

CREATIVE ROADS

TOWARDS URBAN NATURE-BASED SOLUTIONS

By Charlotte Oldenbeuving
17th of January, 2025





Figure 1. Bishan-Ang Mo Kio Park before and after ABC Waters Programme upgrade (ASLA Professional Awards, 2016) (Photo credit to the Ramboll Studio Dreiseitl, reproduced with authorization from Ramboll Studio Dreiseitl).

COMPETING PRIORITIES FOR SPACE

NATURE-BASED SOLUTIONS (NBS)

NATURAL SOLUTIONS

ADDRESSES ENVIRONMENTAL CHALLENGES

**WHILE PROVIDING LOCAL ECONOMIC, SOCIETAL, ECOLOGICAL
BENEFITS**

MULTI-FUNCTIONAL



Figure 2. Water retention – Van Besouw - Goirle (Buro Lubbers, 2023)



Figure 3. Urban water plants - Goirle (URBAN GreenUP, 2018)

SUPPORT FOR NBS INTEGRATION

ADOPTION BY EU

CREATION OF POLICIES

RESEARCH FROM INTERDISCIPLINARY PERSPECTIVES

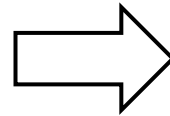
CHALLENGES FOR NBS INTEGRATION

**1) COMPLEX SOCIAL ENVIRONMENT
& UNCERTAINTY OF NATURE**

2) PRIVATE SECTOR ENGAGEMENT

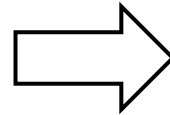
CHALLENGES FOR NBS INTEGRATION

1) COMPLEX SOCIAL ENVIRONMENT
& UNCERTAINTY OF NATURE



**WAY TO DEAL WITH UNCERTAINTY & SOCIAL
COMPLEXITY**

2) PRIVATE SECTOR ENGAGEMENT



**PERSPECTIVE OF ONE SINGLE ACTOR
WITHIN THE PRIVATE SECTOR**

RESEARCH FOCUS

1) WAY TO DEAL WITH UNCERTAINTY & SOCIAL COMPLEXITY

CREATIVITY

1) WAY TO DEAL WITH UNCERTAINTY & SOCIAL COMPLEXITY

CREATIVITY

COMPLEX PROBLEMS

1) WAY TO DEAL WITH UNCERTAINTY & SOCIAL COMPLEXITY

EMBRACING UNCERTAINTY

CREATIVITY

COMPLEX PROBLEMS

1) WAY TO DEAL WITH UNCERTAINTY & SOCIAL COMPLEXITY

SOCIAL CHANGE

EMBRACING UNCERTAINTY

CREATIVITY

COMPLEX PROBLEMS

1) WAY TO DEAL WITH UNCERTAINTY & SOCIAL COMPLEXITY

POWER DYNAMICS

SOCIAL CHANGE

EMBRACING UNCERTAINTY

CREATIVITY

COMPLEX PROBLEMS

1) WAY TO DEAL WITH UNCERTAINTY & SOCIAL COMPLEXITY

POWER DYNAMICS

CREATING NEW

SOCIAL CHANGE

EMBRACING UNCERTAINTY

CREATIVITY

COMPLEX PROBLEMS

1) WAY TO DEAL WITH UNCERTAINTY & SOCIAL COMPLEXITY

POWER DYNAMICS

CREATING NEW

SOCIAL CHANGE

EMBRACING UNCERTAINTY

TEAMWORK

CREATIVITY

COMPLEX PROBLEMS

1) WAY TO DEAL WITH UNCERTAINTY & SOCIAL COMPLEXITY

POWER DYNAMICS

CREATING NEW

SOCIAL CHANGE

EMBRACING UNCERTAINTY

TEAMWORK

CREATIVITY

COMPLEX PROBLEMS

OUTSIDE OF THE BOX THINKING

1) WAY TO DEAL WITH UNCERTAINTY & SOCIAL COMPLEXITY

POWER DYNAMICS

CREATING NEW

SOCIAL CHANGE

EMBRACING UNCERTAINTY

TEAMWORK

CREATIVITY

COMPLEX PROBLEMS

OUTSIDE OF THE BOX THINKING

INNOVATION

1) WAY TO DEAL WITH UNCERTAINTY & SOCIAL COMPLEXITY

POWER DYNAMICS

CREATING NEW

SOCIAL CHANGE

EMBRACING UNCERTAINTY

TEAMWORK

CREATIVITY

COMPLEX PROBLEMS

OUTSIDE OF THE BOX THINKING

INNOVATION

LEARNING BY DOING

PROJECT DEVELOPER

PROJECT DEVELOPER

RELEVANT KNOWLEDGE

PROJECT DEVELOPER

RELEVANT KNOWLEDGE

MANAGEMENT ABILITIES

2) PERSPECTIVE OF ONE SINGLE ACTOR WITHIN THE PRIVATE SECTOR

OPTIMISTIC

PROJECT DEVELOPER

RELEVANT KNOWLEDGE

MANAGEMENT ABILITIES

2) PERSPECTIVE OF ONE SINGLE ACTOR WITHIN THE PRIVATE SECTOR

OPTIMISTIC

IMAGINATIVE

PROJECT DEVELOPER

RELEVANT KNOWLEDGE

MANAGEMENT ABILITIES

2) PERSPECTIVE OF ONE SINGLE ACTOR WITHIN THE PRIVATE SECTOR

OPTIMISTIC

IMAGINATIVE

PRACTICAL VISION

PROJECT DEVELOPER

RELEVANT KNOWLEDGE

MANAGEMENT ABILITIES

2) PERSPECTIVE OF ONE SINGLE ACTOR WITHIN THE PRIVATE SECTOR

OPTIMISTIC

IMAGINATIVE

PRACTICAL VISION

JUDGEMENT

PROJECT
DEVELOPER

RELEVANT KNOWLEDGE

MANAGEMENT ABILITIES

2) PERSPECTIVE OF ONE SINGLE ACTOR WITHIN THE PRIVATE SECTOR

OPTIMISTIC

IMAGINATIVE

PRACTICAL VISION

JUDGEMENT

PROJECT DEVELOPER

RELEVANT KNOWLEDGE

MANAGEMENT ABILITIES

**DECISION-MAKING
ABILITIES**

2) PERSPECTIVE OF ONE SINGLE ACTOR WITHIN THE PRIVATE SECTOR

OPTIMISTIC

IMAGINATIVE

PRACTICAL VISION

COURAGE

JUDGEMENT

**PROJECT
DEVELOPER**

RELEVANT KNOWLEDGE

MANAGEMENT ABILITIES

DECISION-MAKING
ABILITIES

2) PERSPECTIVE OF ONE SINGLE ACTOR WITHIN THE PRIVATE SECTOR

OPTIMISTIC

IMAGINATIVE

THICK SKIN

PRACTICAL VISION

COURAGE

JUDGEMENT

**PROJECT
DEVELOPER**

RELEVANT KNOWLEDGE

MANAGEMENT ABILITIES

DECISION-MAKING
ABILITIES

RESEARCH QUESTION

“How can project developers organize creativity to integrate NbS into their urban development projects?”

PRESENTATION STRUCTURE

PROBLEM STATEMENT

RESEARCH QUESTION & METHODS

RESULTS

DISCUSSIONS

CONCLUSIONS

RESEARCH QUESTION & METHODS

“How can project developers organize creativity to integrate NbS into their urban development projects?”

