL COSTS TO BE	10	-40,9	-46,5	0,0
BENEFITS		15,5	38,2	80,0
FINANCIAL RESULT CUMULATIVE Cash view		-25,4	-33,7	46,3
RONE	28,35%			

HR + External Cost

Net Income

Financial Result

Return on Normalized Equity

Data at table in mln
FTE = full time employee

Total Cost
for 2 teams for 2 years: 3 mln. $

Total Benefits
from 2 teams for 3 years: 4,21 mln. $

Goal of the Capstone Project:
Improvement of cost efficiency +5%
= 150 000$ decreasing of total cost
(for 2 years after implementing of the
project).
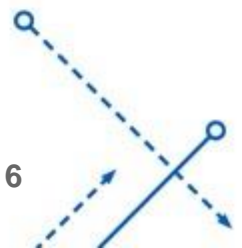
Cost of the project: 15 000$

ROI: 400% (at first year)

Project Chart (Gantt)

	Stages / Task	Duration	Resources	Budget	Status	Comments	2020						2021		
							July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Phase 1	**Stage 1. Pre-analysis and Approval Stage**	8w	management	$ 500,00	complete										
	interviews with management and teams heads	2w	man-t, staff	$ 200,00	complete										
	Preliminary analysis and calculations	3w	Project Manager	$ 100,00	complete										
	Project Charter & Bus. Case Approval	2w	PM, Man-t	$ 100,00	complete										
	Faculty Advisor Approval	1w	PM, FA	$ 100,00	complete										
Phase 2	**Stage 2. Analysis**														
	Interview with stakeholders	2w	management	$ 1 000,00											
	Gemba-walk (field research)	2w	teams members	$ 700,00											
	Process mapping	2w	heads of teams	$ 800,00											
	Interview with team-members (workshops)	2w	teams members	$ 2 000,00											
	Statistics analysis	2w	statistics access	$ 1 000,00											
	Report preparing	1w	Project Manager	$ 500,00											
	Stage 3. Improvement														
	To be process (Solution) preparing	2w	Project Manager	$ 1 000,00											
	Testing of to be process	2w	teams members	$ 1 000,00											
Phase 3	**Stage 4. Pilot Mode**														
	Pilot of process 1 team	1m	teams members	$ 1 500,00											
	Stage 5. Roll-out														
	Pilot at all teams	1m	teams members	$ 2 500,00											
	Stage 6.Analysis of results														
	Asis/to be analysis	2w	Project Manager	$ 500,00											
	Report about results	1w	Project Manager	$ 500,00											
	Proposals for post-project improvements	2w	Project Manager	$ 500,00											
	Stage 7. Closing of the project	2w	management	$ 500,00											
	Stage 8. Retrospective analysis of a project	2w	Project Manager	$ 500,00											
	TOTAL			$ 15 500,00											

Stage of Product Creation	Best practies	Zones of development
Creation of ideas	Our strong and weak side. We know our targets for next 5 years, and we created a roadmap. We understand market and interesting fields on it.	We try to switch to data driven culture. We want to identify ideas not from our expert view, but from data about consumer deviation of our clients
Ideas validation	tbd	It's our weak point. After creation of idea, and accept of a manager we rush to implement it without proper validation with clients and partners. That approach increases our speed but creates wastes for products with weak demand.
Ideas prioritization	We started to use methodology for prioritization of our ideas based on ratio of cost and result.	It's difficult to set to single measure different types of activities: 1) for Sales growth, 2) for clients loyalty, 3) for Optimization, 4) for Regulatory norms meeting.
Business analysis	tbd	For some products we need to provide resource demanding analysis of several dimensions: legal, finance, risk and accept our product with stakeholders. It's very long process and we need to transform it for increasing of out TTY speed.
Prototyping	We try to implement to all teams step of design prototyping, for example with usage of figma software. Because one extended template of new system is more effective for understanding than 10 pages of description.	Part of teams make prototype at zone of development of real systems, because it easier to understand how to do it for developers, but that process is more expensive (at least more than 2 times)
System Analysis	Even with usage of out-staff developers, we transfer all analysis part to in-house for saving of know-how and growth of internal expertise	We need to improve an analysis of inter-relationship between different systems.
Development	We use mix of inhouse, outstaff and outsource models based on different tasks with focus on in-house	tbd
Testing	tbd	We need to improve our automatical forms of testing and regress forms of testing
Launching	tbd	-tbd
Roll-out	We provide trainings for our staff, even with gamification forms	tbd
Monitoring	tbd	Our weak point. We need to improve our post-launch monitoring of usage of all our functionality. For example we can miss some changes of business processes and obsolescence of our functionality.

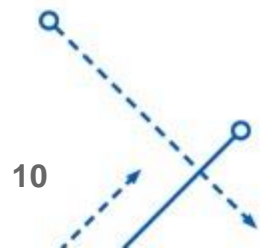# Appendix 2: Agile Mortgage Development Team

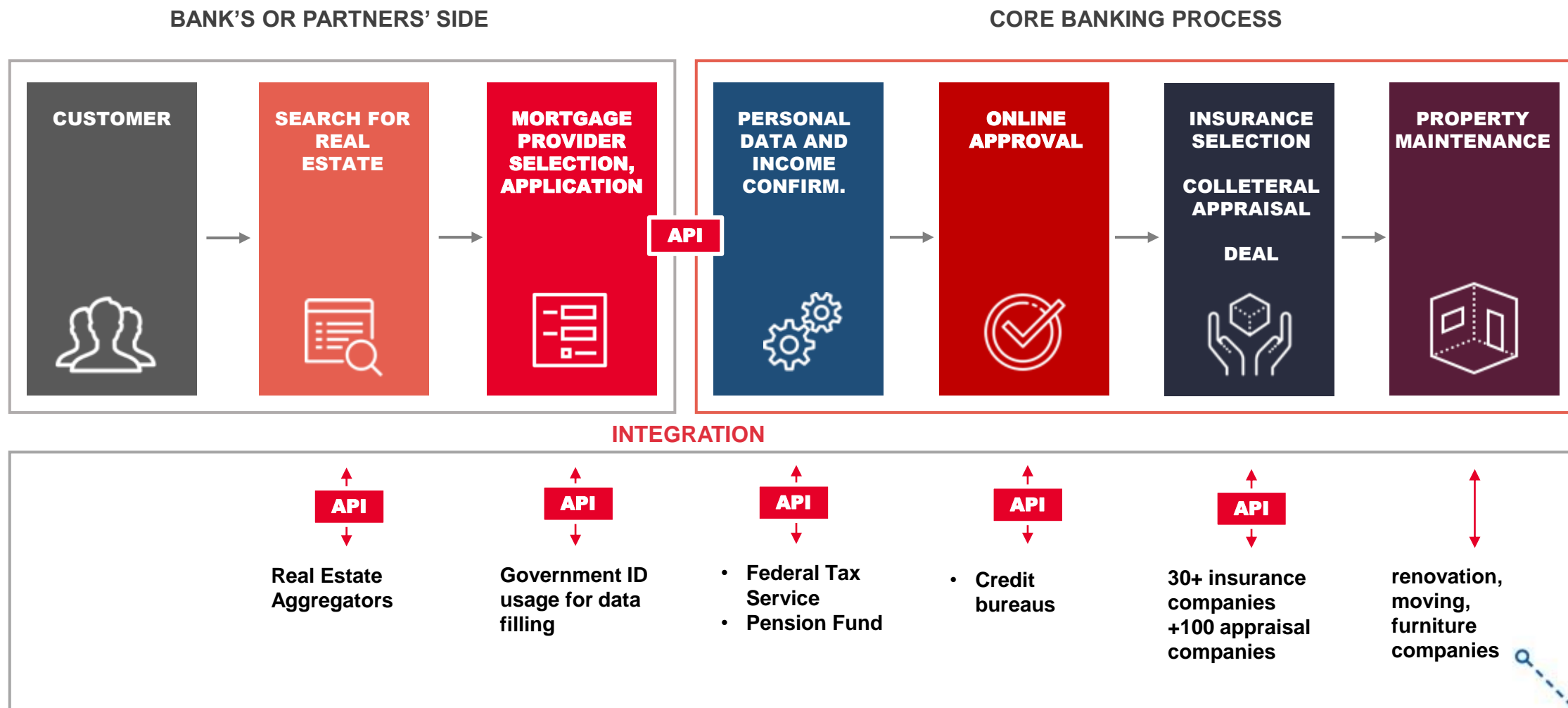| Team Name	IT Stack	FOCUS	Team	Project Framework	Interrelationship
Products and Marketing	MS Dynamics CRM (Conveyor), Automated Core Banking System (ABS)	Development of new mortgage products without question of their delivery at channels, it's about Core Banking system, legal and risks aspects	1 Product-owner (PO), 3 product-managers, 1 business analysts (BA), 1 syst. analyst (SA) + 1 developer (DEV) conveyor 1 SA + 1 DEV ABS	Kanban	With ALL teams
Core	MS Dynamics CRM (Conveyor), Automated Core Banking System	Credit Stream - internal processes at Mortgage conveyor, workplaces for internal employees	1 PO 4 BA 4 SA + 10 DEV Conveyor 4 SA + 10 DEV ABS	Kanban, Agile	With ALL teams
Servicing	Automated Core Banking System, Digital Servicing Web (.Net) and Application (JAVA)	Internal processes and Web/Mobile application for post-deal steps and servicing of current loan	1 PO 4 BA External team of Development Service of Core team for ABS dev.	Agile	Core, Products
B2B Digital Sales	.NET, C#, Angular, JS, web app. MS Dynamics CRM (Conveyor) Flatter (mobile app) .Net, C#, Rest/SOAP API	**digital tools** (web, mobile, integration) as a **self-service** for partners	1 PO, 5 BA **1 UX UI analytic, 1 tester** 3 SA, 8 DEV	SCRUM	Core, Products
B2C Digital Sales	.NET, C#, Angular, JS, web app. MS Dynamics CRM (Conveyor) Bot-platform	**digital tools** (web and bot) as a **self-service** for clients	1 PO 3 BA 2 SA 6 DEV No UX/UI analytics, no testers	Kanban, Agile	Core, Products

Focus of the Capstone project

Appendix 3: RUN / CHANGE Processes Interrelationship

Type of Process	Example	Team	Problems
CHANGE	New Functional of Loyalty Program for partners. Launching of new stage of credit process (for example Insurance stage)	PO, UX/UI expert, BA, SA, Developers, Testers	We always spend our resources for tasks which generates us new volumes of business, and it's always a problem to spend resources for refactoring of processes for decreasing of level of errors and establish a foundation for more efficient development at the future.
RUN	Bugs fixing, corrections of fields, minor changes at processes	BA, SA, Developers, testers, NO PO and UX/UI experts	Lack of global prioritization (do we need to do it?), lack of analysis of root cause of errors.

➢ Single resources

➢ Conflict of priorities

➢ Interrelationship at process of development

Appendix 4: Online customer journey in mortgage

BANK'S OR PARTNERS' SIDE

CORE BANKING PROCESS

| CUSTOMER | SEARCH FOR REAL ESTATE | MORTGAGE PROVIDER SELECTION, APPLICATION | | PERSONAL DATA AND INCOME CONFIRM. | ONLINE APPROVAL | INSURANCE SELECTION COLLETERAL APPRAISAL DEAL | PROPERTY MAINTENANCE |

API

INTEGRATION

API	API	API	API	API	
Real Estate Aggregators	Government ID usage for data filling	• Federal Tax Service • Pension Fund	• Credit bureaus	30+ insurance companies +100 appraisal companies	renovation, moving, furniture companies

Thank You!

The Capstone Project:

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Phase II: Solution Exploration & Proposal

Based on project at Worldwide Banking group,
Author: Igor Dmitriev

Agenda

Topics of presentation:

- Analysis of expectations of stakeholders

- Analysis of teams' workshops

- Analysis of wastes

- Analysis of the data

- Proposed solutions

- Reflections

  and further steps expectations

Second Phase of the project is about focus on details...

Objectives of the Project:

1) 5%

Increasing of a cost efficiency of processes
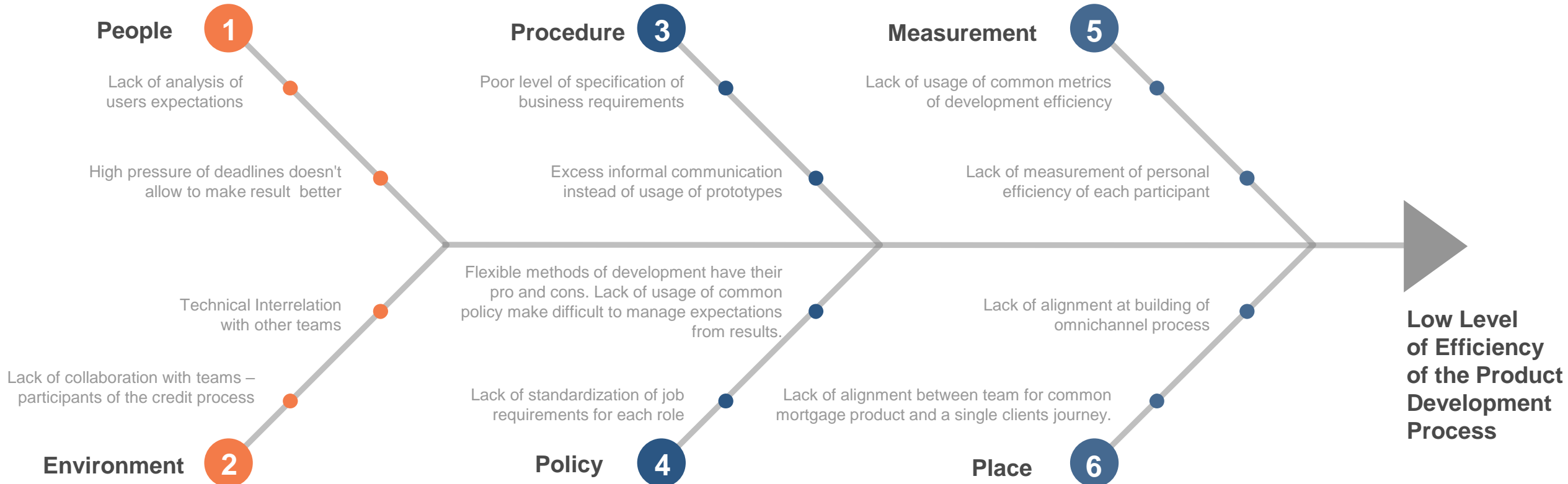
2) 10%

