



BRITT BELT - 4663691

Transforming the built environment through product service systems: A path towards a Circular Economy



INTRODUCTION

METHOD

**DESIGNING THE
PERFECT PSS**

**PRODUCT
SELECTION**

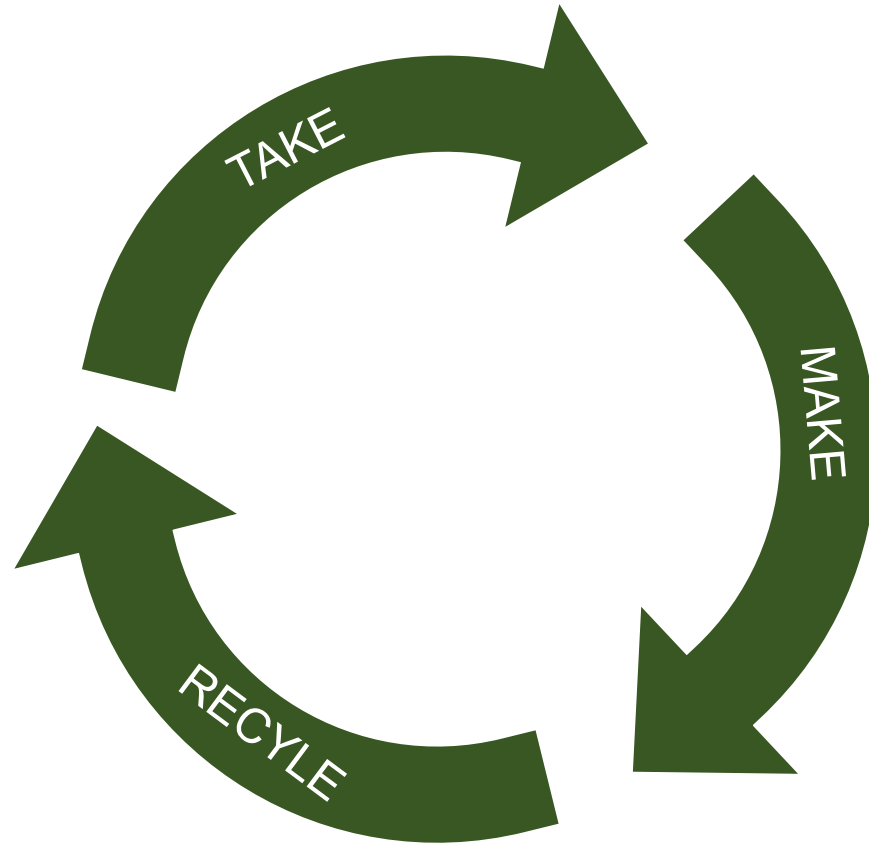
**TESTING THE
RESEARCH**

**IMPLICATIONS,
LIMITATIONS &
FUTHER
RESEARCH**

**CONCLUSION &
ADVICE**







A Product Service System (PSS) is a model that integrates products and services to provide value to customers by fulfilling their needs, while simultaneously aiming to reduce environmental impacts and resource consumption.



How can Product-Service Systems (PSS) be applied in the built environment and expanded to their fullest potential?



How can Product-Service Systems (PSS) be applied in the built environment and expanded to their fullest potential?

SQ1: What is circularity in the built environment?

SQ2: What are product service systems in the built environment?

SQ3: What is the importance of the stakeholders within the circular chain of product service systems?

SQ4: What factors influence product service systems?

SQ5: What are the characteristics & properties necessary for product service systems?

SQ6: What are the future possibilities for product service systems in the built environment?