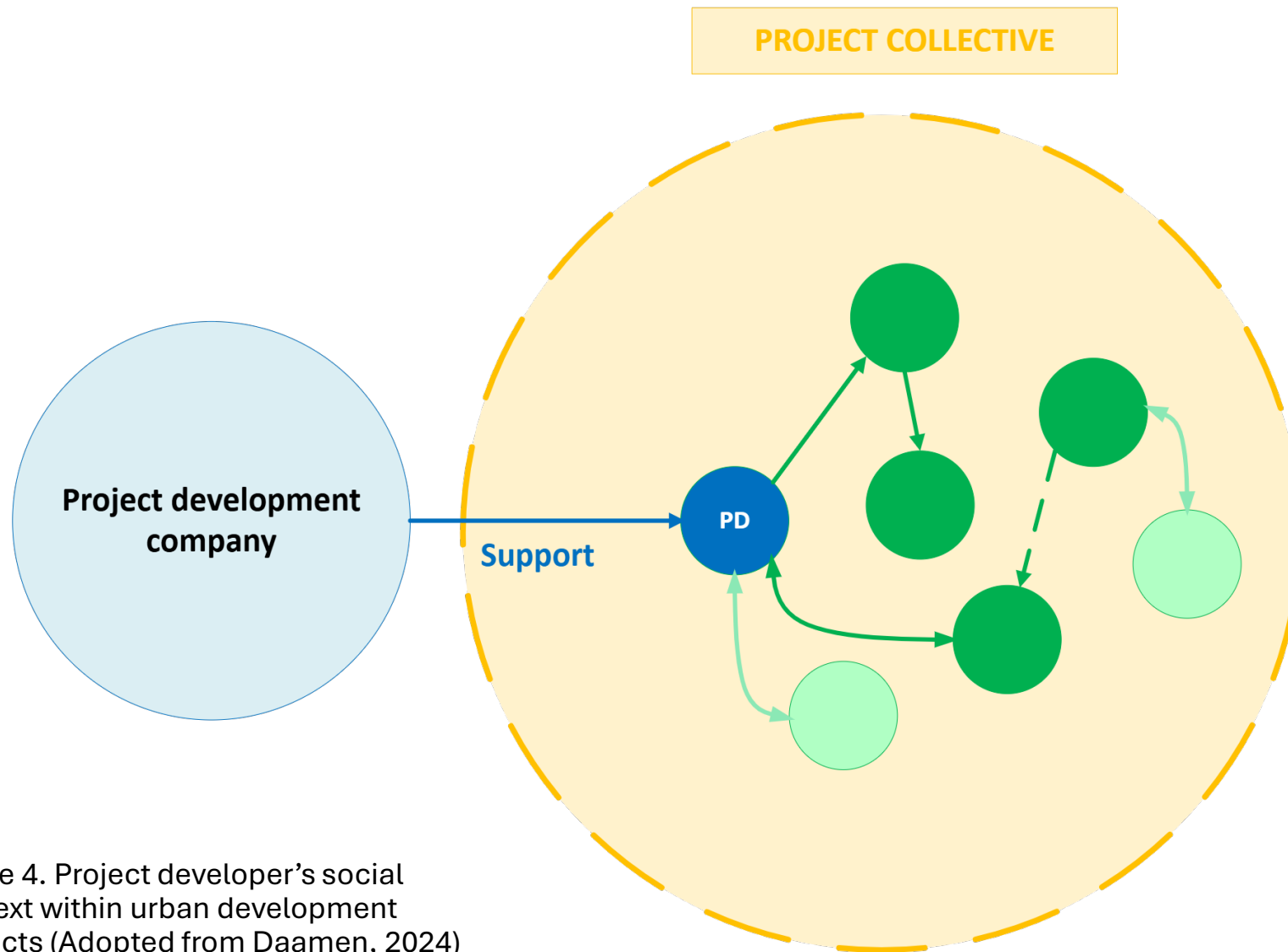


Figure 4. Project developer's social context within urban development projects (Adopted from Daamen, 2024)

“How can project developers organize creativity to integrate NbS into their urban development projects?”

PROJECT DEVELOPERS SOCIAL CONTEXT

“How can project developers organize creativity to integrate NbS into their urban development projects?”

STEP 0: THEORETICAL FRAMEWORK FOR NBS INTEGRATION

**NBS BARRIERS
AND SUCCESS
FACTORS**

(IN THEORY)

PROJECT DEVELOPERS SOCIAL CONTEXT

“How can project developers organize creativity to integrate NbS into their urban development projects?”

STEP 1: LITERATURE RESEARCH

NBS BARRIERS
AND SUCCESS
FACTORS

(IN THEORY)

ORGANIZATION OF
CREATIVITY

(IN THEORY)

PROJECT DEVELOPERS SOCIAL CONTEXT

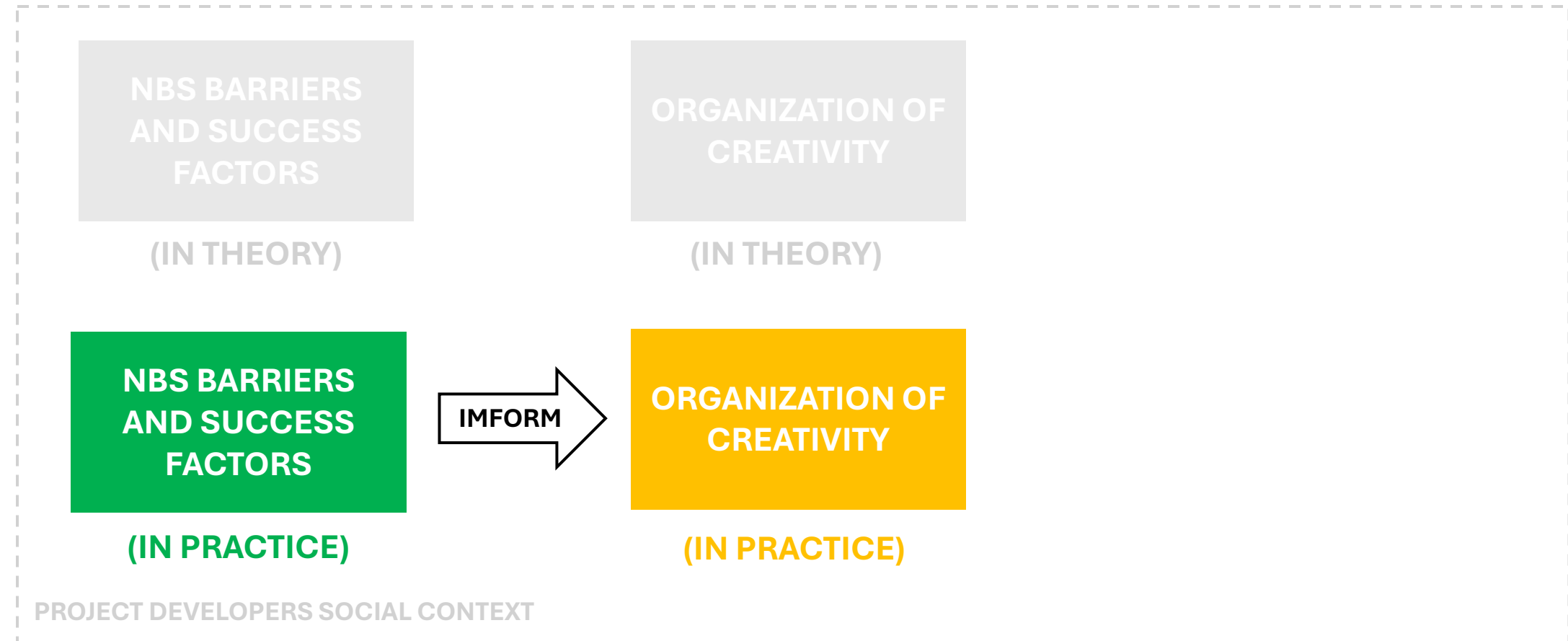
“How can project developers organize creativity to integrate NbS into their urban development projects?”

STEP 2: CASE STUDIES & CROSS-CASE ANALYSIS



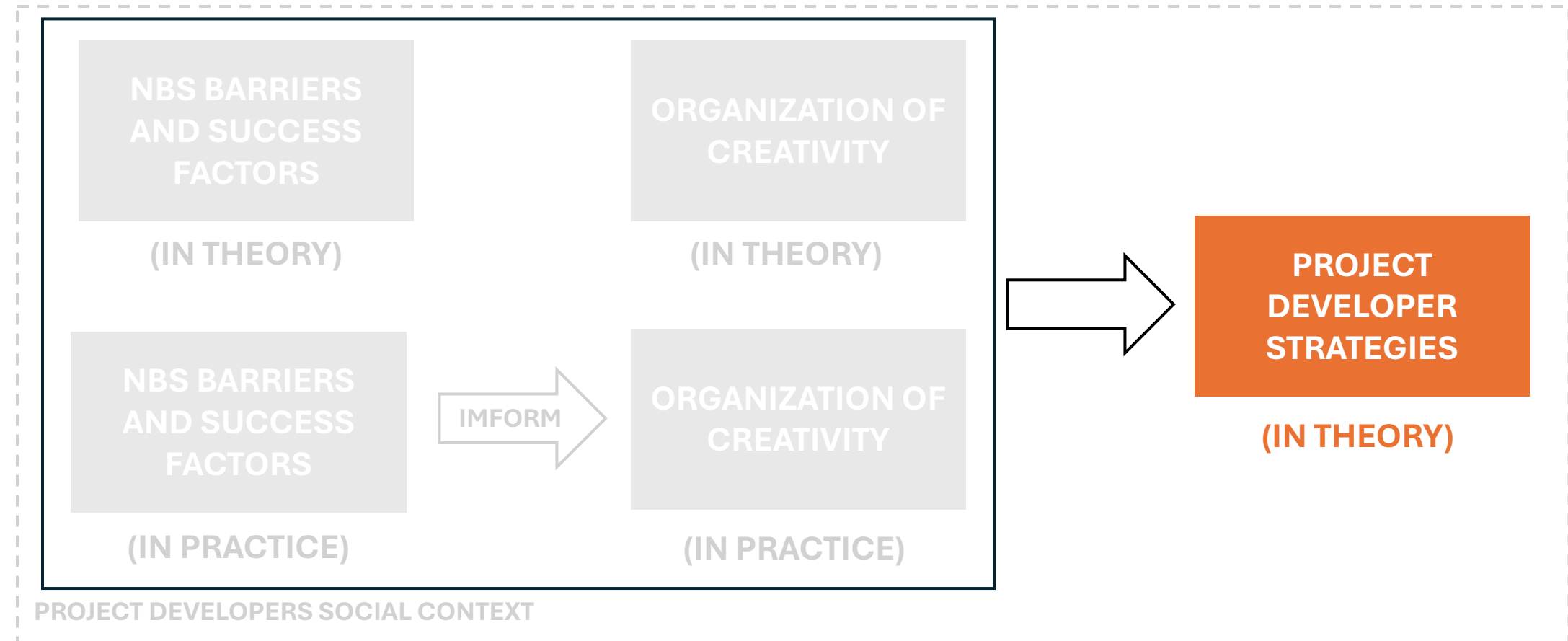
“How can project developers organize creativity to integrate NbS into their urban development projects?”