Increasing of speed of time to market

Results of analysis:
Key expectations of stakeholders and management

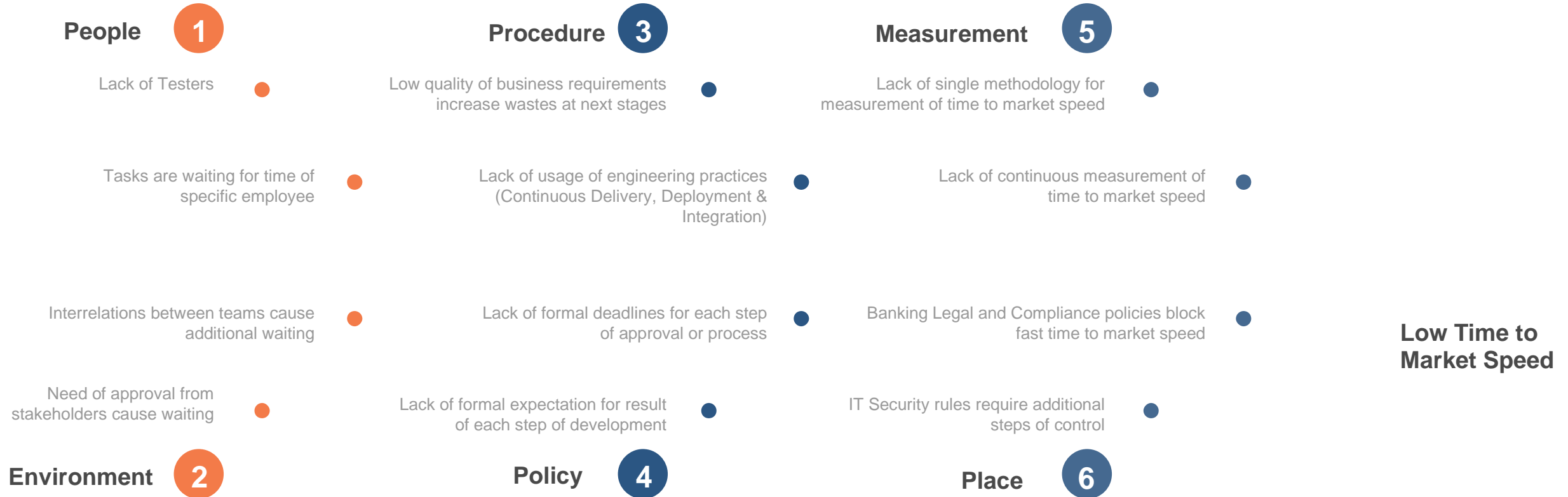| Stakeholders group	Expectations	Not meted expectations both at B2C and B2B	B2C particularity	B2B particularity
General Management = Sponsors	1. Maximizations of efficiency ratio (Business result / Required Resources) 2. Understanding of full utilization of resources 3. Prioritization of tasks based on business KPIs	1. Difficultness at analysis of business result and usage of resources for each task. Lack of single methodology. 2. Difficultness of resources control for change and run tasks 3. Difficultness at process of prioritization	-	1. Internal set of reports
Head of Digital and Projects (Chief Product Owner)	1. Decreasing of defects level 2. Increasing of level of clients satisfaction (based on Net Promoter Score NPS) 3. Increasing of level of usage of functionality 4. Time to Market (TTM) decreasing	1. Defects level 37,5% average 2. Lack of monitoring of clients satisfaction 3. Lack of seamless funnel of usage 4. Lack of entire monitoring of TTM	1. Defects level 41%	1. Defects level 34%
Finance Department (Controlling)	1. ROI (Return on Investments) >1 at first 3 years + RONE > 20% at first 3 years 2. Transparency at resources utilization 3. Clear effect of each task	1. Lack of entire methodology for analysis of each task 2. Lack of information about resources utilization	-	-
Teams Heads (Heads of B2B and B2C)	1. Clear business KPI for each team 2. Understanding of general context and needs of business 3. Transparency at work with each task	1. Lack of understanding of impact of each team for achieving of general KPI 2. Lack of time of general management for synchronization with each team. 3. Lack of usage of single resources control tools.	1. Shared KPI with team of digital marketing	1. Shared KPI with department of partnership and business development managers at branch's network
Heads of Branch's network (participants at credit process)	1. Taking their opinion to consideration at business requirements preparing 2. Analysis of not only digital but also processes of others channels for building of seamless clients' journey	1. Lack of communications 2. Excess focus of each team to their context without looking to entire client's journey	1. Lack of focus to seamless journey of a client at each channel	1. Excess focus to partners journey. Without focus to clients journey (clients who were acquired through partners network)
Other Product Development Teams, IT Architects	1. Alignment with general IT Architecture 2. Taking to consideration of processes of other teams at development	1. Lack of collaboration with other teams	-	-

Results of analysis: Workshops with teams-members
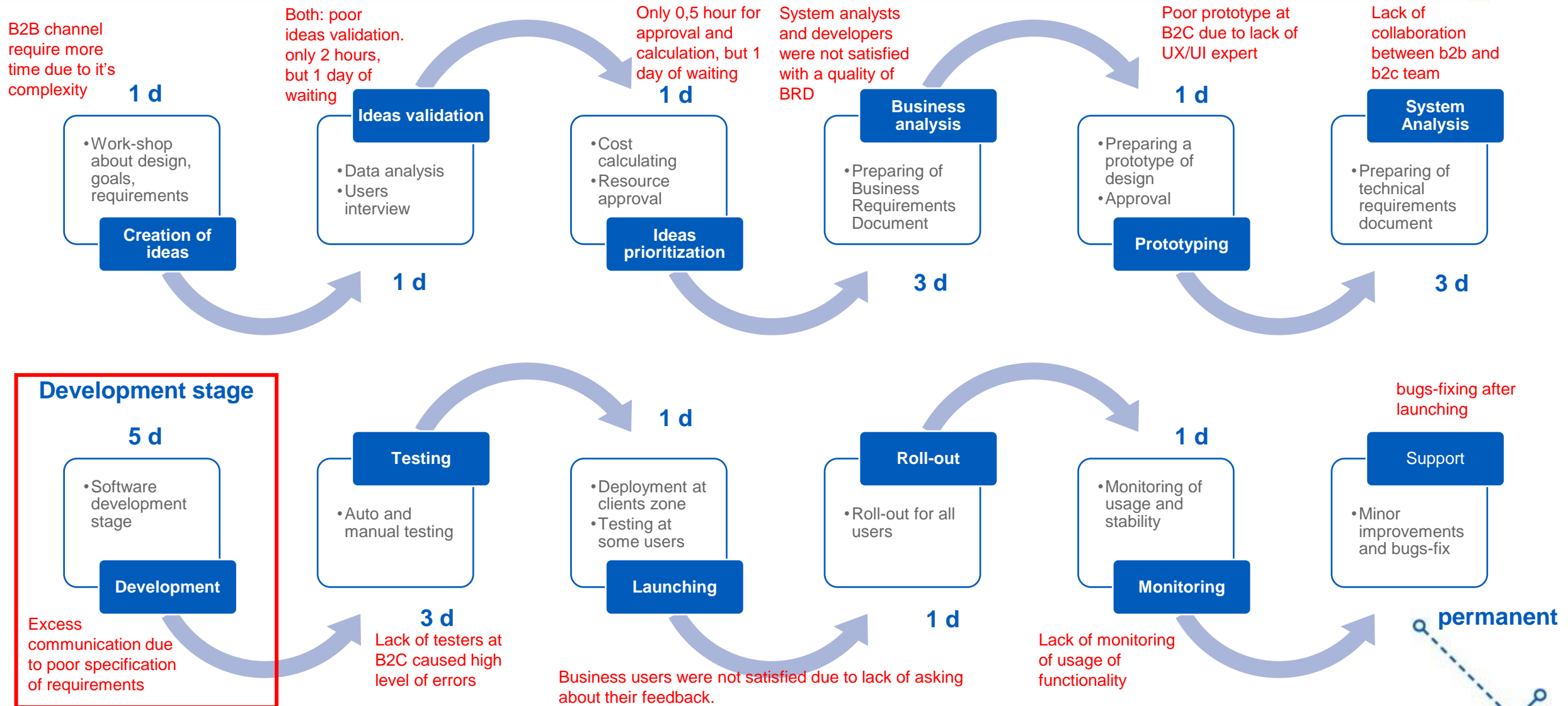# Efficiency of the Product Development Process

People ①

Lack of analysis of users expectations

High pressure of deadlines doesn't allow to make result better

Technical Interrelation with other teams

Lack of collaboration with teams – participants of the credit process

Environment ②

Procedure ③

Poor level of specification of business requirements

Excess informal communication instead of usage of prototypes

Flexible methods of development have their pro and cons. Lack of usage of common policy make difficult to manage expectations from results.

Lack of standardization of job requirements for each role

Policy ④

Measurement ⑤

Lack of usage of common metrics of development efficiency

Lack of measurement of personal efficiency of each participant

Lack of alignment at building of omnichannel process

Lack of alignment between team for common mortgage product and a single clients journey.

Place ⑥

Low Level of Efficiency of the Product Development Process

Results of analysis: Workshops with teams-members Time-to-market speed

People ①

- Lack of Testers
- Tasks are waiting for time of specific employee
- Interrelations between teams cause additional waiting
- Need of approval from stakeholders cause waiting

Environment ②

Procedure ③

- Low quality of business requirements increase wastes at next stages
- Lack of usage of engineering practices (Continuous Delivery, Deployment & Integration)
- Lack of formal deadlines for each step of approval or process
- Lack of formal expectation for result of each step of development

Policy ④

Measurement ⑤

- Lack of single methodology for measurement of time to market speed
- Lack of continuous measurement of time to market speed
- Banking Legal and Compliance policies block fast time to market speed
- IT Security rules require additional steps of control

Place ⑥

Low Time to Market Speed

Product Development Process Map: Common and differences for B2B and B2C teams.

B2B channel require more time due to it's complexity

Both: poor ideas validation. only 2 hours, but 1 day of waiting

Only 0,5 hour for approval and calculation, but 1 day of waiting

System analysts and developers were not satisfied with a quality of BRD

Poor prototype at B2C due to lack of UX/UI expert

Lack of collaboration between b2b and b2c team

1 d

Creation of ideas
- Work-shop about design, goals, requirements

Ideas validation
- Data analysis
- Users interview

1 d

Ideas prioritization
- Cost calculating
- Resource approval

1 d

Business analysis
- Preparing of Business Requirements Document

3 d

1 d

Prototyping
- Preparing a prototype of design
- Approval

System Analysis
- Preparing of technical requirements document

3 d

Development stage

5 d

Development
- Software development stage

Excess communication due to poor specification of requirements

Testing
- Auto and manual testing

3 d

Lack of testers at B2C caused high level of errors

1 d

Launching
- Deployment at clients zone
- Testing at some users

Business users were not satisfied due to lack of asking about their feedback.

Roll-out
- Roll-out for all users

1 d

1 d

Monitoring
- Monitoring of usage and stability

Lack of monitoring of usage of functionality

bugs-fixing after launching

Support
- Minor improvements and bugs-fix

permanent

The example task: additional mortgage program at product calculator (program with government subsidy for primary market). We need to do it both at B2C and B2B channels. Total time to market: 21 days

19

Results of analysis:
Gemba-walk (field research)

zoom

COVID 19 dramatically changed working environment and principles of management.

**At product & Software development process this year (from March 2020 to February 2021)
all employees are working at remote mode with regular working meeting.**

**I was able to analyze quality of work at meetings, and ask about principles of business and system
analysis, but it was difficult to emulate real working conditions (for example real-life conversations
between different analyst or developers in case of asking about ideas for solution)**

**I think new fully remote conditions is a challenge for management
and process improvements activities.**

Results of analysis:
8 types of Wastes at Product / Software Development

Type of Waste Canonical	Type of Wastes at Software Development	Description / Specific problems
★ Overproduction	★ 1. Development of features that users don't need, 2. Overproduction of task at backlog	1. Needs to support useless functionality 2. Obsolescence of tasks (and BRD)
★ Waiting	Waiting / Delays	Waiting between stages
★ Transportation	Task switching	Needs to delete useless code. Risk of conflicts of code for new task and code from not finished and not tested task.
Inventory	Incomplete / Partial work done	Conflicts between code of different tasks.
★ Over/Incorrect Processing	Rework due to poor preparation of requirements	Rework, retesting, due to lack of clear business and system requirements
★ Unnecessary Movement	Excess communication due to lack of requirements formalization	Lack of detailed requirements leads to excess communication, subjectivity in interpretation, difficultness at testing.
★ Defects	Software Errors	Inoperability or wrong functionality
Unused employee creativity	Short deadline / lack of time for task doesn't allow to improve quality of requirements or realization	Generating the volume not a quality of functionality

★ focuses for increasing of cost efficiency   ★ focuses for increasing of time to market speed

Difference between shares of roles at workload and roleas at teams

Legend: B2C Share of roles at team | B2C share of roles at the example task | B2B Share of roles at team | B2B share of roles at the example task | B2C diff | B2B diff
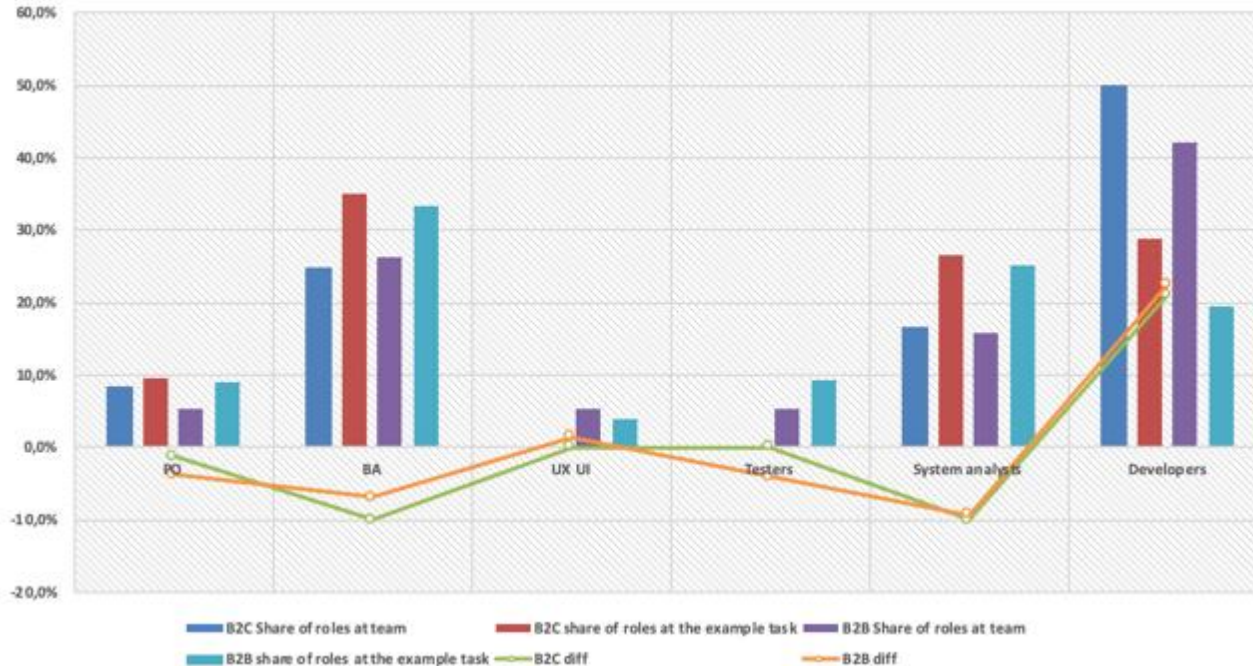
If we share an average workload at each stage and available roles and resources, we able to see shortage of resources of Business Analysts and System Analysts (both at B2C and B2B), testers for B2C.