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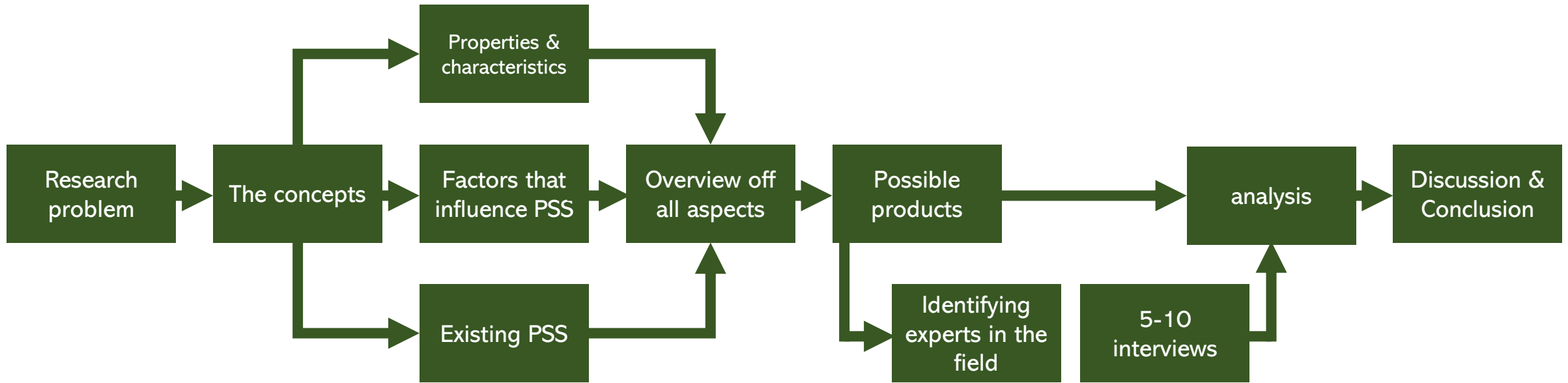
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SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

FACTORS



SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

FACTORS

Dutch regulations & property law



SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

FACTORS

Dutch regulations & property law

- **The unity principle:** “the owner of a good is also the owner all the components of that good”
- **Accession:** “An object loses ownership of that section when it merges with the main object”
- **Common opinion!**



SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

FACTORS

Dutch regulations & property law

Contracts



SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

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Dutch regulations & property law

Contracts

- **Financial Lease**
- **Pay per Use**
- **Operational Lease**
- **Buyback & Take back contracts**



SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

FACTORS

Dutch regulations & property law

Contracts

Risks



SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

FACTORS

Dutch regulations & property law

Contracts

Risks

- High investment needed
- Return logistics
- Design
- Institutional and policy challenges
- Risk in ownership
- Lack of consumer awareness and interest



SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

FACTORS

Dutch regulations & property law

Contracts

Risks

Collaboration of stakeholders



SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

FACTORS

Dutch regulations & property law

Contracts

Risks

Collaboration of stakeholders

- Involvement of all stakeholders
- Communication



SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

FACTORS

Dutch regulations & property law

Contracts

Risks

Collaboration of stakeholders

Producer incentives



SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

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Dutch regulations & property law

Contracts

Risks

Collaboration of stakeholders

Producer incentives

- Financial incentive
- Intrinsic motivation



SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

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Dutch regulations & property law

Contracts

Risks

Collaboration of stakeholders

Producer incentives

The right clients



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Dutch regulations & property law

Contracts

Risks

Collaboration of stakeholders

Producer incentives

The right clients

- PSS allows smaller, regular payments
- Institutional building owners



SUCCESSFUL PSS

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Dutch regulations & property law

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Risks

Collaboration of stakeholders

Producer incentives

The right clients

Involvement of financial institutions



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Collaboration of stakeholders

Producer incentives

The right clients

Involvement of financial institutions

- Paying initial investments



SUCCESSFUL PSS

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Contracts

Risks

Collaboration of stakeholders

Producer incentives

The right clients

Involvement of financial institutions

Start with a good business model



SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

FACTORS

Dutch regulations & property law

Contracts

Risks

Collaboration of stakeholders

Producer incentives

The right clients

Involvement of financial institutions

Start with a good business model

- Establishing a sustainable revenue model



SUCCESSFUL PSS

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Dutch regulations & property law

Contracts

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Collaboration of stakeholders