STEP 3: CASE STUDIES & CROSS-CASE ANALYSIS



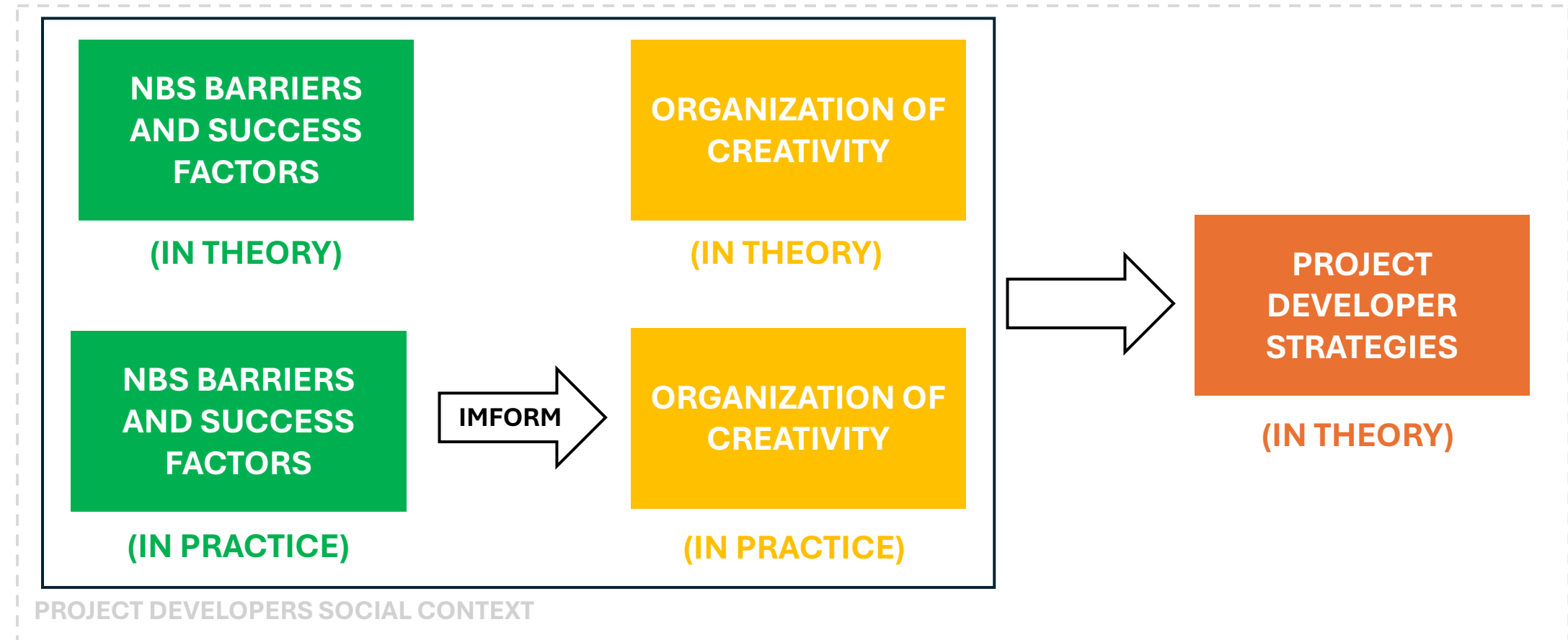
“How can project developers organize creativity to integrate NbS into their urban development projects?”

STEP 4: DATA-SYNTHESIS



“How can project developers organize creativity to integrate NbS into their urban development projects?”

STEP 5: DISCUSSIONS AND CONCLUSIONS



RESULTS

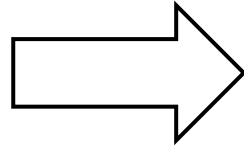
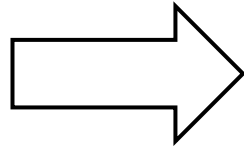
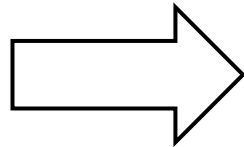
THEORETICAL FRAMEWORK FOR NBS INTEGRATION

THINKING

SAYING

DOING

(Adopted from Van Poeck et al. 2020; Stam et al. 2023)

THINKING**CONCEPTUAL****SAYING****RELATIONAL****DOING****PRACTICAL**

(Adopted from Van Poeck et al. 2020; Stam et al. 2023)

BARRIERS & SUCCESS FACTORS

NBS THINKING	For conceptual learning outcomes
NBS SAYING	For relational learning outcomes
NBS DOING	For practical learning outcomes

Figure 5. Theoretical framework for NbS Integration (Adopted from Van Poeck et al. 2020; Stam et al. 2023)

LITERATURE RESEARCH

CREATIVITY DEFENITION

PROCESS

PRODUCT

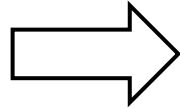
PERSON

PRESS

(The four P's; Rhodes, 1961)

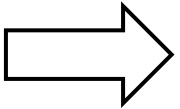
CREATIVITY DEFENITION

PROCESS



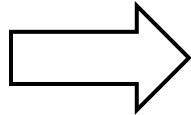
REINTEGRATION OF EXISTING MATERIAL OR KNOWLEDGE

PRODUCT



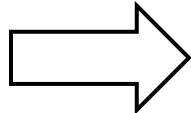
NOVEL, USEFUL, CONVINCING

PERSON



PERFORMED BY A CREATIVE PERSON

PRESS



WHO IS IN CONVERSATION WITH THEIR ENVIRONMENT

(The four P's; Rhodes, 1961)

PERSONS: CREATIVITY ON INDIVIDUAL, GROUP AND ORGANIZATIONAL LEVEL

CREATIVE SITUATIONS

CREATIVE RESOURCES (ON ALL LEVELS)

CREATIVE BEHAVIORS (ON INDIVIDUAL AND GROUP LEVEL)

(Woodman, 1993)