But it doesn't mean that we need to fire developers, because they are main production workforce. It mean that we see bottle neck at product development conveyor. And if we improve these zones we improve overall speed and efficiency of the overall process.

f

Parameter	B2B	B2C
Team Size (FTE)	19	12
Existence of internal groups	yes	no
Amount of internal groups	4	1
Tasks for 6 months	840	168
Tasks for 1 team-member per month	7,4	2,3

As we can see based on the data work of B2B and B2C teams have several differences:

B2C has 1 single team, B2B has 4 sub-teams

B2C uses bigger size of task for 1 employee, B2B uses more detailed separation of tasks.
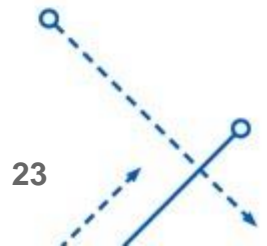
Results of analysis:
The main categories of errors

Current Success Level of Product and Technical Development

Product Task Success Level (deadlines meeting, functionality, cost, usage): B2C 75,0%, B2B 70,0%, AVG 72,5%

Technical Task (cost, errors, wrong functionality): B2C 71,4%, B2B 77,9%, AVG 74,6%

Legend: ■ B2C ■ B2B ■ AVG

Product Development Errors
= Did we create a correct product?
Equal to waste: Overproduction, Over/Incorrect Processing

- Development of features that users don't need
- Rework due to poor preparation of requirements

Technical Error
= Is our functionality working correctly?
Equal to waste: Defects

- Inoperability
- Wrong functionality

Product Development and Technical errors have different nature but common causes.

But what if technical errors meet to errors at product development stage?

Cost of an Etalon Task = X
X * % (probability of prod. errors) * % (probability of technical errors) = X * 72,5% * 74,6% = **184,9% X**

24
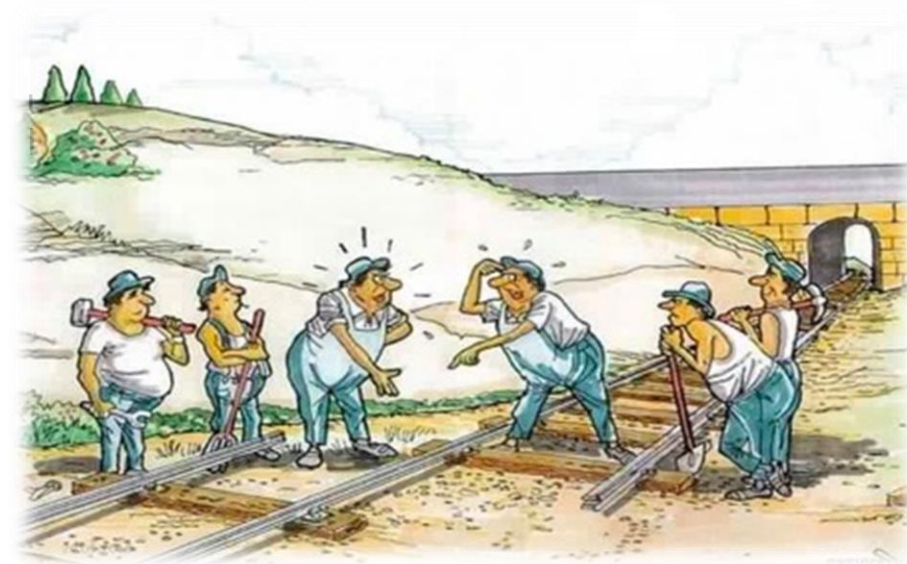
Results of analysis:
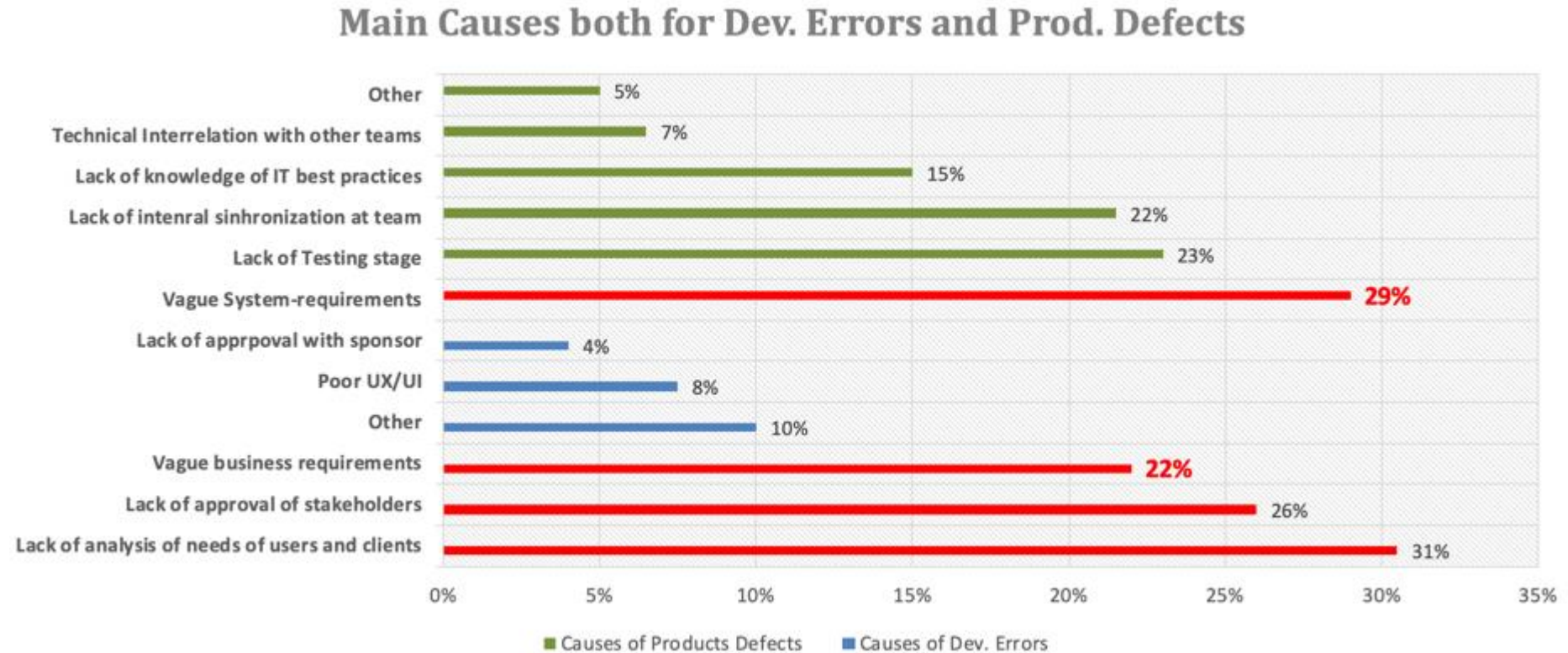## Statistics analysis
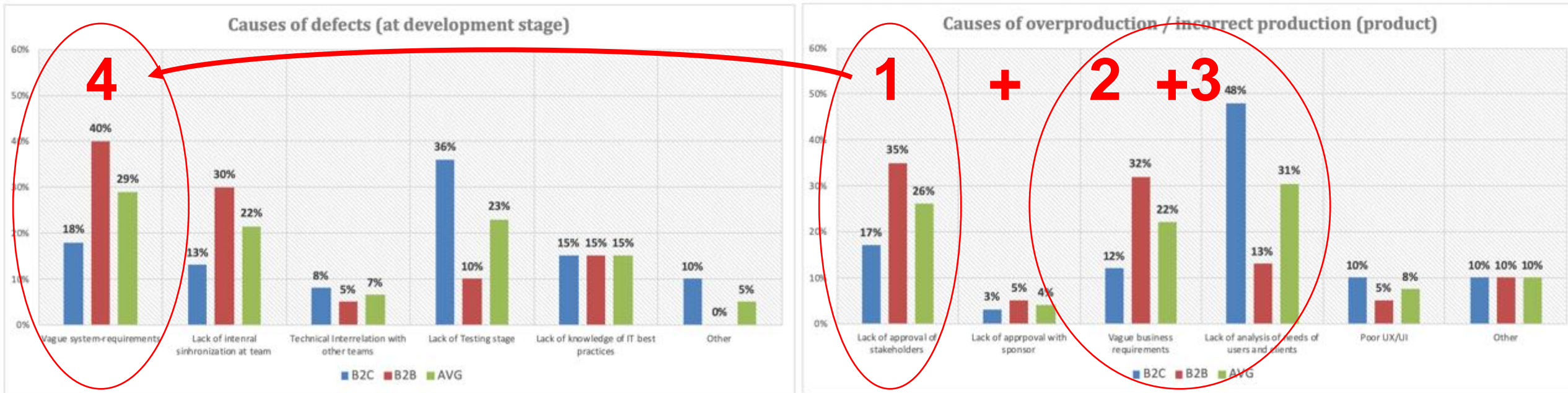
As we can see both for B2B and B2C – vague system requirements cause defects at development stage. But it really interrelated with causes of errors at products development process. System analysis based on results of business analysis and we can see that it also poor.
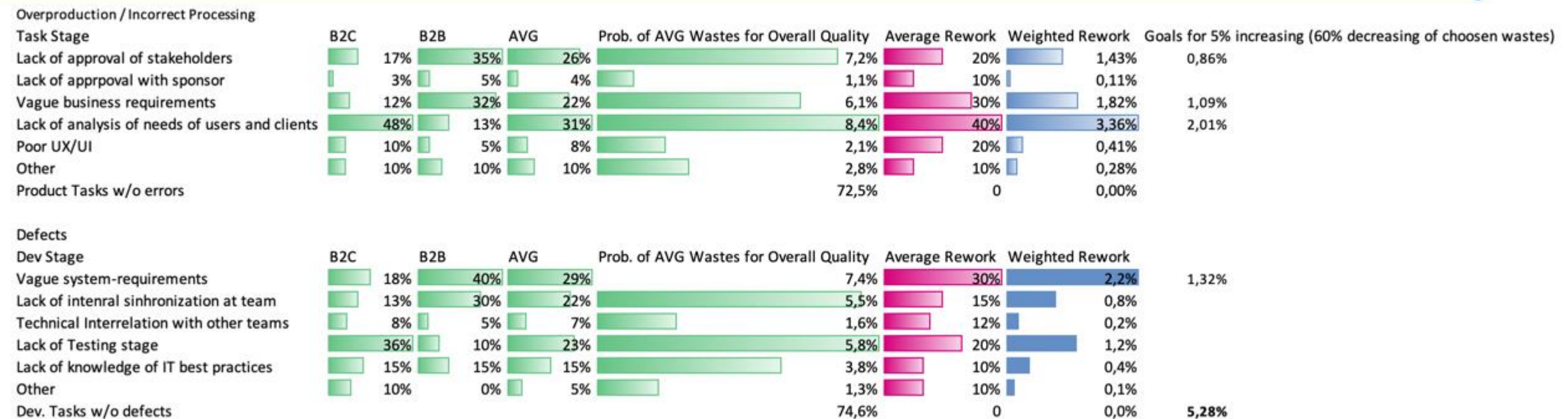
It's a strong insight for focusing of our research.

Results of analysis:
Statistics analysis

If we stack results of the main categories of errors both for product and software development processes we again able to see strong impact from stages linked to business and system analysis for quality of the overall process.

Main Causes both for Dev. Errors and Prod. Defects

Category	Value
Other	5%
Technical Interrelation with other teams	7%
Lack of knowledge of IT best practices	15%
Lack of intenral sinhronization at team	22%
Lack of Testing stage	23%
Vague System-requirements	**29%**
Lack of apprpoval with sponsor	4%
Poor UX/UI	8%
Other	10%
Vague business requirements	**22%**
Lack of approval of stakeholders	26%
Lack of analysis of needs of users and clients	31%

Legend: ■ Causes of Products Defects ■ Causes of Dev. Errors

Results of analysis:
Statistics analysis

Overproduction / Incorrect Processing

Task Stage	B2C	B2B	AVG	Prob. of AVG Wastes for Overall Quality	Average Rework	Weighted Rework	Goals for 5% increasing (60% decreasing of choosen wastes)
Lack of approval of stakeholders	17%	35%	26%	7,2%	20%	1,43%	0,86%
Lack of apprpoval with sponsor	3%	5%	4%	1,1%	10%	0,11%	
Vague business requirements	12%	32%	22%	6,1%	30%	1,82%	1,09%
Lack of analysis of needs of users and clients	48%	13%	31%	8,4%	40%	3,36%	2,01%
Poor UX/UI	10%	5%	8%	2,1%	20%	0,41%	
Other	10%	10%	10%	2,8%	10%	0,28%	
Product Tasks w/o errors				72,5%	0	0,00%	

Defects

Dev Stage	B2C	B2B	AVG	Prob. of AVG Wastes for Overall Quality	Average Rework	Weighted Rework	
Vague system-requirements	18%	40%	29%	7,4%	30%	2,2%	1,32%
Lack of intenral sinhronization at team	13%	30%	22%	5,5%	15%	0,8%	
Technical Interrelation with other teams	8%	5%	7%	1,6%	12%	0,2%	
Lack of Testing stage	36%	10%	23%	5,8%	20%	1,2%	
Lack of knowledge of IT best practices	15%	15%	15%	3,8%	10%	0,4%	
Other	10%	0%	5%	1,3%	10%	0,1%	
Dev. Tasks w/o defects				74,6%	0	0,0%	**5,28%**

It important not only identify main causes of wastes, but also weight it with average amount of wastes.