Producer incentives

The right clients

Involvement of financial institutions

Start with a good business model

Convenience for clients



SUCCESSFUL PSS

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Dutch regulations & property law

Contracts

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Collaboration of stakeholders

Producer incentives

The right clients

Involvement of financial institutions

Start with a good business model

Convenience for clients

- Clients are willing to pay for convenience and ease

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CHARACTERISTICS & PROPERTIES

Durability

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Contracts

Risks

Collaboration of stakeholders

Producer incentives

The right clients

Involvement of financial institutions

Start with a good business model

Convenience for clients



SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

Durability

- Lease contracts: 10-year lifespan
- Buy-back/ take back: Longer life spans
- Pay per use: short life span

FACTORS

Dutch regulations & property law

Contracts

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Collaboration of stakeholders

Producer incentives

The right clients

Involvement of financial institutions

Start with a good business model

Convenience for clients



SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

Durability

Repairability

FACTORS

Dutch regulations & property law

Contracts

Risks

Collaboration of stakeholders

Producer incentives

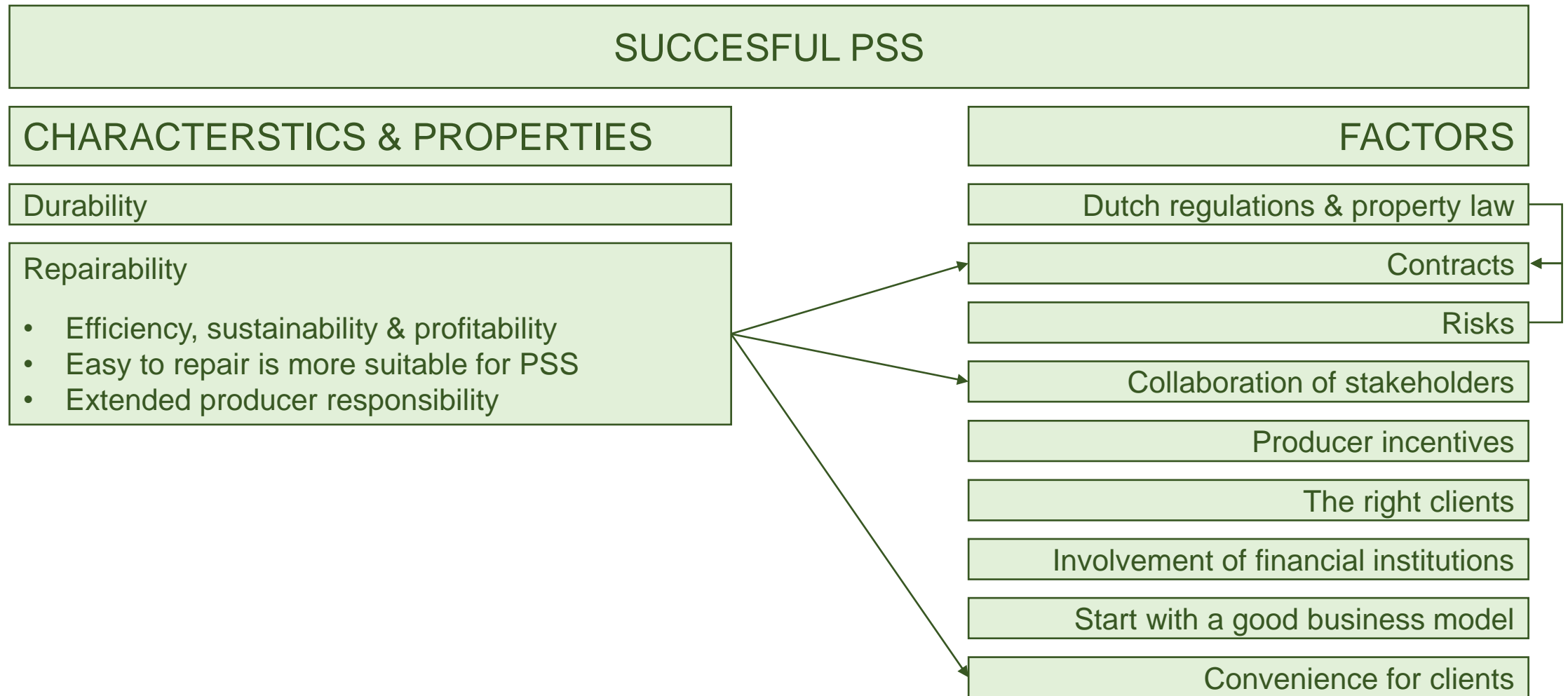
The right clients

Involvement of financial institutions

Start with a good business model

Convenience for clients





SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

Durability

Repairability

(Re-)usability

FACTORS

Dutch regulations & property law

Contracts

Risks

Collaboration of stakeholders

Producer incentives

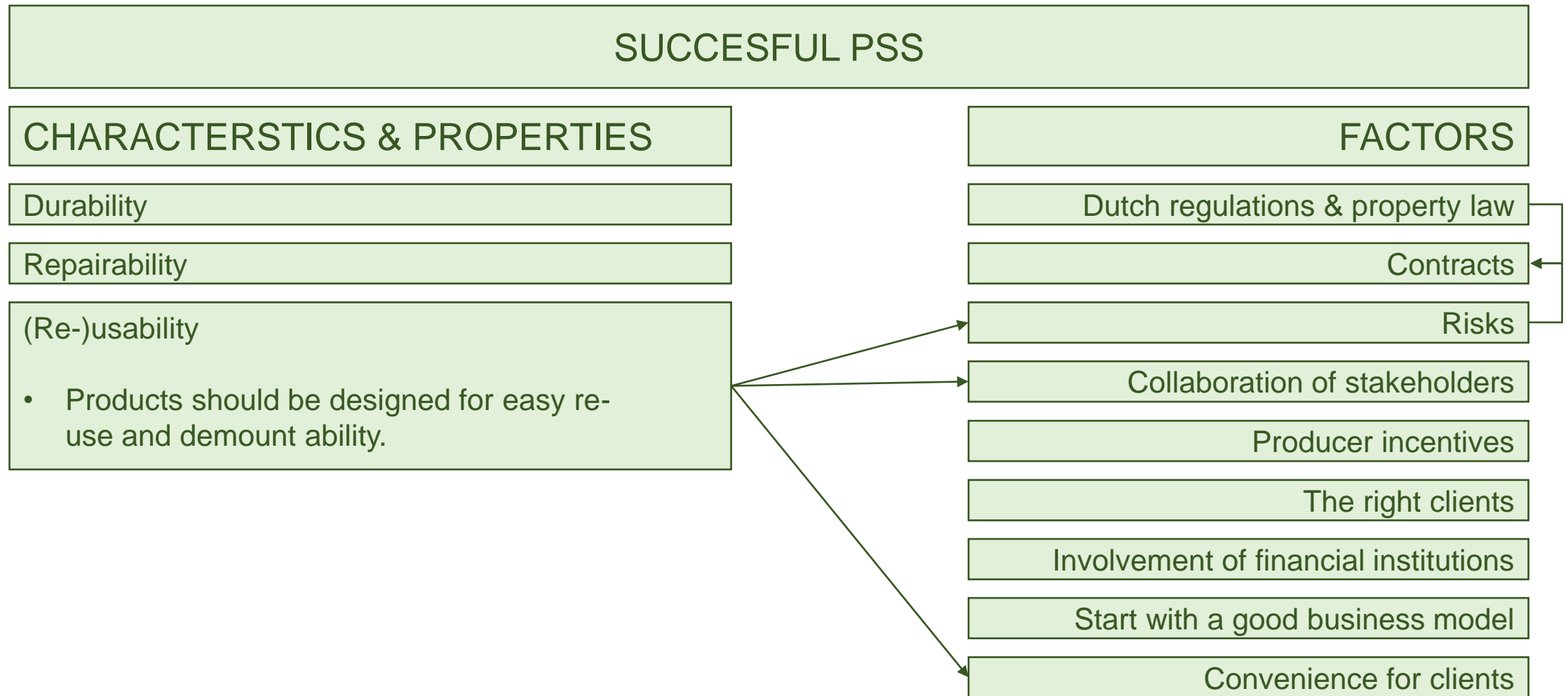
The right clients

Involvement of financial institutions

Start with a good business model

Convenience for clients





SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

Durability

Repairability

(Re-)usability

Standardization/ customizability

FACTORS

Dutch regulations & property law

Contracts

Risks

Collaboration of stakeholders

Producer incentives

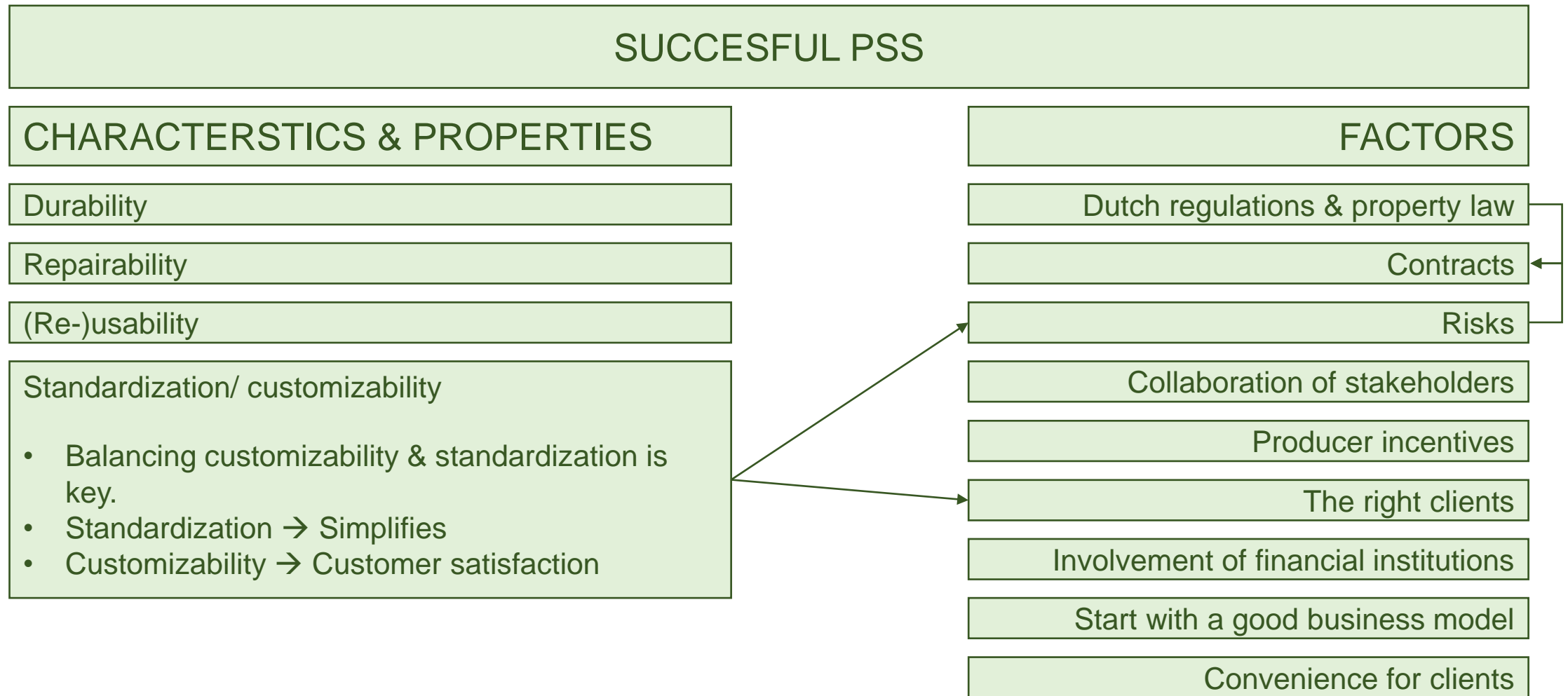
The right clients

Involvement of financial institutions

Start with a good business model

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SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