ORGANIZATION OF CREATIVITY BY THE PROJECT DEVELOPER

PRESS

PERSON

PROCESS

PRODUCT

PD

ORGANIZATION OF CREATIVITY BY THE PROJECT DEVELOPER

PRESS

PERSON

PROCESS

PRODUCT

**CREATIVE
SITUATION**

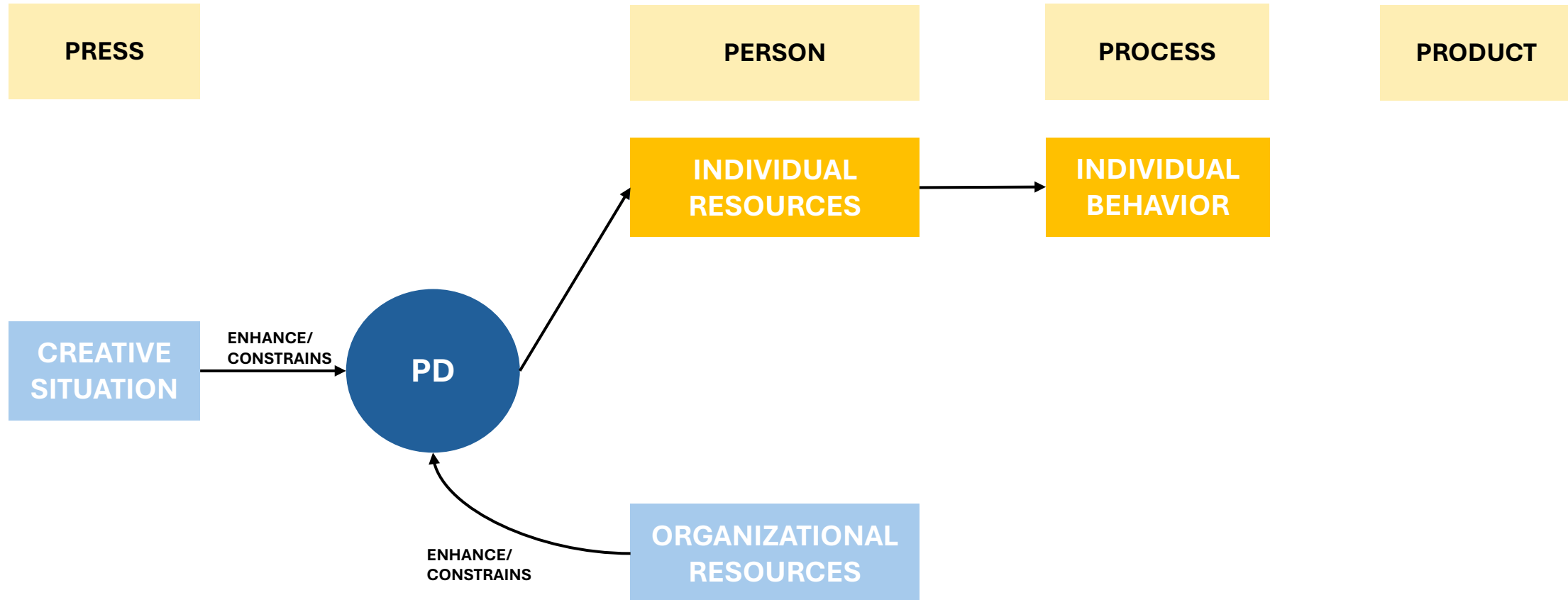
ENHANCE/
CONSTRAINS

PD

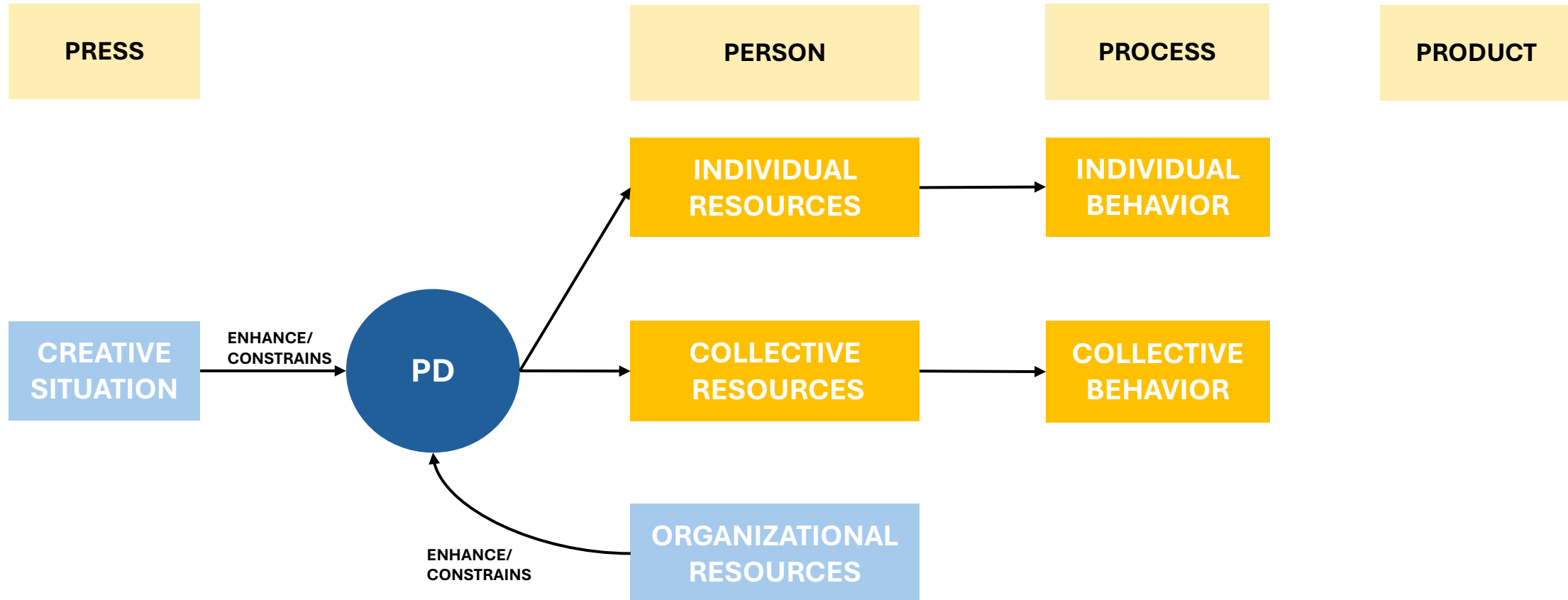
ENHANCE/
CONSTRAINS

**ORGANIZATIONAL
RESOURCES**

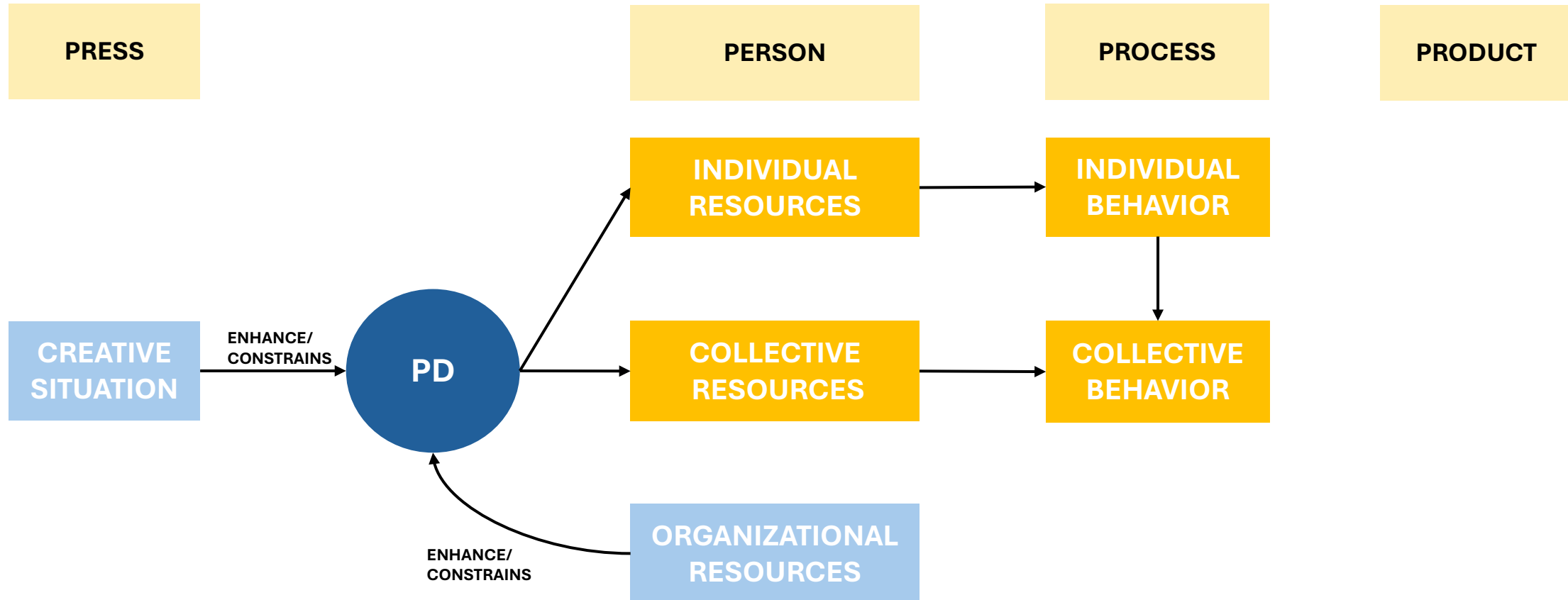
ORGANIZATION OF CREATIVITY BY THE PROJECT DEVELOPER



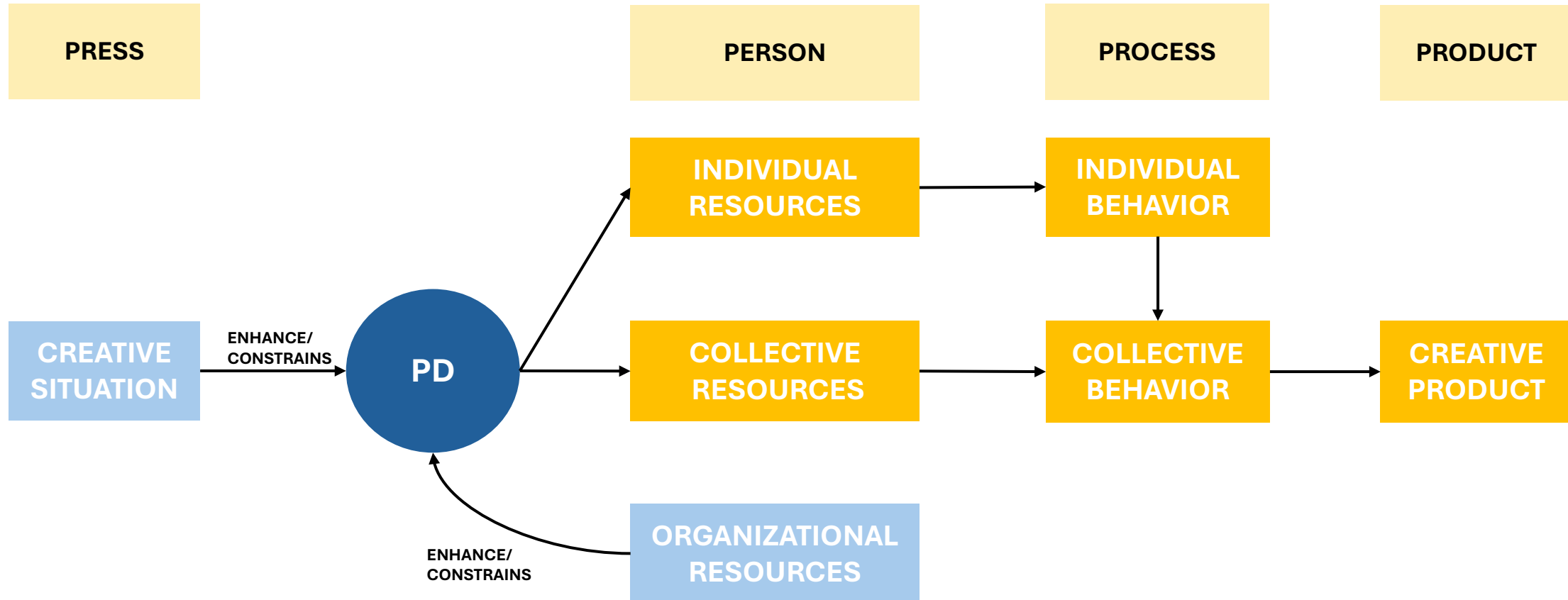
ORGANIZATION OF CREATIVITY BY THE PROJECT DEVELOPER



ORGANIZATION OF CREATIVITY BY THE PROJECT DEVELOPER



ORGANIZATION OF CREATIVITY BY THE PROJECT DEVELOPER



CASE STUDIES AND CROSS-CASE ANALYSIS

4 CASES

15 INTERVIEWS

15 MAIN STORY LINES

NBS BARRIERS

NBS BARRIERS → NBS SUCCESS FACTORS

NBS SUCCESS FACTORS

NBS THINKING, SAYING, DOING CONNECTIONS

NBS BARRIERS & SUCCESS FACTORS

BARRIER

NO SURROUNDING ECOLOGICAL STRUCTURES

“On the other hand, there is also the realization that you are dependent on what happens in the surrounding area. It remains critical because a building on its own is not a habitat for plants and animals if the surrounding, for example, the access roads are disrupted. Those roads also need to be available, so there is a dependency on third parties.” - (Steve, project developer)