After analysis of results of multiplication of probability to value of rework we able to see the main causes for rework.

Based on the goal of "5% increasing of the overall efficiency" I identified 4 key wastes as a focuses for improvement:
- Lack of approval of stakeholders;
- lack of analysis of needs of users and clients;
- Vague business requirements;
- Vague system requirements.

Statistics analysis

as is	Overall Duration (days)				B2B Man/Hours								B2C Man/Hours							AVG	AVG Share at total workload	
	B2B	B2C	AVG	AVG2	PO	BA	UX/UI	Test.	SA	Devel.	Total		PO	BA	UX/UI	Test.	SA	Devel.	Total			
Stages of Product Development																						
1. Creation of Ideas	1	1	1	1	2	4	0	0	2	0	8	4,4%	1	2	0	0	1	0	4	3,0%	6	4%
2. Ideas Validation	1	1	1	1	1	1	0	0	0	0	2	1,1%	1	1	0	0	0	0	2	1,5%	2	1%
3. Ideas Prioritization	1	1	1	1	0,5	0	0	0	0	0	0,5	0,3%	0,5	0	0	0	0	0	0,5	0,4%	0,5	0%
4. Business Analysis	3	2	2,5	3	2	16	4	0	8	0	30	16,3%	2	8	0	0	4	0	14	10,6%	22	14%
5. Prototyping	1	0	0,5	1	2	4	2	0	2	0	10	5,4%	1	2	0	0	1	0	4	3,0%	7	4%
6. System Analysis	4	3	3,5	3	1	8	1	0	16	4	30	16,3%	1	4	0	0	8	2	15	11,4%	22,5	14%
7. Development	5	6	5,5	5	0	4	0	1	8	24	37	20,2%	0	6	0	0	12	32	50	38,0%	43,5	28%
8. Testing	3	3	3	3	1	8	0	16	8	8	41	22,3%	2	16	0	0	8	4	30	22,8%	35,5	23%
9. Launching	1	1	1	1	2	6	0	0	0	0	8	4,4%	2	3	0	0	0	0	5	3,8%	6,5	4%
10. Roll-out	1	1	1	1	2	4	0	0	0	0	6	3,3%	1	2	0	0	0	0	3	2,3%	4,5	3%
11. Monitoring	2	1	1,5	1	3	6	0	0	2	0	11	6,0%	1	2	0	0	1	0	4	3,0%	7,5	5%
12. Support (permanent)																						
grand total											183,5								131,5		157,5	

One of the main insights of analysis stage was hidden at differences at practices of teams in question of separation of overall workload between stages.

I analyses differences of approaches of each teams, and moreover differences of time spending and used roles.

Results of analysis:
Statistics analysis

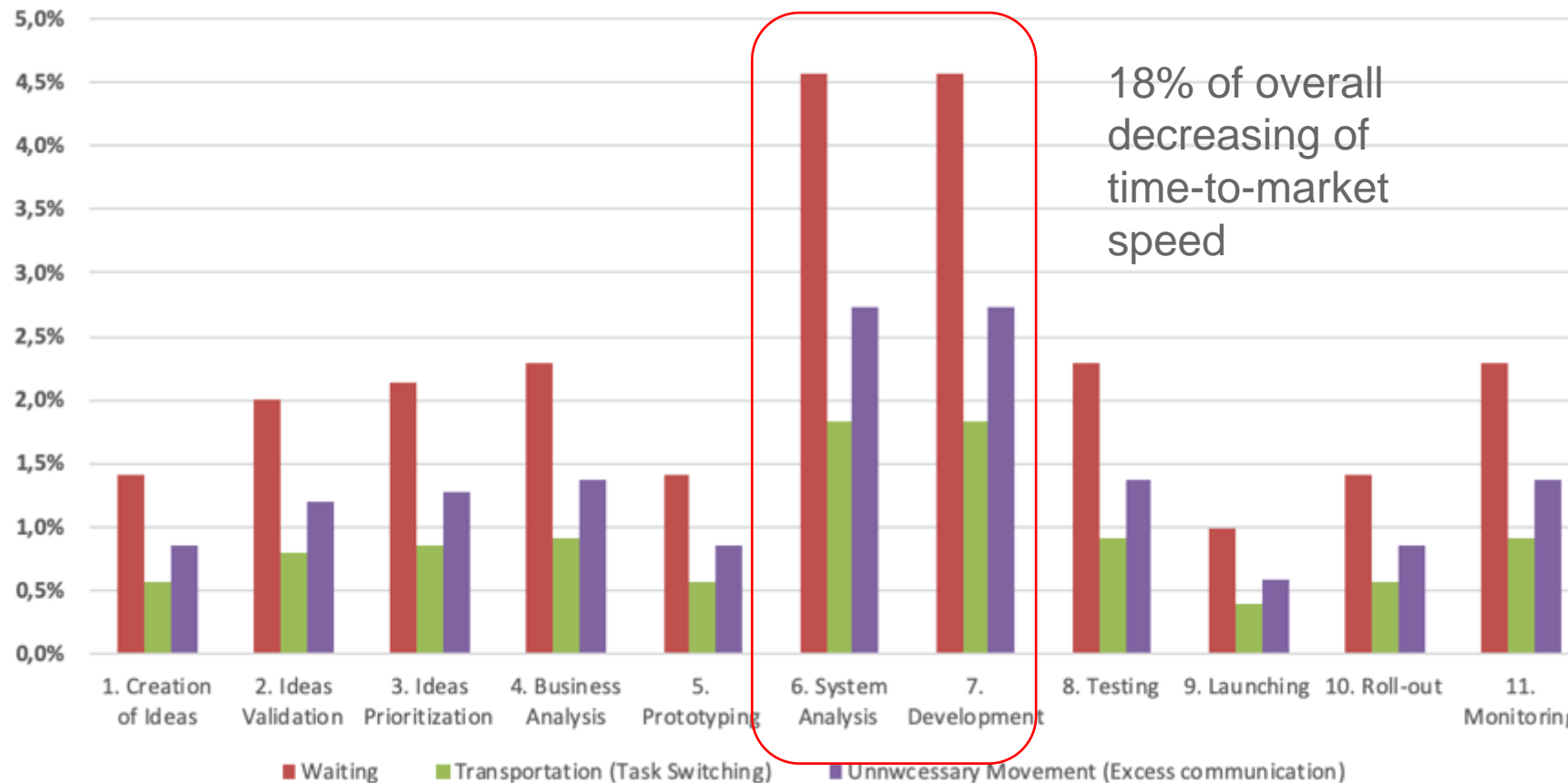**Difference of shares of stages for workload**
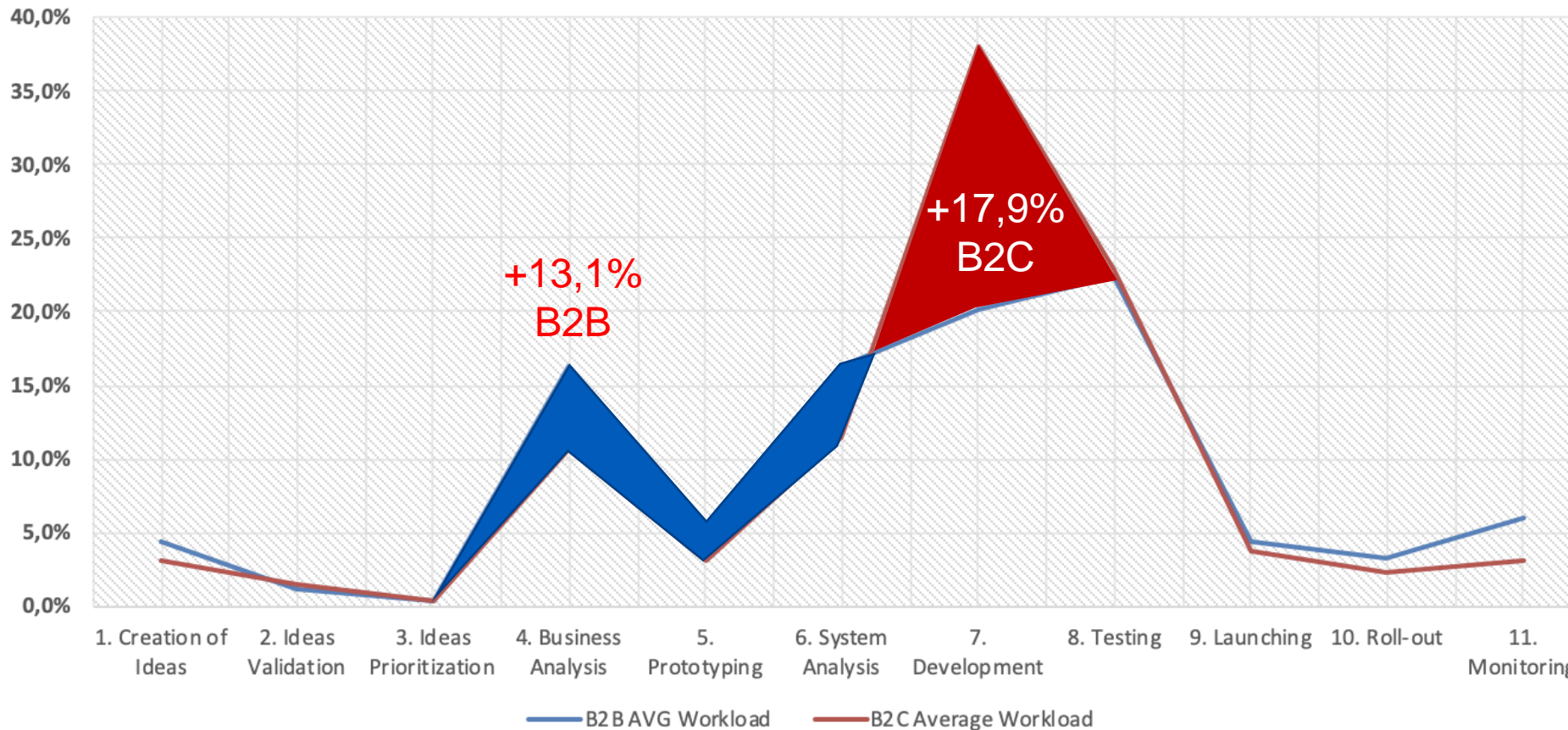
As we can see 13% of extra work at stage of business analysis and research of users and clients expectations saves 18% of development cost.

It's not a focus of the project, but If we take to account cases where cost of 1 developer higher than cost of 1 business analyst, we get one more strong point for efficiency improvement.

Results of analysis:
Statistics analysis

The main wastes with impact to overal duration of tasks (AVG B2C & B2B)

18% of overall decreasing of time-to-market speed

Legend: Waiting ■ Transportation (Task Switching) ■ Unnwcessary Movement (Excess communication) ■

If we talk about decreasing of time to market speed we need to look at types of wastes at each stage of the project.

We able to see that waiting and excess communication are critical at stages of system analysis and development.

Overall wastes at these stages more than 18%.