Durability

Repairability

(Re-)usability

Standardization/ customizability

Modularity

FACTORS

Dutch regulations & property law

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Risks

Collaboration of stakeholders

Producer incentives

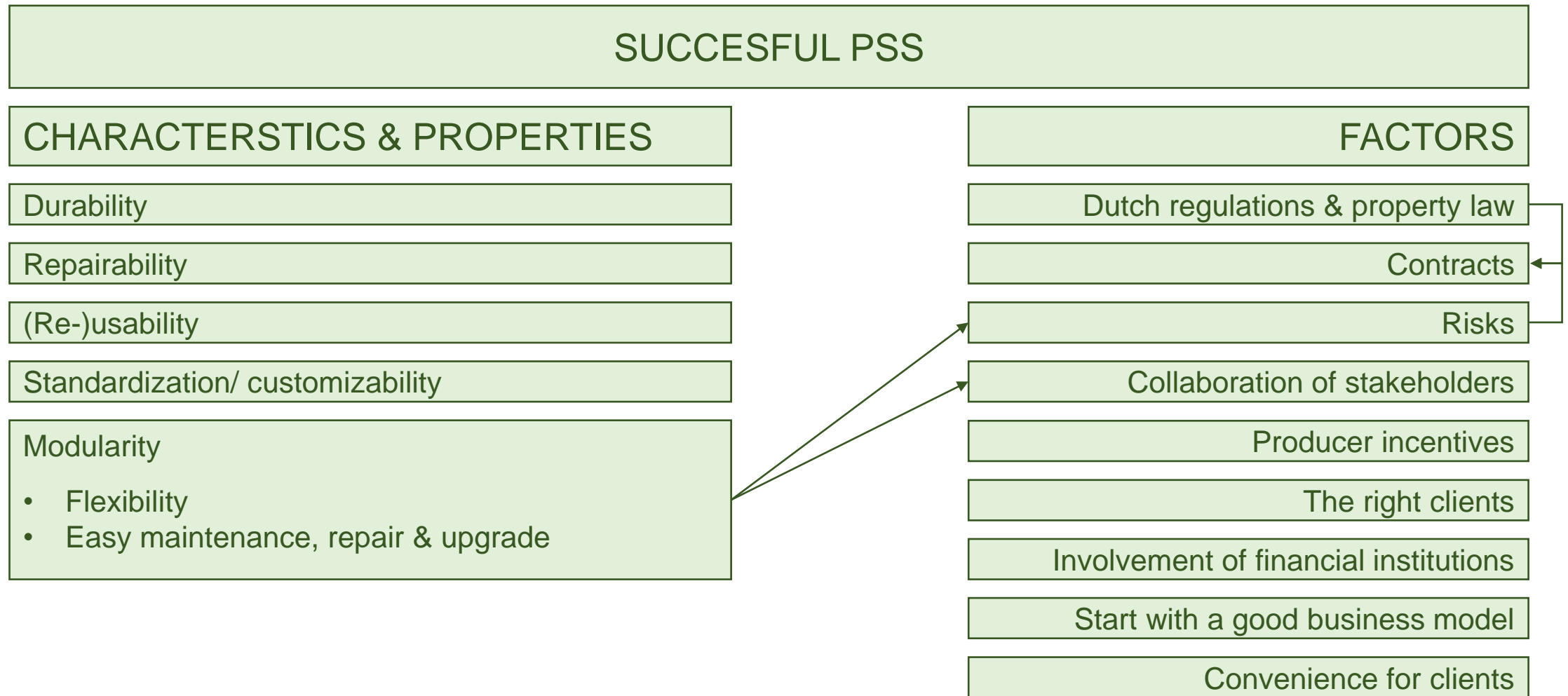
The right clients

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Start with a good business model

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SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