Figure 6. A small green Tile within a Grey Environment (Own work)

NBS BARRIERS & SUCCESS FACTORS

BARRIER → SUCCESS FACTOR

COMMUNITY ENGAGEMENT → ENABLE AND STIMULATE

“We now see, although we don't know exactly whether it is because of that booklet, but in phase one there are already gardens that are completely green, even with trees that are not from us. So it seems that some people are really greening their gardens” (Jonas, Landscape architect)

NBS BARRIERS & SUCCESS FACTORS

SUCCESS FACTOR

COMPOSE CREATIVE RESOURCES FOR NBS

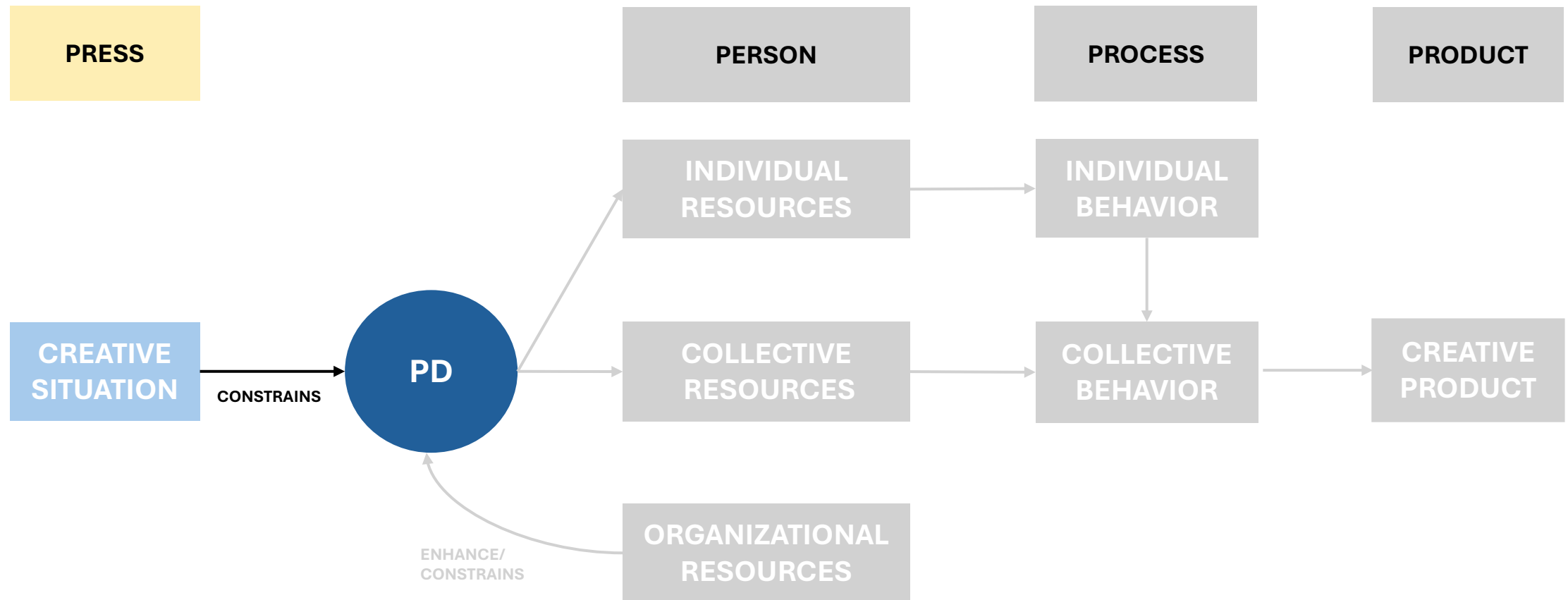
Intrinsic motivation

“Although it is not new, nature, the capacity in which we now want to integrate nature into our environment, that is indeed new... it starts with embracing that innovation and not being put off by the unknown and therefore trying to hold on to the traditional approach....if you embrace that innovative approach from day one, new ideas really emerge.” – (Anne, Project developer)

CASE STUDIES AND CROSS-CASE ANALYSIS

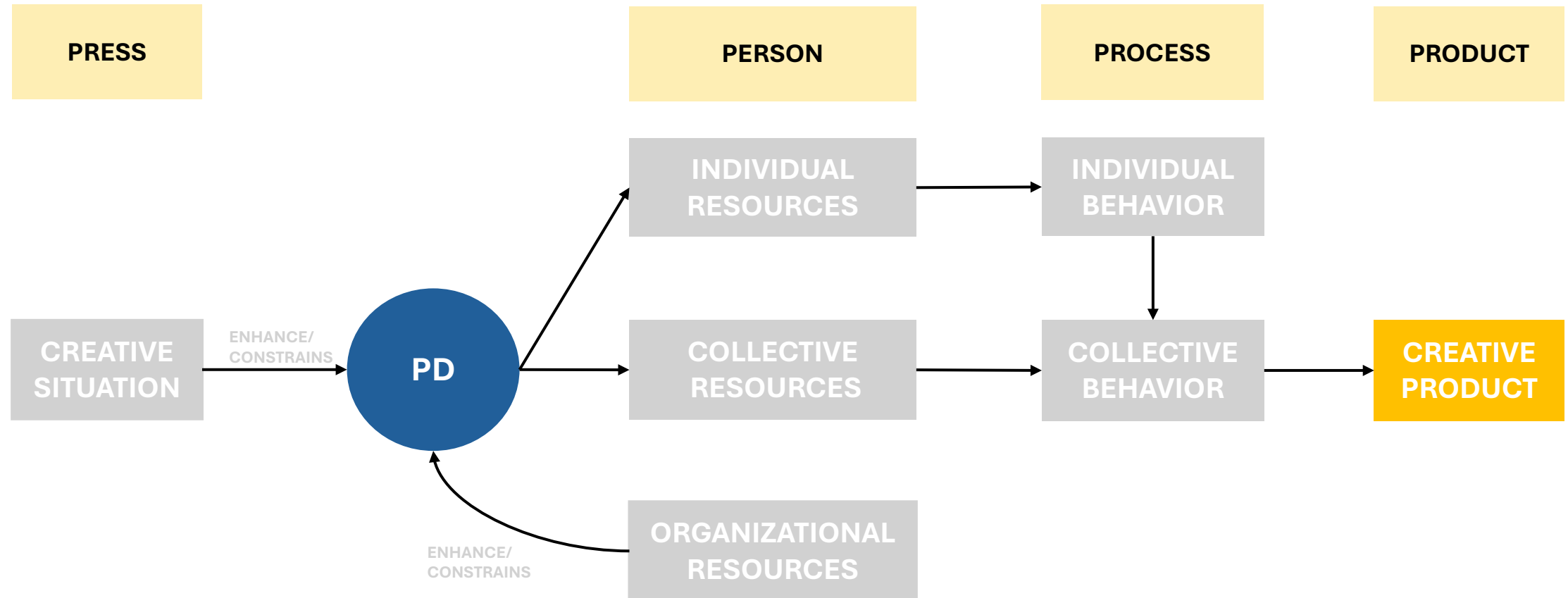
ORGANIZATION OF CREATIVITY BY THE PROJECT DEVELOPER (IN PRACTICE)