Results of analysis:
Statistics analysis to be

Difference of shares of stages for workload
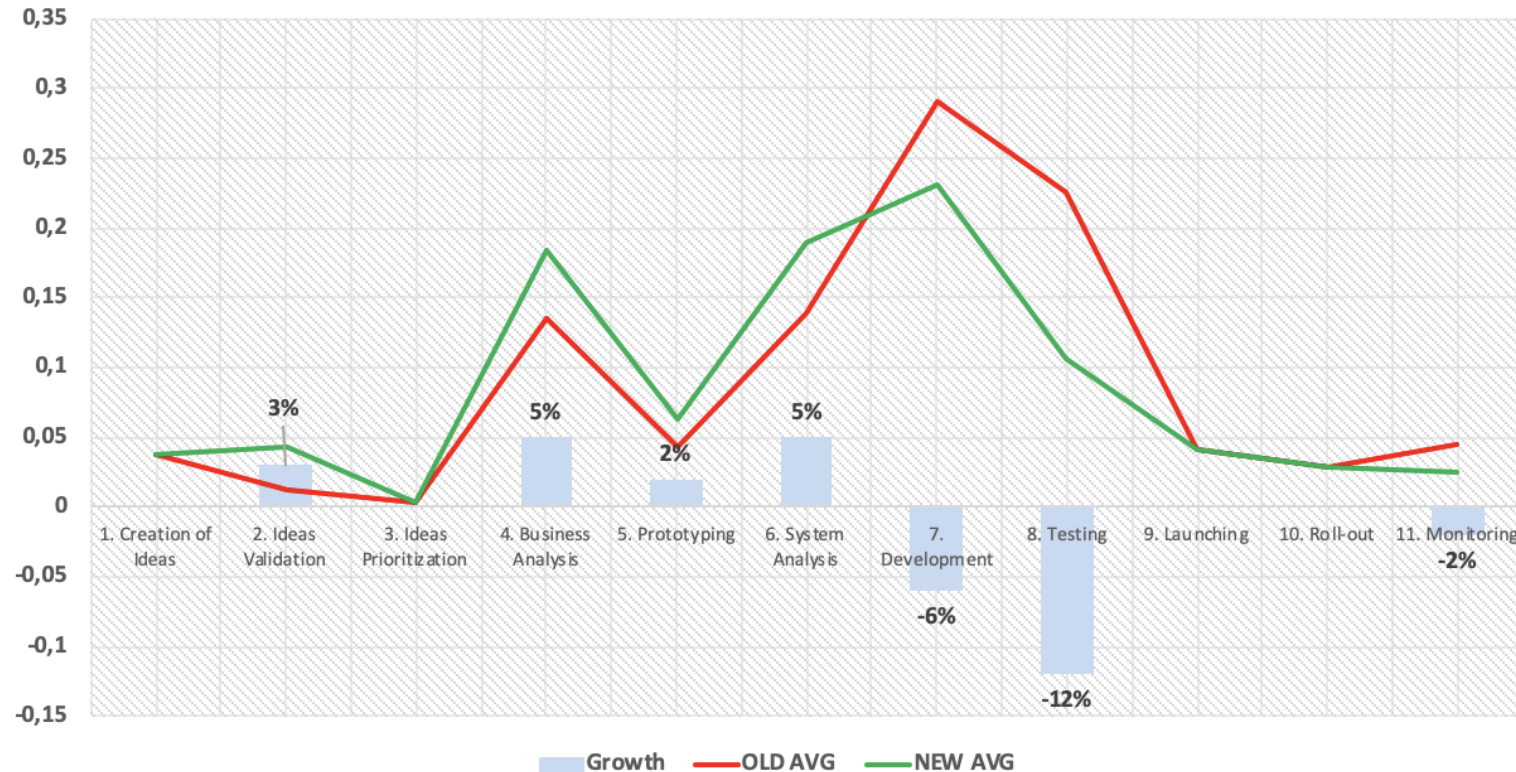
Stage of Product Development	B2B AV	B2C Av	OLD AV	NEW AV	Growth
1. Creation of Ideas	4,4%	3,0%	3,7%	3,7%	
2. Ideas Validation	1,1%	1,5%	1,3%	4,3%	3%
3. Ideas Prioritization	0,3%	0,4%	0,3%	0,3%	
4. Business Analysis	16,3%	10,6%	13,5%	18,5%	5%
5. Prototyping	5,4%	3,0%	4,2%	6,2%	2%
6. System Analysis	16,3%	11,4%	13,9%	18,9%	5%
7. Development	20,2%	38,0%	29,1%	23,1%	-6%
8. Testing	22,3%	22,8%	22,6%	10,6%	-12%
9. Launching	4,4%	3,8%	4,1%	4,1%	
10. Roll-out	3,3%	2,3%	2,8%	2,8%	
11. Monitoring	6,0%	3,0%	4,5%	2,5%	-2%
			100%	95%	

Proposed solution is increase at 15% amount of efforts at stages of:
- Ideas Validation
- Business Analysis
- System Analysis
- Prototyping

For 20% decreasing of work at stages:
- Development
- Testing
- Monitoring

Stage 3: Improvement
Proposed Countermeasures

Proposed Solutions for increasing of efficiency level

Linked Cause of Wastes	Countermeasures
Lack of approval of stakeholders	1. Usage of Poka-yoke (check-lists for interviews) 2. Formalization of approval process (formal deadlines and scope of responsible persons) 3. Usage of more effective ways for approval (less text more prototypes and process maps) 4. More active feedback usage at process of development 5. Including of stakeholders to working groups
Lack of analysis of needs of users and clients	1. Less experts opinions, more data driven decisions 2. Usage of customer-development practices (deep interviews, feedback collecting) 3. Usage of technical tools for analysis (f.e. clicks monitoring) 4. Usage of beta stages with loyal users
Vague business requirements	1. Usage of Poka-yoke (check-lists for analysis) 2. Increasing of usage of prototyping 3. Usage of special analysis frameworks (f.e. user stories) 4. Additional learning of business analysts for required data for system analysis and development stage
Vague system requirements	1. Usage of Poka-yoke (check-lists for analysis) 2. Usage of required analysis frameworks (for example process maps, data maps) 3. Including of system analysts to stage of customer development

+ formalized expectations and roles descriptions for each participants

Stage 3: Improvement
Proposed Countermeasures

Proposed Solutions for increasing of time to market speed

| Stages of Process	Type of wastes	Countermeasures
System Analysis + Development	Waiting	1. Setting of deadlines for time of answer and approval 2. Setting of prioritization between analysis of new tasks and answering for questions for existing tasks 3. Usage of more effective notification of start of waiting and arrival of the answer
	Excess Communications	1. Implementation of set of improvement for business and system analysis (setting of requirement format of documents, usage of prototypes and mock-ups, usage of schemas, preparing of data and process maps) 2. Usage of more effective tools for collaboration

Causes of deadlines shifting:

- Wrong estimation of required time resources

- Excess communications and approvals at bank

- Defocus due to pressure from other tasks

Key Insights and experience:

- "Snow ball" effect. Difficultness of prioritization of findings.

- COVID 19 environment: all discussions at online mode

- Avoid of resolving before finishing of the analysis.
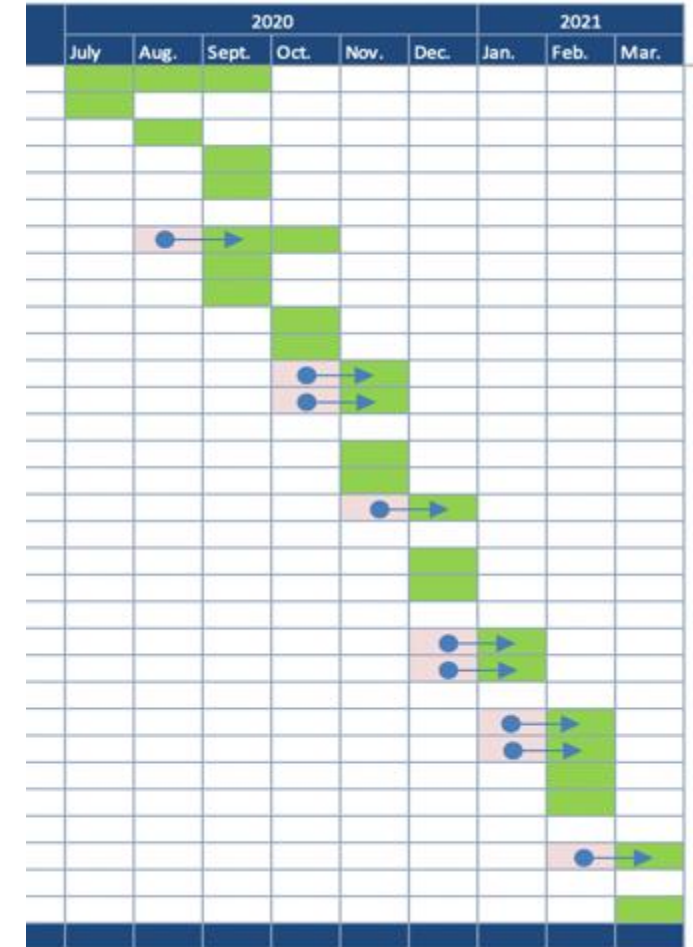
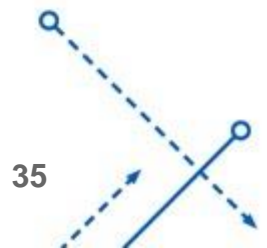**The main goal – looking for the best focuses of improvement based on ratio: required resources / expected result.**

Appendix: Phase 3 Expectations

Revision of Phase 2 results:

- Insights at implementation stage able to improve our understanding

- Validation of methodology of measurement of results

Following to focuses:

- Focus on the more critical points of process improvement

- Avoid to try to improve anything, it's impossible

- Set the system of the quality maintenance.

The Project Chart

	Stages / Task	Duration	Resources	Budget	Status	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
			Resources			**2020**						**2021**		
Phase 1	**Stage 1. Pre-analysis and Approval Stage**	8w	management	$ 500,00	complete									
	interviews with management and teams heads	2w	man-t, staff	$ 200,00	complete									
	Preliminary analysis and calculations	3w	Project Manager	$ 100,00	complete									
	Project Charter & Bus. Case Approval	2w	PM, Man-t	$ 100,00	complete									
	Faculty Advisor Approval	1w	PM, FA	$ 100,00	complete									
Phase 2	**Stage 2. Analysis**													
	Interview with stakeholders	2w	management	$ 1 000,00	complete									
	Gemba-walk (field research)	2w	teams members	$ 700,00	complete									
	Process mapping	2w	heads of teams	$ 800,00	complete									
	Interview with team-members (workshops)	2w	teams members	$ 2 000,00	complete									
	Statistics analysis	2w	statistics access	$ 1 000,00	complete									
	Report preparing	1w	Project Manager	$ 500,00	complete									
	Stage 3. Improvement													
	To be process (Solution) preparing	2w	Project Manager	$ 1 000,00	in proc.									
	Testing of to be process	2w	teams members	$ 1 000,00										
Phase 3	**Stage 4. Pilot Mode**													
	Pilot of process 1 team	1m	teams members	$ 1 500,00										
	Stage 5. Roll-out													
	Pilot at all teams	1m	teams members	$ 2 500,00										
	Stage 6. Analysis of results													
	Asis/to be analysis	2w	Project Manager	$ 500,00										
	Report about results	1w	Project Manager	$ 500,00										
	Proposals for post-project improvements	2w	Project Manager	$ 500,00										
	Stage 7. Closing of the project	2w	management	$ 500,00										
	Stage 8. Retrospective analysis of a project	2w	Project Manager	$ 500,00										
	TOTAL			**$15 500,00**										

36

Thank You!

The Capstone Project:

Increasing of a cost efficiency of a software development at creation of self-services channels at a commercial bank.

Phase III: Implementation & Evaluation

Part 1: Tools Implementation

Based on project at Worldwide Banking group, Author: Igor Dmitriev

Agenda

Topics of the presentation:

- Goals of Phase III / Part 1 of Phase III

- Preliminary results

- Implementation Process overview

- Phase 3 Part 1 retrospective analysis

- Phase 3 Part 2 and overall project finalization next steps and expectations

Short Overall Overview of The Project

Goal of The Project: ➡ Phases I, II Key Insights: ➡ Phase III Goals: ➡ Preliminary Results:

Goal of The Project:

Goal of the project is increasing of cost efficiency and speed of "time to market" for processes of product and software development at creation of self-services for clients and partners at Digital B2C and Digital B2B teams of Mortgage and Real Estate Ecosystem Business Line

Objectives & Goals / Expected Outcomes / Deliverables:
1) 5% Increasing of cost efficiency of processes, equal to 150 000$ decreasing of total cost for 2 years,
2) 10% Increasing of speed of time to market = 2.1 days (in comparison with an etalon task "Additional mortgage program at product calculator" with 21 days of total time to market)

Phases I, II Key Insights:

Key zones of Wastes Reduction:
Based on the goal of "5% increasing of the overall efficiency" I identified 4 key wastes as focuses for improvement: lack of approval of stakeholders; lack of analysis of needs of users and clients; vague business requirements; vague system requirements.

Key zones of an overall efficiency increasing: As we can see 13% of extra work at stage of business analysis and research of users and clients expectations saves 18% of development cost. Proposed solution is increase at 15% amount of efforts at analysis stages for 20% decreasing of further stages.

Key Zones of Time to Market value Decreasing: Waiting and excess communication are critical at stages of system analysis and development. Overall wastes at these stages more than 18%.

Phase III Goals:

1st of March: first 1/2 of the final presentation
- **with parts about prepared tools (f.e. poka-yokas, process improvements, project frameworks)** and results of their usage (**some pro and cons of each tool**, **some primary qualitative and quantitative results for each tool**)

green – done
orange – partially done

1st of April: last 1/2 of the final presentation.
- qualitative and quantitative results of the implementation of the proposed process
- "to do" for the after-project stage
- as my important focus - some approaches for ensuring the sustainability of the implemented improvements
- reflections about the overall project

Preliminary Results:

Challenges:
• We met resistance of part of team members against of rebalance of work-load.
• We don't' sure about efficiency of part of solutions, but we unable to make a decision without analysis of an **overall effect** to full value chain.

Quick Wins:
• We see positive impact of several implemented tools
• We deeply understand problems of our value chain and our next steps

Next steps:
• We need to finish our analysis of overall results of system of new solutions
• We need to make a decision about final process.
• We need to implement a solution for results maintenance.