BARRIER: NO SURROUNDING ECOLOGICAL STRUCTURES



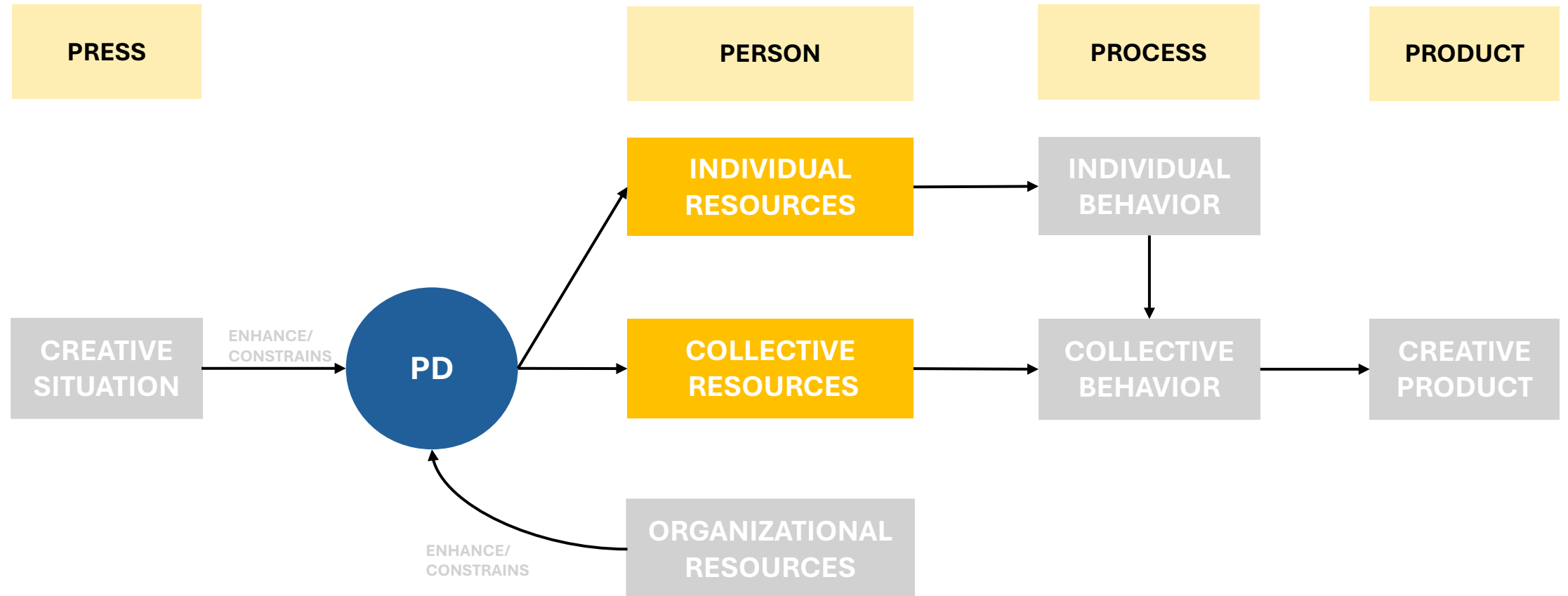
ORGANIZATION OF CREATIVITY BY THE PROJECT DEVELOPER (IN PRACTICE)

BARRIER → SUCCESS FACTOR: COMMUNITY ENGAGEMENT → ENABLE & STIMULATE



ORGANIZATION OF CREATIVITY BY THE PROJECT DEVELOPER (IN PRACTICE)

SUCCESS FACTOR: COMPOSE CREATIVE RESOURCES FOR NBS



DATA-SYNTHESIS

4C MODEL

4C MODEL

COMPOSING
CONVINCING
CONDUCTING
CONTEMPLATING

COMPOSING

CREATE ENVIRONMENT FOR NBS THINKING, SAYING & DOING

COMPOSE AMBITIONS FOR NBS, PROJECT COLLECTIVE,
MULTI-FUNCTIONAL SOLUTIONS

CASE EXAMPLE (PROJECT COLLECTIVE)

“Mismatch between architects’ ambitions and ambitions for NbS”

“I select the architect, so it’s my role to clearly state from the start that the project must be nature-inclusive, climate-adaptive, and meet specific standards. The entire project should ‘breathe green.’ Then I choose an architect who feels connected to that. I think that is an important step to safeguard the entire process.”

- (Anne, project developer)



Figure 7. (Adopted from Ssstocker. (n.d.)

NBS SUCCESS FACTOR: COMPOSE CREATIVE RESOURCES FOR NBS
ORGANIZATION OF CREATIVITY: CHOOSE COLLECTIVE RESOURCES

CONVINCING

CONVINCE ACTORS TOWARDS NBS THINKING, SAYING & DOING

CONVINCE THE JUDGES TO GET APPROVAL, ENABLE, STIMULATE

CASE EXAMPLE (ENABLE)

“Parking-norms of the municipality vs Space for NbS”

“... you have a book and it’s called the right of the fastest.... we were working on the public design of Berckelbosch and someone from the municipality was quite focused on traffic rules. We were in the aquarium and there was this book ...we gave it to them.... And at the next meeting he came: “yes, I have thought about it, we can also.....’then he started looking for space within his own frameworks.”

- (Lily, developer)

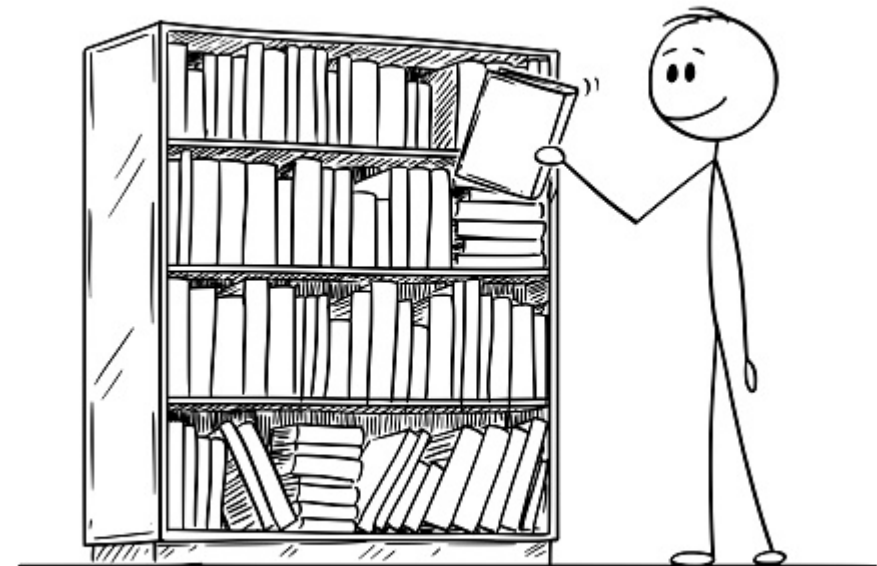


Figure 8. (Ursus, n.d.)

NBS BARRIER – SUCCESS FACTOR: PRIORITIZING COMMON PRACTICE (DESIGN PHASE)

ORGANIZATION OF CREATIVITY: INDIVIDUAL BEHAVIOR → COLLECTIVE BEHAVIOR

CONDUCTING

DOING AN ACTIVITY FOR NBS THINKING, SAYING & DOING TO MAKE SOMETHING HAPPEN

CONDUCT BY MONITORING, ADAPTIVE RESPONSE, ITERATING

CASE EXAMPLE (RESPONDING ADAPTIVE)

“The frog incident at Wickevoorst construction site”

“In a partial plan, we made the ground ready for construction, and at one point the ground was a bit sandy. There was a risk that there might be protected frogs in that area... which ultimately caused a 7-month delay in that partial plan.....Well, I did learn from it, because you can also deal with it in a very creative way...Then you let pigs or goats or sheep walk around in that area or partial plan: and they are allowed to eat those frogs” - (Lucas, area developer)

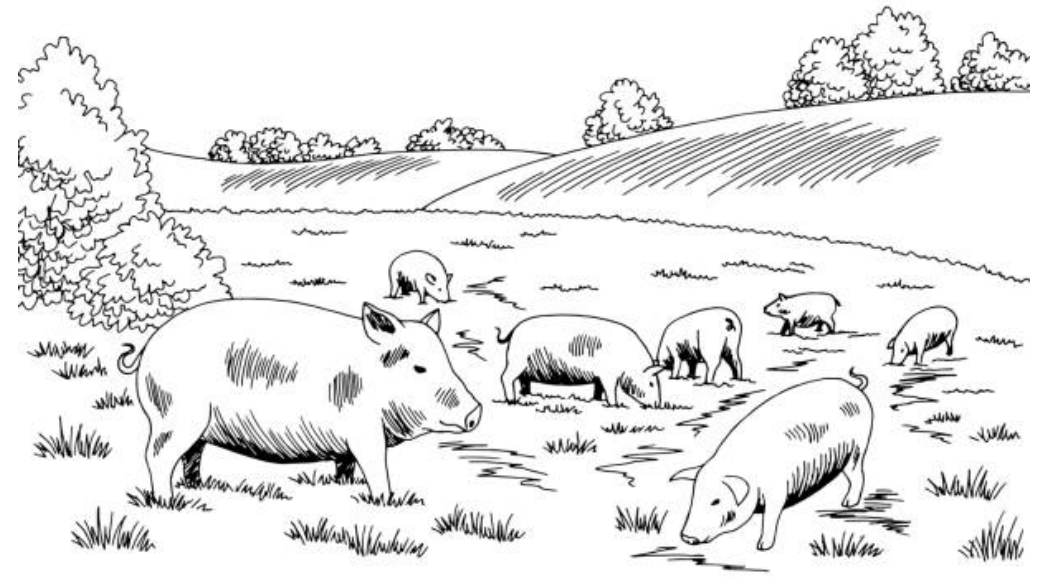


Figure 9. (Akifeva, 2020)

NBS BARRIER – SUCCESS FACTOR: PRIORITIZING COMMON PRACTICE (CONSTRUCTION-SITE)
ORGANIZATION OF CREATIVITY: INDIVIDUAL BEHAVIOR

CONTEMPLATING

SPEND TIME CONSIDERING POSSIBLE FUTURE NEEDS OF NBS THINKING, SAYING & DOING

CONTEMPLATE PROACTIVELY BY ORGANIZING EVENTS, JOINING (EXTERNAL EVENTS), CHANGING ENVIRONMENT

CASE EXAMPLE (ORGANIZING EVENTS)

“From implementing Hero biodiversity scan towards education of approach Dutch Biodiversity collabs”

“We used a Jenga tower as a model for biodiversity in the Netherlands....we had cards with everything we do wrong for biodiversity in the Netherlands....When that came up, the players had to push blocks out of the tower.....and finally, when the tower fell: “biodiversity Collapse”. Then we went on to say that that is really coming and explained how you can use the scan to counteract that in your projects. I've never had such positive reactionsthe most traditional colleagues really said: "I'm going to do it completely differently.”
(Olivia, Sustainability advisor)

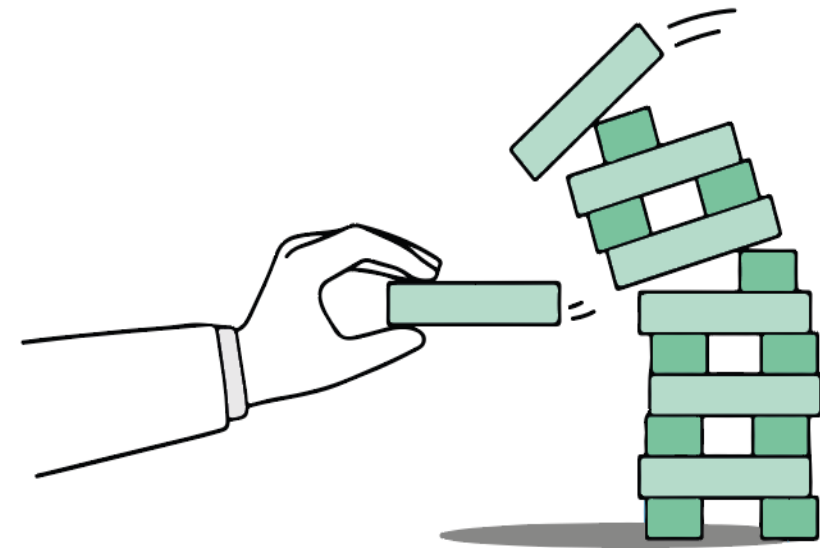
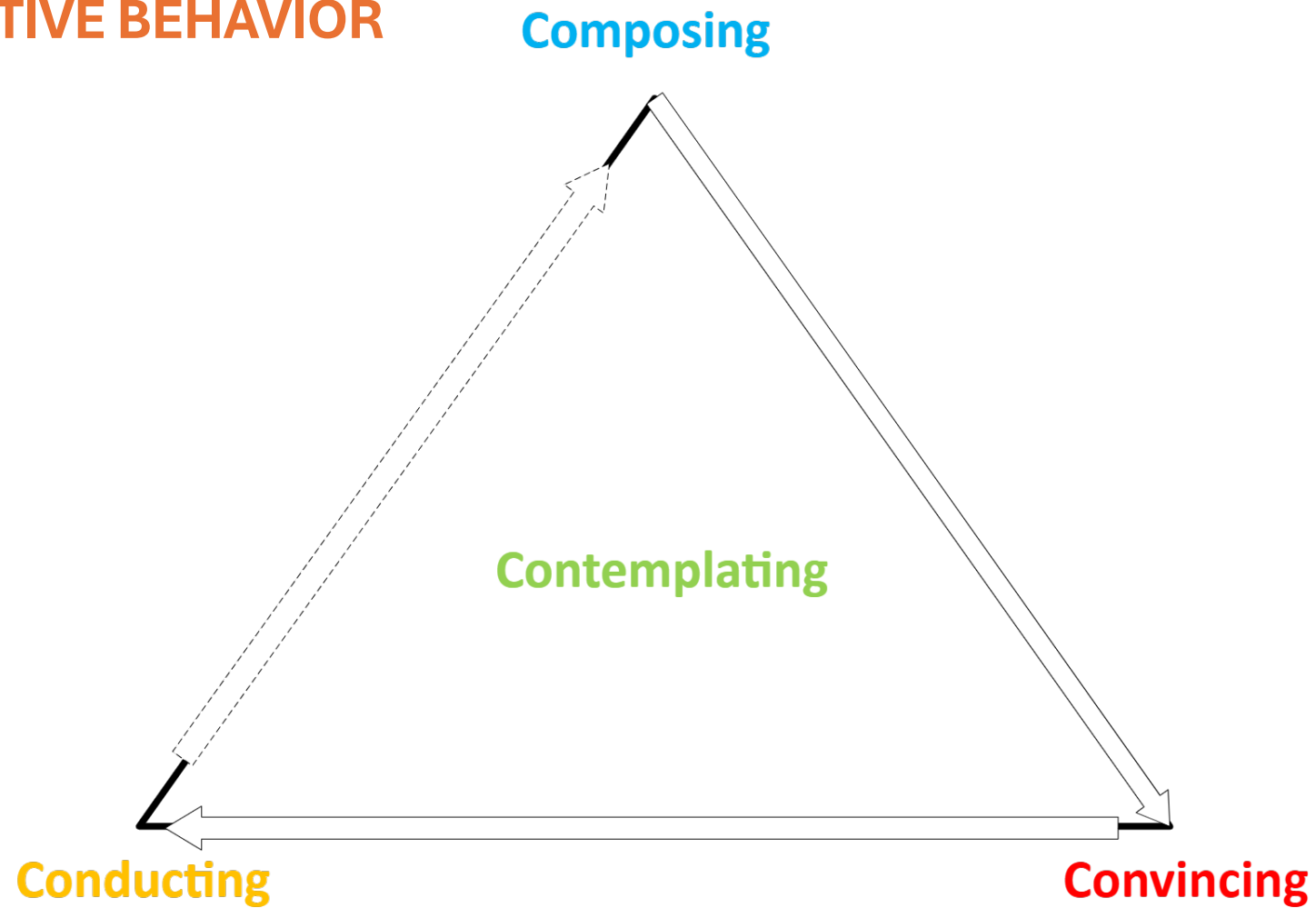