Changes at Overall Process

1 d

Ideas validation

•Work-shop about design, goals, requirements

1. Merge

•Data analysis
•Users interview

Creation of ideas

1 d

1 d

•Cost calculating
•Resource approval

Ideas prioritization

Business analysis

•Preparing of Business Requirements Document

1. Merge

1 d

•Preparing a prototype of design
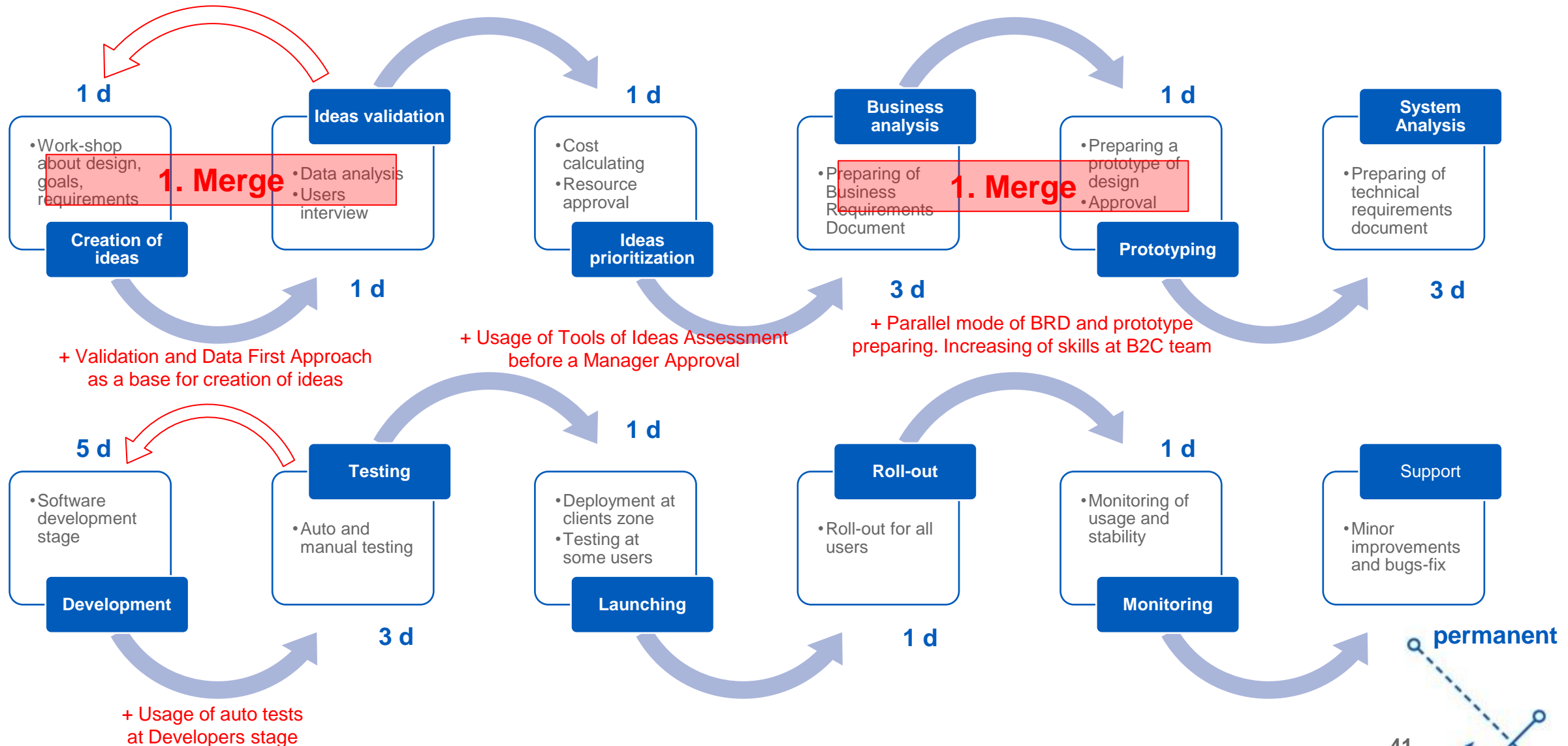•Approval

Prototyping

System Analysis

•Preparing of technical requirements document

3 d

3 d

+ Validation and Data First Approach as a base for creation of ideas

+ Usage of Tools of Ideas Assessment before a Manager Approval

+ Parallel mode of BRD and prototype preparing. Increasing of skills at B2C team

5 d

Testing

•Software development stage

•Auto and manual testing

Development

1 d

•Deployment at clients zone
•Testing at some users

Launching

Roll-out

•Roll-out for all users

1 d

•Monitoring of usage and stability

Monitoring

Support

•Minor improvements and bugs-fix

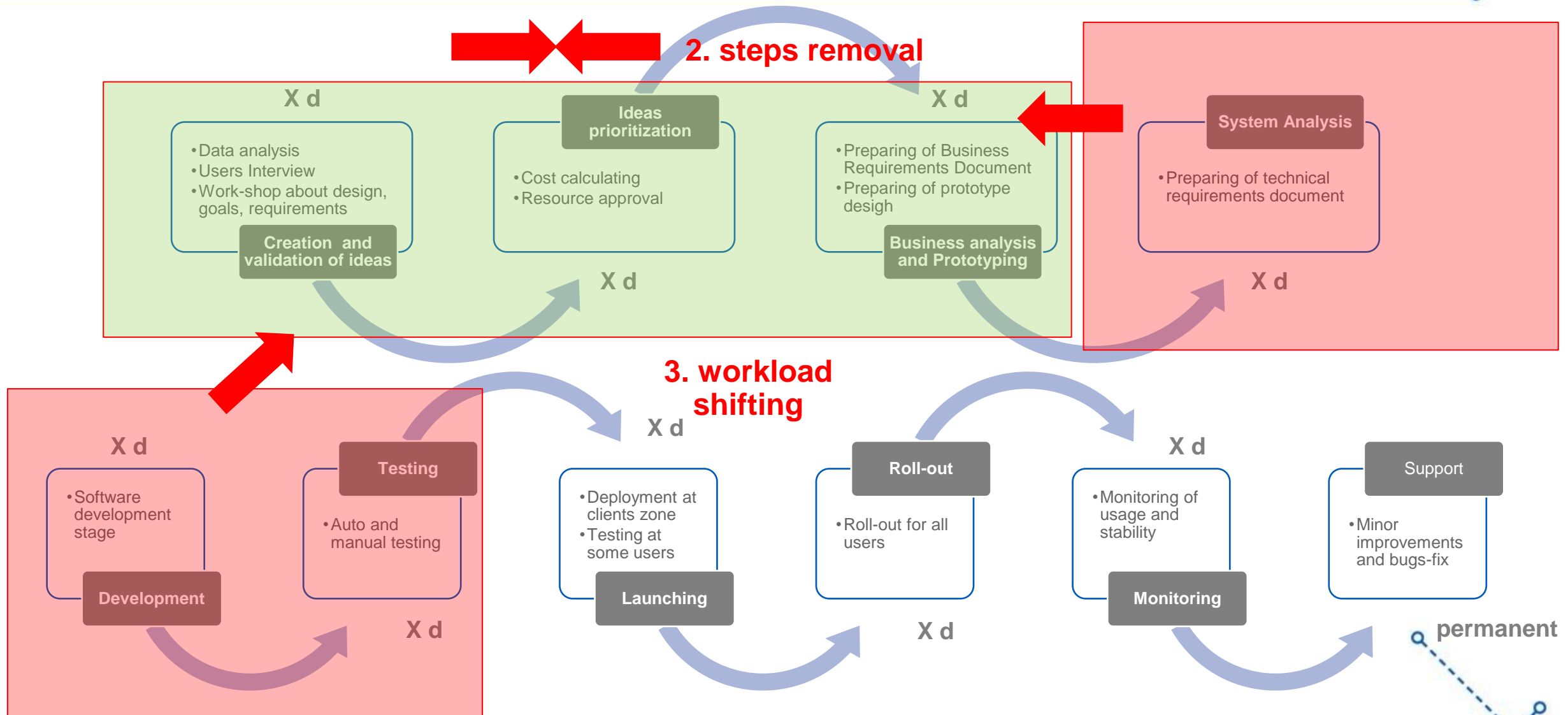**3 d**

1 d

permanent

+ Usage of auto tests at Developers stage

The example task: additional mortgage program at product calculator. Total time to market: 21 days

41

Changes at Overall Process

2. steps removal

X d

Creation and validation of ideas
- Data analysis
- Users Interview
- Work-shop about design, goals, requirements

Ideas prioritization
- Cost calculating
- Resource approval

X d

Business analysis and Prototyping
- Preparing of Business Requirements Document
- Preparing of prototype desigh

System Analysis
- Preparing of technical requirements document

X d

3. workload shifting

X d

Development
- Software development stage

Testing
- Auto and manual testing

X d

Launching
- Deployment at clients zone
- Testing at some users

X d

Roll-out
- Roll-out for all users

X d

Monitoring
- Monitoring of usage and stability
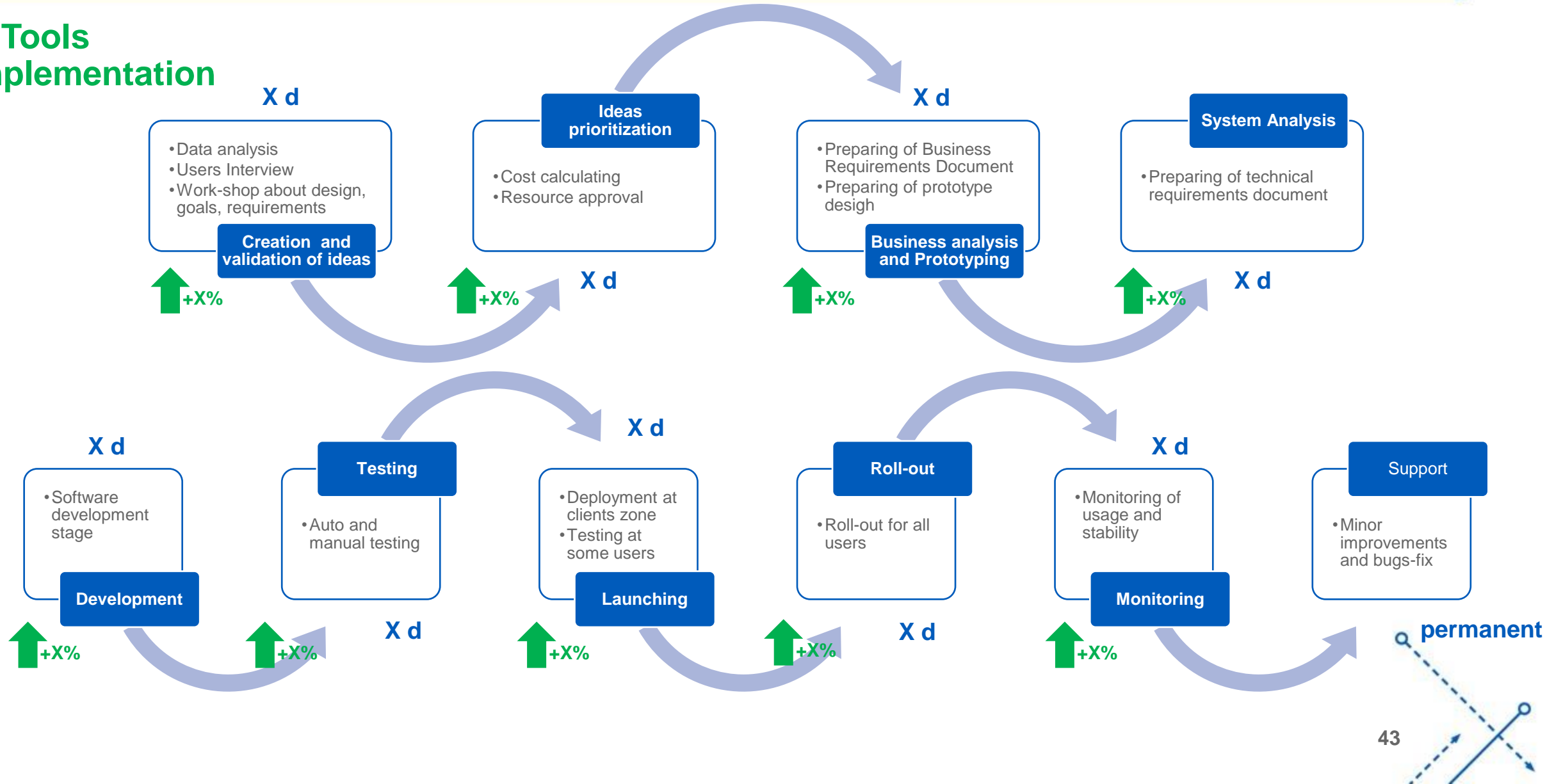
Support
- Minor improvements and bugs-fix

permanent

The example task: additional mortgage program at product calculator. Total time to market: 21 days (previously)
Resulted time will be calculated at Part 2 of Phase III

Changes at Overall Process

4. Tools implementation

X d

Creation and validation of ideas
- Data analysis
- Users Interview
- Work-shop about design, goals, requirements

+X%

Ideas prioritization
- Cost calculating
- Resource approval

+X%

X d

Business analysis and Prototyping
- Preparing of Business Requirements Document
- Preparing of prototype desigh

+X%

X d

System Analysis
- Preparing of technical requirements document

+X%

X d

X d

Development
- Software development stage

+X%

Testing
- Auto and manual testing

+X%

X d

Launching
- Deployment at clients zone
- Testing at some users

+X%

Roll-out
- Roll-out for all users

+X%

X d

Monitoring
- Monitoring of usage and stability

+X%

Support
- Minor improvements and bugs-fix

permanent

43

Stage Check-List:

0. Do we have an idea or we need to create an one?:
☐ yes, go through check-list
☐ no, let's create it based on data

1. Requirements of our Strategy
☐ decreasing of the cost of process
☐ increasing of sales
☐ increasing of cross-sale level
☐ increasing of clients satisfaction
☐ decreasing or risk level

2. Do we have an existent data
☐ if yes, let's analyze
☐ if no, is it possible to collect it?

3. Do we have users feedback
☐ if yes, let's analyze
☐ if no, is it possible to collect it?

4. Filling of template
☐ cost
☐ benefit
☐ auditory of users
☐ Is approval of stakeholders required?
☐ short name
☐ description

Linked Wastes:

1. Overproduction
Development of features that users don't need

2. Unnecessary movement
Excess communication due to lack of requirements formalization.

3. Unused employee creativity
It's not required to ask developers and testers propose ideas, but it improves overall team's spirit and motivation.

Also we had unused clients and partners creativity.

Implemented Tools:

1. Required Quantitative (f.e. funnel metrics) and Qualitative (f.e. clicks monitoring) Data Analysis
Allow to decrease impact of experts' biases

2. Deep interviews and Feedback analysis
Is it important for our users? Do we have they preferences?

3. Strategy driven approach
Which goal we try to achieve?

4. Stage Check-list
Usage of check-list allow us not to miss important details

5. Template usage
- Preliminary expectations (cost, benefit) allow us to understand is our idea important. We set minimum buy-back period of 2 years as a threshold
- Required fields allow to avoid unnecessary communications.

6. Users Club
We ask loyal external and internal users join our users club for ability to discuss ideas and be involved to beta-test of new functionality. Also including of internal stakeholders to Users club decreases risk of rejecting at approval stage.