Figure 10. (Vecteezy, n.d)

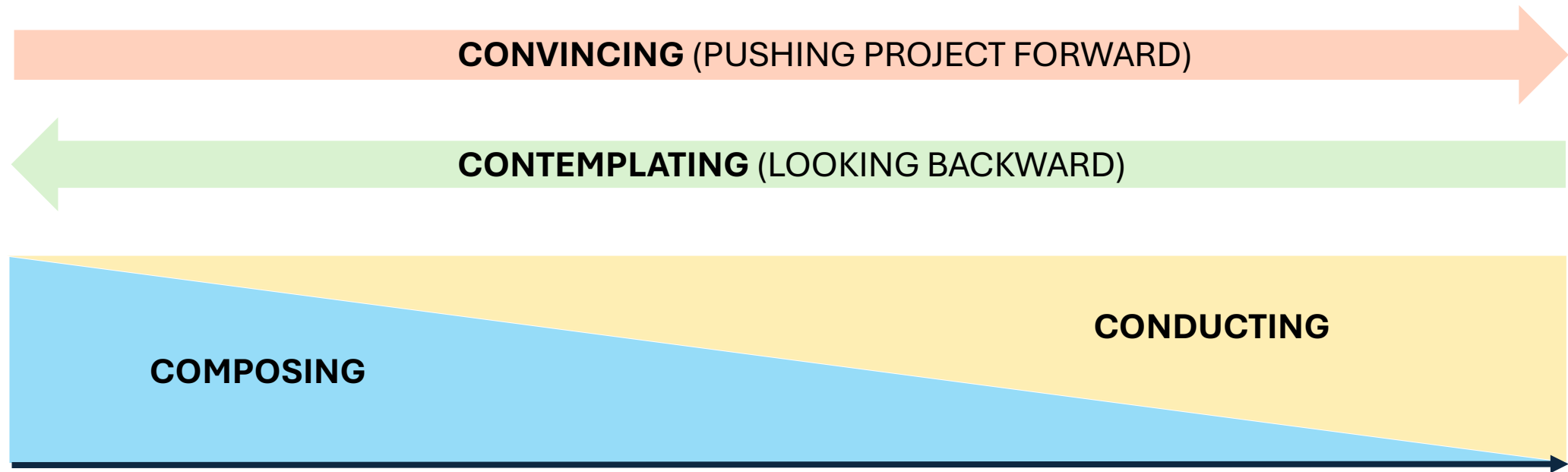
OUTCOME DATA SYNTHESIS

ORGANIZATION OF CREATIVITY: INDIVIDUAL BEHAVIOR → ORGANIZATION BEHAVIOR

PROACTIVE BEHAVIOR



PROACTIVE BEHAVIOR



Time line – Urban Development project

REACTIVE BEHAVIOR

CONTINUES PROCESS OF JUMPING FROM CONDUCTING TO CONVINCING TO COMPOSING AS ADAPTIVE RESPONSE TO EVENTS THAT ARE PROMISING OR CHALLENGING

CASE EXAMPLE (FROM CONDUCTING TO CONVINCING TO COMPOSING)

“Hero originates from the Hero factory, which is a jam factory etc. So we really looked for things in the street names that have a nod to that (Proactive Composing), . And the funny thing is, because we are now really going live (Proactive Conducting), that Hero from Switzerland, is now calling: Wow, we actually find what you are doing so charming, we would like to participate. Yes, how would you like to participate? Well, I don't know, maybe you can think of things for me that we can contribute to financially, so that it will be better. (Reactive Convincing) ...So the team that is currently in place is now going to think of possibilities for that (Reactive Composing).” (James, Area Developer)

NBS SUCCESS FACTOR: CREATING NEW RELATIONSHIPS & NETWORK DEVELOPMENT
ORGANIZATION OF CREATIVITY: INDIVIDUAL BEHAVIOR → COLLECTIVE BEHAVIOR



Figure 11. (Kamenuka, n.d.)

DISCUSSIONS

NOT COMPLETE PICTURE

NOT TESTED

CONCLUSIONS

CONCLUSIONS

“How can project developers organize creativity to integrate NbS into their urban development projects?”

CONCLUSIONS

“How can project developers organize creativity to integrate NbS into their urban development projects?”

OVERCOMING NBS BARRIERS & ENABELING SUCCESS FACTORS

CONCLUSIONS

“How can project developers organize creativity to integrate NbS into their urban development projects?”

OVERCOMING NBS BARRIERS & ENABELING SUCCESS FACTORS

COMPOSING THE RIGHT ENVIRONMENT FOR LEARNING AND CHANGE

CONVINCING ACTORS TO LEARN AND CHANGE

CONDUCTING CHANGE BE MONITORING AND ITERATING

CONTEMPLATING TO SPOT NEW NEEDS FOR CHANGE

CONCLUSIONS

“How can project developers organize creativity to integrate NbS into their urban development projects?”

OVERCOMING NBS BARRIERS & ENABELING SUCCESS FACTORS

COMPOSING THE RIGHT ENVIRONMENT FOR LEARNING AND CHANGE

CONVINCING ACTORS TO LEARN AND CHANGE

CONDUCTING CHANGE BE MONITORING AND ITERATING

CONTEMPLATING TO SPOT NEW NEEDS FOR CHANGE

PROACTIVE & REACTIVE BEHAVIOR



Figure 12. Bishan-Ang Mo Kio Park before and after ABC Waters Programme upgrade (ASLA Professional Awards, 2016) (Photo credit to the Ramboll Studio Dreiseitl, reproduced with authorization from Ramboll Studio Dreiseitl).



THANK YOU FOR LISTENING ;)

*“Introducing nature as a stakeholder is more than just adding a seat at the table — it requires us to fundamentally change how we interact and make decisions, calling for both adaptation and **creativity**.”*

(Charlotte Oldenbeuving)



Figure 13. (Vecteezy, n.d.)

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Figure 1 & 12: ASLA Professional Awards. (2016). Bishan-Ang Mo Kio Park. Available online: <https://www.asla.org/2016awards/169669.html> (accessed on August 12, 2021).

Figure 2: Buro Lubbers. (2023). *Van Besouw*. Retrieved from https://burolubbers.nl/1806_van-besouw/

Figure 3: URBAN GreenUP (2018). *D1.1: NBS Catalogue (WP 1, T 1.1)*. URBAN GreenUP. Innovation Action – Grant Agreement No. 730426.

Figure 7: Ssstocker. (n.d.). *Growth positive think optimistic thinking confident woman pouring flower self head brain fulfillment mental health mind care* [Illustration]. Dreamstime.

Figure 8: Depositphotos. (n.d.). *Cartoon of man taking book from the bookcase* [Vector illustration]. <https://depositphotos.com/nl/vector/cartoon-of-man-taking-book-from-the-bookcase-264544276.html>

Figure 9: Alamy. (n.d.). *Pigs feeding grass on the hill, graphic black white sketch illustration vector* [Vector illustration]. <https://www.alamy.com/pigs-feeding-grass-on-the-hill-graphic-black-white-sketch-illustration-vector-image388483273.html?imageid=58D42F62-9D54-4BF4-92C2-312D5A85370D&p=1307089&pn=1&searchId=2c44d97279ba854b5cdcc91d4e0f06f8&searchtype=0>

Figure 10: Vecteezy. (n.d.). *Mens nemen houten steen speel houten blok Jenga spel, zakenman risico verloofd in bedrijf opstarten of project, mannetje werknemer betrokken in speels werkzaamheid geest hersenen trein, vlak vector illustratie* [Vector art]. <https://nl.vecteezy.com/vector-kunst/13700005-mens-nemen-houten-steen-speel-houten-blok-jenga-spel-zakenman-risico-verloofd-in-bedrijf-opstarten-of-project-mannetje-werknemer-betrokken-in-speels-werkzaamheid-geest-hersenen-trein-vlak-vector-illustratie>

Figure 11: Kamenuka. (n.d.). *Appelboom met een ladder en mand van rijpe appel, appelkwekerij vectorillustratie* [Illustration]. Dreamstime. <https://nl.dreamstime.com/appelboom-met-een-ladder-en-mand-van-rijpe-appelappelkwekerijvectorillustratie-image182082798>

Figure 13: Vecteezy. (n.d.). *Fabriek gelukkig emoji* [Vector art]. <https://nl.vecteezy.com/vector-kunst/16120217-fabriek-gelukkig-emoji>