Indicator	AS IS	TO BE	PRO	CONS
Cost of stage (average, m/h)	X		Self-checking and a better formalization decrease time spending at next stages	1. Implemented tools required of spending of additional time 2. It's not obviously for team, why their need to spend additional time
Impact to total wastes				
Impact to total Time-to-Market				
Impact to total cost				

Calculations in process

44

Stage Check-List:

0. Use the scoring file
- ☐ Fill cost of task
- ☐ Fill expected amount of new sales (1 year after implementation)
- ☐ Fill expected size of cost decrease (sum for 1 year after implementation)
- ☐ Fill NPS (Net promoter score) increase
- ☐ Fill Cost of Risk Decrease (1 year after implementation)
- ☐ Fill amount of selling of cross-sale products
- ☐ Compare net result and buy-back period

FYI: Methodology
Scoring file use financial model of mortgage business and analyze impact of different drivers to net result of business. I use net income from new loans (based on expected life-long result), impact of Opex and COR decrease to net income, amount of income from cross-sale products. But we need to finish our research about impact of clients satisfaction to net result (we try to check impact to sales, cross-sale or customer churn)

Linked Wastes:

1. Overproduction
Development of features that not required by business

Implemented Tools:

1. Scoring File
During the project we implemented best at our bank tool for ideas prioritization. If you put at calculator your expected cost and benefits, you will see buy-back period and resulted net result. It's very useful if you need to compare different dimension of benefits (sales, cost decrease, clients satisfaction, cost of risk, cross-sale increase)

AS IS	FYI Cost AS IS RUN (mln, RUB)	Cost AS IS Change (mln, RUB)	New Production (bln, RUB per year)	Opex Decrease (mln, RUB per year)	NPS Increase	COR decrease (mln, RUB per year)	Cross-sale Increase (#, add. NBI)	CS # TD	CS # CL	CS # CC	CS # Prem	CS # Card	Net Result +1Year, mln, RUB	Срок возврата инвестици
Team														
Core		10	5				0						148,75	0,0672269
Servicing		10		100			0						80	0,125
Products		10				100	0						80	0,125
B2B		10					4608450	50	50	50	50	50	3,68676	2,7124087
B2C							0						0	#ДЕЛ/0!
Итого:	0	40	5	100	0	100	4608450	50	50	50	50	50	312,43676	0,1280259

Indicator	AS IS	TO BE	PRO	CONS
Cost of stage (average, m/h)	X		Efficient tool for analysis of different dimension of benefits at single measure.	We currently unable to calculate impact of clients satisfaction to net income.
Impact to total wastes				
Impact to total Time-to-Market				
Impact to total cost				

Calculations in process

45

Stage Check-List:

0. Usage of Template
☐ Fill all required fields, especially
- changed systems
- group of processes (sales, service, credit conveyor)
- new/changed functionality

1. CJM or Process Map
☐ If new process include/change more than 3 step of process and more than 2 points of decision usage of CJM or process map is mandatory
☐ All steps of process need to be described
☐ If process map contains more than 2 participants – it's mandatory to use BPMN notation.

2. Matrix of Approval
☐ Use matrix of approval for checking of new functionality with stakeholders

3. Requirements for mock-up
☐ Visual effects
If it required to use any special visual effects – please provide link or short video to sites with the same functionality
☐ Elements of control
Please highlight elements of control and show different conditions
☐ Web / Mobile
Please check how proposed page looks at web and mobile versions.
☐ Colors
In case of usage of new types of colors – please provide codes of colors
☐ Alignment with BRD
In case of change of functionality please check it with author of BRD doc.

Linked Wastes:

1. Over/Incorrect Processing
Rework due to poor preparation of requirements.

2. Unnecessary movement
Excess communication due to lack of requirements formalization.

Implemented Tools:

1. Templates and User-Stories / Mock-Ups Usage
Usage of templates (f.e. BRD - Business Requirements Document) allows to analyst remember about all important points of analysis, and to user of document – easier navigate through it.

2. CJM and Process Map Usage
Preparing of Client Journey Map and Process Map (for example in BPMN notation) allows to easier understand a process and interrelationship between it parts.

3. Matrix of Approvals
If we change several fields of process we need to approve it with stakeholders.

4. Stage check-list usage / Deadlines settings
Usage of check-list as a part of template allow to remember about important details and deadlines. Feedback of System analysts and developers used for templates preparing.

Indicator	AS IS	TO BE	PRO	CONS
Cost of stage (average, m/h)	X		- Decrease of excess communications at next steps - It's easier for analysts to remember about important details	- Analysts resistant to new rules due to increase of level of their work. - Necessity of training for analysts for usage of mock-ups tools (f.e. figma).
Impact to total wastes				
Impact to total Time-to-Market				
Impact to total cost				

Calculations in process

46

Stage Check-List:

0. Data Model
- ☐ Description of changes and integration for fields
- ☐ Integration map

1. Functional map
- ☐ Extended description of systems deviation

2. System map
- ☐ Description of required for use system elements (plugins, services,..) and changes linked to it

3. Preliminary settings
- ☐ Our system (Dynamics CRM) allow to system analysts create part of new process steps and system objects without development

4. Interrelationship analysis
- ☐ Analysis of common usage of system elements between different teams.

Linked Wastes:

1. Over/Incorrect Processing
Rework due to poor preparation of requirements.

2. Unnecessary movement
Excess communication due to lack of requirements formalization.

3. Inventory
Incomplete / Partial work done.

Implemented Tools:

1. Wiki for log of used modules and changes
Allow to different teams understand common changes

2. Data Maps
If system requirements document (SRD) contains changes or integration more than 5 fields.

3. Templates and check-list for analysis
Usage of templates for providing of analysis of different systems. Usage of required deadlines and priorities for analysis.

4. Additional learning
Alignment of knowledge base between analysts (sql, databases, basic principles of development) for their ability to prepare more useful for developers technical requirements.

Indicator	AS IS	TO BE	PRO	CONS
Cost of stage (average, m/h)	X		Decrease of wastes at further steps	Necessity of additional training for analysts
Impact to total wastes				
Impact to total Time-to-Market				
Impact to total cost				

Calculations in process

47

Tools implementation at Product Development Stages: Stage 5: Development

Linked Wastes:

1. Inventory
Incomplete / Partial work done

2. Transportation
Task switching

3. Defects
Software Errors

4. Unnecessary movement
Excess communication due to lack of requirements formalization.

Implemented Tools:

1. Auto-tests
Usage of auto-test for basic functions decrease time for overall testing of work of the whole system.
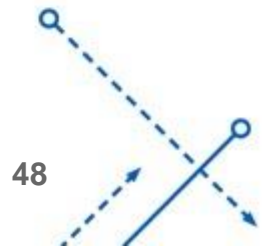
2. Feedback Analysis
We included to our process flow system field for feedback of developers about lack of information at system requirements. It allow to system analysts correct their work.

! We identified some needs for implementing of software engineering practices like continuous delivery and continuous integration, devops, but implementation of tolls such these out of scope of the project. We will include that proposals to to do list for post-project stage.

Indicator	AS IS	TO BE	PRO	CONS
Cost of stage (average, m/h)	X		- Decreasing of time of testing. - Decreasing of level of errors.	- Additional time for building of auto-tests. - Not all analysts are happy to receive feedback.
Impact to total wastes				
Impact to total Time-to-Market		Calculations in process		
Impact to total cost				

Linked Wastes:

1. Unnecessary movement
Excess communication due to lack of requirements formalization.

Implemented Tools:

1. Including of testers to stage of system requirements approval
Participation of testers at system requirements preparing allow to predict problems of testing and include requirement system objects for automatical testing.

2. Auto-test usage
Usage of automatical tests requires time for tests development, but decreases time spending and time to market at future.

3. Beta Tests with User-Group
Proposal to members of User Group to participate at beta-test allow to find hidden bugs.

4. Learning for B2C team
We don't' have a tester at B2C team, but for decrease of impact of lack of that knowledge at team we provided a training for business and system analysts. Also we will include proposal of including of additional team member for consistency of team to to do plan for post-project stage.

Indicator	AS IS	TO BE	PRO	CONS
Cost of stage (average, m/h)	X		- Decreasing of time of testing.	- Additional time for building of auto-tests.
Impact to total wastes				
Impact to total Time-to-Market		*Calculations in process*		
Impact to total cost				

Tools implementation at Product Development Stages: Stage 7: Launching

Linked Wastes:

1. Unnecessary movement
Excess communication due to lack of requirements formalization.

Implemented Tools:

1. Preparing of learning materials
We analyzed that usually teams provide communications about changes without convenient learning materials. It's cause additional communications after implementation.

We were unable to prepare a template for learning materials due to lack of resources.

Low Result

Even with understanding of key steps of process for improvement we try to improve all. As a result we implemented too minor improvements at non-important stages and spent time required for major improvements.

Indicator	AS IS	TO BE	PRO	CONS
Cost of stage (average, m/h)	X		N/A	N/A
Impact to total wastes				
Impact to total Time-to-Market				
Impact to total cost				

Calculations in process

Linked Wastes:

1. Unnecessary movement
Excess communication due to lack of requirements formalization

Implemented Tools:

1. Usage of Change Management principles
We provided a training about basic change management principles.

We were unable to prepare a template or check-list for that stage due to lack of resources.

Low Result

Even with understanding of key steps of process for improvement we try to improve all. As a result we implemented too minor improvements at non-important stages and spent time required for major improvements.

Indicator	AS IS	TO BE	PRO	CONS
Cost of stage (average, m/h)	X		N/A	N/A
Impact to total wastes				
Impact to total Time-to-Market				
Impact to total cost				

Calculations in process

51

Tools implementation at Product Development Stages: Stage 9: Monitoring

Linked Wastes:

1. Overproduction
Development of features that users don't need

Implemented Tools:

1. Training about post-implementation monitoring
We identified that users don't use a part of functionality. We provided a training for teams about principles of post-implementing monitoring.

We were unable to prepare data models and charts for monitoring due to lack of resources.

Low Result

Even with understanding of key steps of process for improvement we try to improve all. As a result we implemented too minor improvements at non-important stages and spent time required for major improvements.

Indicator	AS IS	TO BE	PRO	CONS
Cost of stage (average, m/h)	X		N/A	N/A
Impact to total wastes				
Impact to total Time-to-Market				
Impact to total cost				

Calculations in process

Phase 3 Part 1 Reflections

Our mistakes:

- Even with understanding of key steps of process for improvement we try to improve all. As a result we implemented too minor improvements at non-important stages and spent time required for major improvements.

Lessons learned and External factors:

- We met resistance of several members of teams against of changes.
  It's a sign of our insufficient efforts of change management.
- Several tools were ineffective. At one hand it's permissible at pilot stage.
  At other hand – it's a sign of our poor preliminary analysis.
- During our project team was involved to a process of political and structure changes at the Bank.
  It's was an obstacle for seamless implementing of tools and clear process of measurements.
- It's difficult to use all Lean 6 Sigma tools if we analyze creative process. For example we were unable to use multi-factors analysis and ask team to use tools at 2^K*R variations. Also each creative task contains non-controlled variable (for example mood and overall condition of employee (for example if any developer spent all night for computer gaming)).

Phase 3 Part 2 Expectations

Data analysis:

- Merge all collected data to a single model with analysis of 4 dimensions at each step of process: cost of stage, impact to overall wastes, impact to overall Time-to-Market, impact to overall cost of a process

Purposes of the stage:

- Final analysis of all qualitative and quantitative data

- Final analysis of overall results and lessons learned

- Project Closing

- To Do for after-project stage including framework of sustainability of implemented improvements

- Reflections about overall project

Thank You!

The Capstone Project:

Increasing of a cost efficiency of a software development at creation of self-services channels at a commercial bank.

Phase III: Implementation & Evaluation

Part 2: Evaluation and Overall Conclusion

Based on project at Worldwide Banking group,
Author: Igor Dmitriev

Agenda

Topics of the presentation:

- Analysis of the Project's results

- Proposals for after-project stages

- The project retrospective analysis

The third phase of the project is about

ensuring the sustainability of the implemented

improvements...

* wastes Creation (%) - cumulative indicator - remark for overall task weighted on probability, caused by defects of process at that stage

AS IS	1. Creation of Ideas	2. Ideas Validation	Sum of 1+2	3. Ideas Prioritization	4. Business Analysis	5. Prototyping	Sum of 4 + 5	6. System Analysis	7. Development	8. Testing	9. Launching	10. Roll-out	11. Monitoring	Total wastes (sum at stages + overall for all stages)	Total + Weighted Rework
B2C															
Cost (M/H)	4	2	6	0,5	14	4	18	15	50	30	5	3	4	131,5	147,977
PO	1	1	2	0,5	2	1	3	1	0	2	2	1	1		
BA	2	1	3	0	8	2	10	4	6	16	3	2	2		
UX/UI	0	0	0	0	0	0	0	0	0	0	0	0	0		
Test.	0	0	0	0	0	0	0	0	0	0	0	0	0		
SA	1	0	1	0	4	1	5	8	12	8	0	0	1		
Devel.	0	0	0	0	0	0	0	2	32	4	0	0	0		
Wastes Creation (%)		4,80%	4,80%		0,93%	1,40%	2,33%	1,81%	0,43%	2,06%				12,53%	16,48
Time to Market (days)	1	1	2	1	2	1	3	3	6	3	1	1	1		21
B2B															
Cost (M/H)	8	2	10	0,5	30	10	40	30	37	41	8	6	11	183,5	205,2448
PO	2	1	3	0,5	2	2	4	1	0	1	2	2	3		
BA	4	1	5	0	16	4	20	8	4	8	6	4	6		
UX/UI	0	0	0	0	4	2	6	1	0	0	0	0	0		
Test.	0	0	0	0	0	0	0	0	1	16	0	0	0		
SA	2	0	2	0	8	2	10	16	8	8	0	0	2		
Devel.	0	0	0	0	0	0	0	4	24	8	0	0	0		
Wastes Creation (%)		1,56%	1,56%		2,25%	3,18%	5,43%	2,79%	0,33%	0,44%				11,85%	21,74
Time to Market (days)	1	1	2	1	3	1	4	4	5	3	1	1	2		23
Cost (Average)	6	2	8	0,5	22	7	29	22,5	43,5	35,5	6,5	4,5	7,5	157,5	176,6109
Wastes		3,18%	3,18%		1,59%	2,29%	3,88%	2,30%	0,38%	1,25%					12,19%
Time to Market	1,0	1,0	2,0	1,0	2,5	1,0	3,5	3,5	5,5	3,0	1,0	1,0	1,5		22

To Be			1. Creation and validation of Ideas	2. Ideas Prioritization			3. Business Analysis and Prototyping	4. System Analysis	5. Development	6. Testing	7. Launching	8. Roll-out	9. Monitoring	Total wastes (sum at stages + overall for all stages)	Total + Weighted Rework
B2C															
Cost (M/H)			9	0,5			24	21	38	17	5	3	7	124,5	132,5801
PO			3	0,5			4	1	0	1	2	1	2		
BA			4	0			14	5	2	10	3	2	4		
UX/UI			0	0			0	0	0	0	0	0	0		
Test.			0,5	0			0	1	0	0	0	0	0		
SA			1	0			6	10	8	4	0	0	1		
Devel.			0,5	0			0	4	28	2	0	0	0		
Wastes Creation (%)			1,90%				1,10%	0,70%	0,35%	1,34%				6,49%	8,08
Time to Market (days)			1,5	0,5			3	3	4	3	1	1	1		18
B2B															
Cost (M/H)			14,5	0,5			48	37	29	29	8	6	14	186	196,3602
PO			4	0,5			6	1	0	1	2	2	4		
BA			7	0			22	10	2	6	6	4	8		
UX/UI			0,5	0			8	1	0	0	0	0	0		
Test.			0,5	0			0	1	1	12	0	0	0		
SA			2	0			12	18	6	6	0	0	2		
Devel.			0,5	0			0	6	20	4	0	0	0		
Wastes Creation (%)			0,40%				2,14%	1,30%	0,24%	0,19%				5,57%	10,36
Time to Market (days)			2	0,5			4	4	3	3	1	1	2		20,5
Cost (Average)			11,75	0,5			36	29	33,5	23	6,5	4,5	10,5	155,25	164,4701
Wastes			1,15%				1,62%	1,00%	0,30%	0,77%					6,03%
Time to Market			1,8	0,5			3,5	3,5	3,5	3,0	1,0	1,0	1,5		19,25
Resulted Workload Shifting			46,88%	0,00%			24,14%	28,89%	-22,99%	-35,21%	0,00%	0,00%	40,00%	-1,43%	-6,87%
Wastes (Change)			-2,03%	0,00%			-2,26%	-1,30%	-0,09%	-0,49%	0,00%	0,00%	0,00%		-50,53%
Time to Market (Change)			-12,50%	-50,00%			0,00%	0,00%	-36,36%	0,00%	0,00%	0,00%	0,00%		-12,50%
Planned Workload Shifting (Change)			3%				7%	5%	-6%	-12%					-2%

Goal of the Project	% of fulfiment
-5%	-6,87%
	-50,53%
-10%	-12,50%

Analysis of the Project's results

1. Cost (Man/Hours)
2. Weighted Wastes
3. Time to market

Weighted cost of reference task (with average value of rework)

Steps of the process

Data Model:

- Analysis of several dimensions of data (cost, wastes, TTM) and their overall results.
- Analysis of teams separately
- Specific value of weighted wastes (probability of wastes * % of total rework caused by errors at stage).

* wastes Creation (%) - cumulative indicator - remork for overall task weighted on probability, caused by defects of process at that stage

AS IS	1. Creation of Ideas	2. Ideas Validation	Sum of 1+2	3. Ideas Prioritization	4. Business Analysis	5. Prototyping	Sum of 4 + 5	6. System Analysis	7. Development	8. Testing	9. Launching	10. Roll-out	11. Monitoring	Total wastes (sum at stages + overall for all stages)	Total + Weighted Rework
B2C															
Cost (M/H)	4	2	6	0,5	14	4	18	15	50	30	5	3	4	131,5	147,977
PO	1	1	2	0,5	2	1	3	1	0	2	2	1	1		
BA	2	1	3	0	8	2	10	4	6	16	3	2	2		
UX/UI	0	0	0	0	0	0	0	0	0	0	0	0	0		
Test.	0	0	0	0	0	0	0	0	0	0	0	0	0		
SA	1	0	1	0	4	1	5	8	12	8	0	0	1		
Devel.	0	0	0	0	0	0	0	2	32	4	0	0	0		
Wastes Creation (%)		4,80%	4,80%		0,93%	1,40%	2,33%	1,81%	0,43%	2,06%				12,53%	16,48
Time to Market (days)	1	1	2	1	2	1	3	3	6	3	1	1	1		21
B2B															
Cost (M/H)	8	2	10	0,5	30	10	40	30	37	41	8	6	11	183,5	205,2448
PO	2	1	3	0,5	2	2	4	1	0	1	2	2	3		
BA	4	1	5	0	16	4	20	8	4	8	6	4	6		
UX/UI	0	0	0	0	4	2	6	1	0	0	0	0	0		
Test.	0	0	0	0	0	0	0	0	1	16	0	0	0		
SA	2	0	2	0	8	2	10	16	8	8	0	0	2		
Devel.	0	0	0	0	0	0	0	4	24	8	0	0	0		
Wastes Creation (%)		1,56%	1,56%		2,25%	3,18%	5,43%	2,79%	0,33%	0,44%				11,85%	21,74
Time to Market (days)	1	1	2	1	3	1	4	4	5	3	1	1	2		23
Cost (Average)	6	2	8	0,5	22	7	29	22,5	43,5	35,5	6,5	4,5	7,5	157,5	176,6109
Wastes		3,18%	3,18%		1,59%	2,29%	3,88%	2,30%	0,38%	1,25%					12,19%
Time to Market	1,0	1,0	2,0	1,0	2,5	1,0	3,5	3,5	5,5	3,0	1,0	1,0	1,5		22

Analysis of the Project's results

1. removal of stages

2. Planned workload shifting was lower

Results:

- Goals of the Project achieved:

✓ Cost reduction -6,87% / 5%

✓ TTM reduction -12,5% / 10%

✓ Also -50,53% reduction of wastes

To Be		1. Creation and validation of Ideas	2. Ideas Prioritization		3. Business Analysis and Prototyping	4. System Analysis	5. Development	6. Testing	7. Launching	8. Roll-out	9. Monitoring	Total wastes (sum at stages + overall for all stages)	Total + Weighted Rework
B2C													
Cost (M/H)		9	0,5		24	21	38	17	5	3	7	124,5	132,5801
PO		3	0,5		4	1	0	1	2	1	2		
BA		4	0		14	5	2	10	3	2	4		
UX/UI		0	0		0	0	0	0	0	0	0		
Test.		0,5	0		0	1	0	0	0	0	0		
SA		1	0		6	10	8	4	0	0	1		
Devel.		0,5	0		0	4	28	2	0	0	0		
Wastes Creation (%)		1,90%			1,10%	0,70%	0,35%	1,34%				6,49%	8,08
Time to Market (days)		1,5	0,5		3	3	4	3	1	1	1		18
B2B													
Cost (M/H)		14,5	0,5		48	37	29	29	8	6	14	186	196,3602
PO		4	0,5		6	1	0	1	2	2	4		
BA		7	0		22	10	2	6	6	4	8		
UX/UI		0,5	0		8	1	0	0	0	0	0		
Test.		0,5	0		0	1	1	12	0	0	0		
SA		2	0		12	18	6	6	0	0	2		
Devel.		0,5	0		0	6	20	4	0	0	0		
Wastes Creation (%)		0,40%			2,14%	1,30%	0,24%	0,19%				5,57%	10,36
Time to Market (days)		2	0,5		4	4	3	3	1	1	2		20,5
Cost (Average)		11,75	0,5		36	29	33,5	23	6,5	4,5	10,5	155,25	164,4701
Wastes		1,15%			1,62%	1,00%	0,30%	0,77%					6,03%
Time to Market		1,8	0,5		3,5	3,5	3,5	3,0	1,0	1,0	1,5		19,25
Resulted Workload Shifting		46,88%	0,00%		24,14%	28,89%	-22,99%	-35,21%	0,00%	0,00%	40,00%	1,43%	-6,87%
Wastes (Change)		-2,03%	0,00%		-2,26%	-1,30%	-0,09%	0,49%	0,00%	0,00%	0,00%		-50,53%
Time to Market (Change)		-12,50%	-50,00%		0,00%	0,00%	-36,36%	0,00%	0,00%	0,00%	0,00%		-12,50%
Planned Workload Shifting (Change)		3%			7%	5%	-6%	-12%			-2%		

Goal of the Project	% of fulfiment
-5%	-6,87%
	-50,53%
-10%	-12,50%

To Be			1. Creation and validation of Ideas	2. Ideas Prioritization			3. Business Analysis and Prototyping	4.System Analysis	5.Development	6.Testing	7.Launching	8.Roll-out	9.Monitoring	Total wastes (sum at stages + overall for all stages)	Total + Weighted Rework
B2C															
Cost (M/H)			9	0,5			24	21	38	17	5	3	7	124,5	132,5801
PO			3	0,5			4	1	0	1	2	1	2		
BA			4	0			14	5	2	10	3	2	4		
UX/UI			0	0			0	0	0	0	0	0	0		
Test.			0,5	0			0	1	0	0	0	0	0		
SA			1	0			6	10	8	4	0	0	1		
Devel.			0,5	0			0	4	28	2	0	0	0		
Wastes Creation (%)			1,90%				1,10%	0,70%	0,35%	1,34%				6,49%	8,08
Time to Market (days)			1,5	0,5			3	3	4	3	1	1	1		18
B2B															
Cost (M/H)			14,5	0,5			48	37	29	29	8	6	14	186	196,3602
PO			4	0,5			6	1	0	1	2	2	4		
BA			7	0			22	10	2	6	6	4	8		
UX/UI			0,5	0			8	1	0	0	0	0	0		
Test.			0,5	0			0	1	1	12	0	0	0		
SA			2	0			12	18	6	6	0	0	2		
Devel.			0,5	0			0	6	20	4	0	0	0		
Wastes Creation (%)			0,40%				2,14%	1,30%	0,24%	0,19%				5,57%	10,36
Time to Market (days)			2	0,5			4	4	3	3	1	1	2		20,5
Cost (Average)			11,75	0,5			36	29	33,5	23	6,5	4,5	10,5	155,25	164,4701
Wastes			1,15%				1,62%	1,00%	0,30%	0,77%					6,03%
Time to Market			1,8	0,5			3,5	3,5	3,5	3,0	1,0	1,0	1,5		19,25
Resulted Workload Shifting			46,88%	0,00%			24,14%	28,89%	-22,99%	-35,21%	0,00%	0,00%	40,00%	-1,43%	-6,87%
Wastes (Change)			-2,03%	0,00%			-2,26%	-1,30%	-0,09%	-0,49%	0,00%	0,00%	0,00%		-50,53%
Time to Market (Change)			-12,50%	-50,00%			0,00%	0,00%	-36,36%	0,00%	0,00%	0,00%	0,00%		-12,50%
Planned Workload Shifting (Change)			3%				7%	5%	-6%	-12%			-2%		

Goal of the Project	% of fulfilment
-5%	-6,87%
	-50,53%
-10%	-12,50%

Decreasing of wastes was more efficient than general decreasing of usual cost of each task… It seems obvious after calculation of results, but it was not perceived at separated stages. It's a reason why support of management is important and why wide looking is mandatory.

Key Insights:

- Real workload shifting was dramatically higher than planned

- Primary cost was decreased only at 1,43%. It's was too low for teams perception as a justification of changes.

- Total wastes (causes for rework) were decreased twice! It's allow to decrease total cost of work more than at 6,87% and decrease TTM from 21-22 days to 19 days!

Proposals for after-project stages

❑ Analysis of interrelationship with other teams (Core, Products, Servicing)

❑ Implementing of post-launch monitoring

❑ Usage of Change Management principles

❑ Analysis of Change/Run process interrelationship

❑ Roll-our of best practice to other teams

❑ Analysis of waiting buffer between teams, implementing of Kanban principles

❑ Lean 6 Sigma Learning and Culture Implementing

But we understand that we need to launch improvements at step-by-step basis.


The best way of ensuring of sustainability of results – building of culture of continuous improvements.
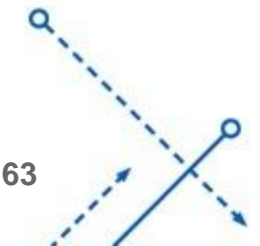
Overall Project Reflections

- ❑ Limitations of implementing of tools of work standardization at creative processes...
- ❑ But flexible agile and lean principles of process improvement are effective.
- ❑ It difficult to see overall result at narrow stage.
  It was the reason of resistance. But after presenting of results for overall process team accepted changes.
  It's a reason why we need to use both helicopter view of overall problem and deep mining of zones of development.
- ❑ It's was an insight that focus on wastes is really effective, not lower than focus at just cost of stages.
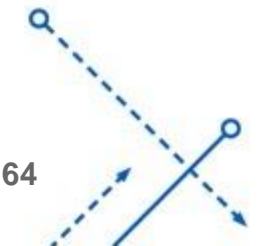
Appendix: The Project Chart

	Stages / Task	Duration	Resources	Budget	Status	2020 July	Aug.	Sept.	Oct.	Nov.	Dec.	2021 Jan.	Feb.	Mar.
Phase 1	**Stage 1. Pre-analysis and Approval Stage**	8w	management	$ 500,00	complete									
	interviews with management and teams heads	2w	man-t, staff	$ 200,00	complete									
	Preliminary analysis and calculations	3w	Project Manager	$ 100,00	complete									
	Project Charter & Bus. Case Approval	2w	PM, Man-t	$ 100,00	complete									
	Faculty Advisor Approval	1w	PM, FA	$ 100,00	complete									
Phase 2	**Stage 2. Analysis**				complete									
	Interview with stakeholders	2w	management	$ 1 000,00	complete									
	Gemba-walk (field research)	2w	teams members	$ 700,00	complete									
	Process mapping	2w	heads of teams	$ 800,00	complete									
	Interview with team-members (workshops)	2w	teams members	$ 2 000,00	complete									
	Statistics analysis	2w	statistics access	$ 1 000,00	complete									
	Report preparing	1w	Project Manager	$ 500,00	complete									
	Stage 3. Improvement													
	To be process (Solution) preparing	2w	Project Manager	$ 1 000,00	complete									
	Testing of to be process	2w	teams members	$ 1 000,00	complete									
Phase 3	**Stage 4. Pilot Mode**				complete									
	Pilot of process 1 team	1m	teams members	$ 1 500,00	complete									
	Stage 5. Roll-out				complete									
	Pilot at all teams	1m	teams members	$ 2 500,00	complete									
	Stage 6.Analysis of results				complete									
	Asis/to be analysis	2w	Project Manager	$ 500,00	complete									
	Report about results	1w	Project Manager	$ 500,00	complete									
	Proposals for post-project improvements	2w	Project Manager	$ 500,00	complete									
	Stage 7. Closing of the project	2w	management	$ 500,00	complete									
	Stage 8. Retrospective analysis of a project	2w	Project Manager	$ 500,00	complete									
	TOTAL			$ 15 500,00										

65

Thank You!