Durability

Repairability

(Re-)usability

Standardization/ customizability

Modularity

Environmental sustainability

FACTORS

Dutch regulations & property law

Contracts

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Collaboration of stakeholders

Producer incentives

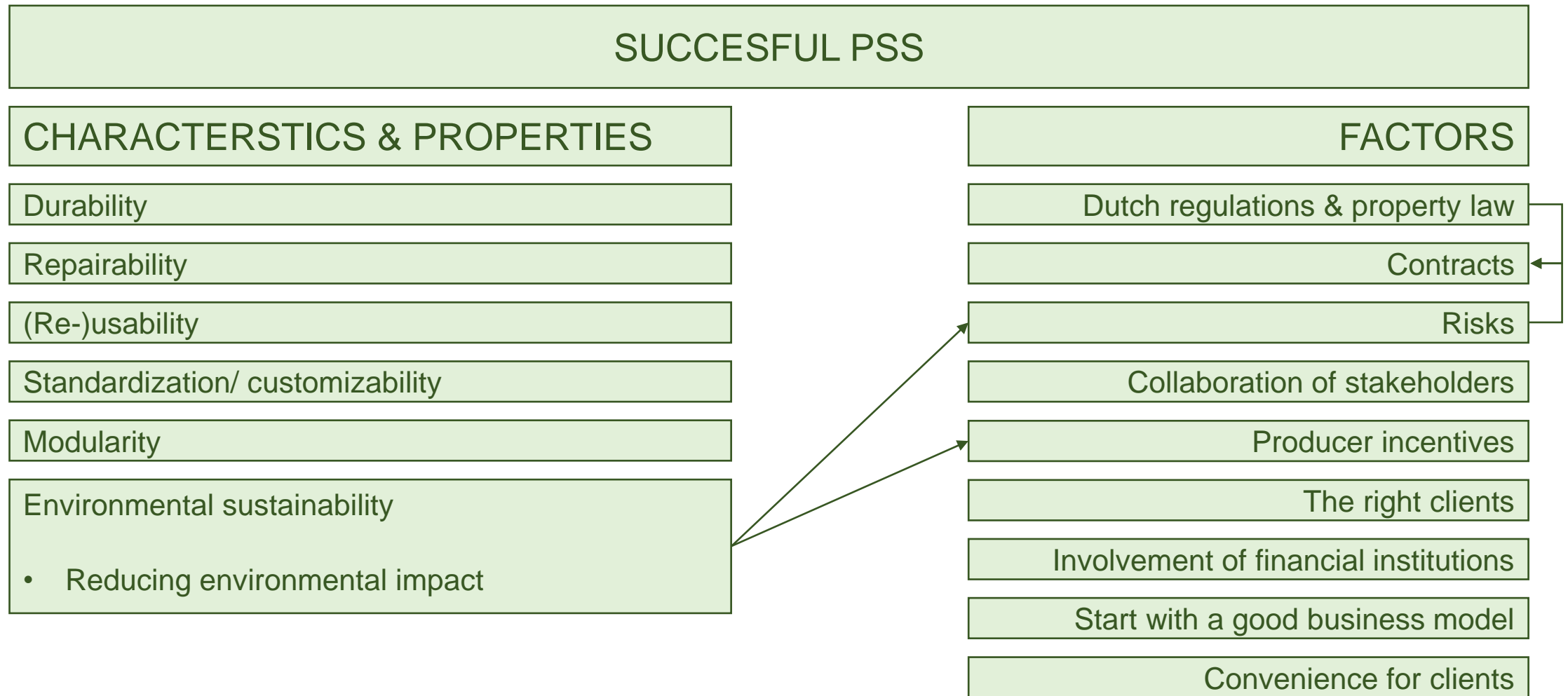
The right clients

Involvement of financial institutions

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SUCCESSFUL PSS

CHARACTERISTICS & PROPERTIES

Durability

Repairability

(Re-)usability

Standardization/ customizability

Modularity

Environmental sustainability

Economic viability

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Collaboration of stakeholders

Producer incentives

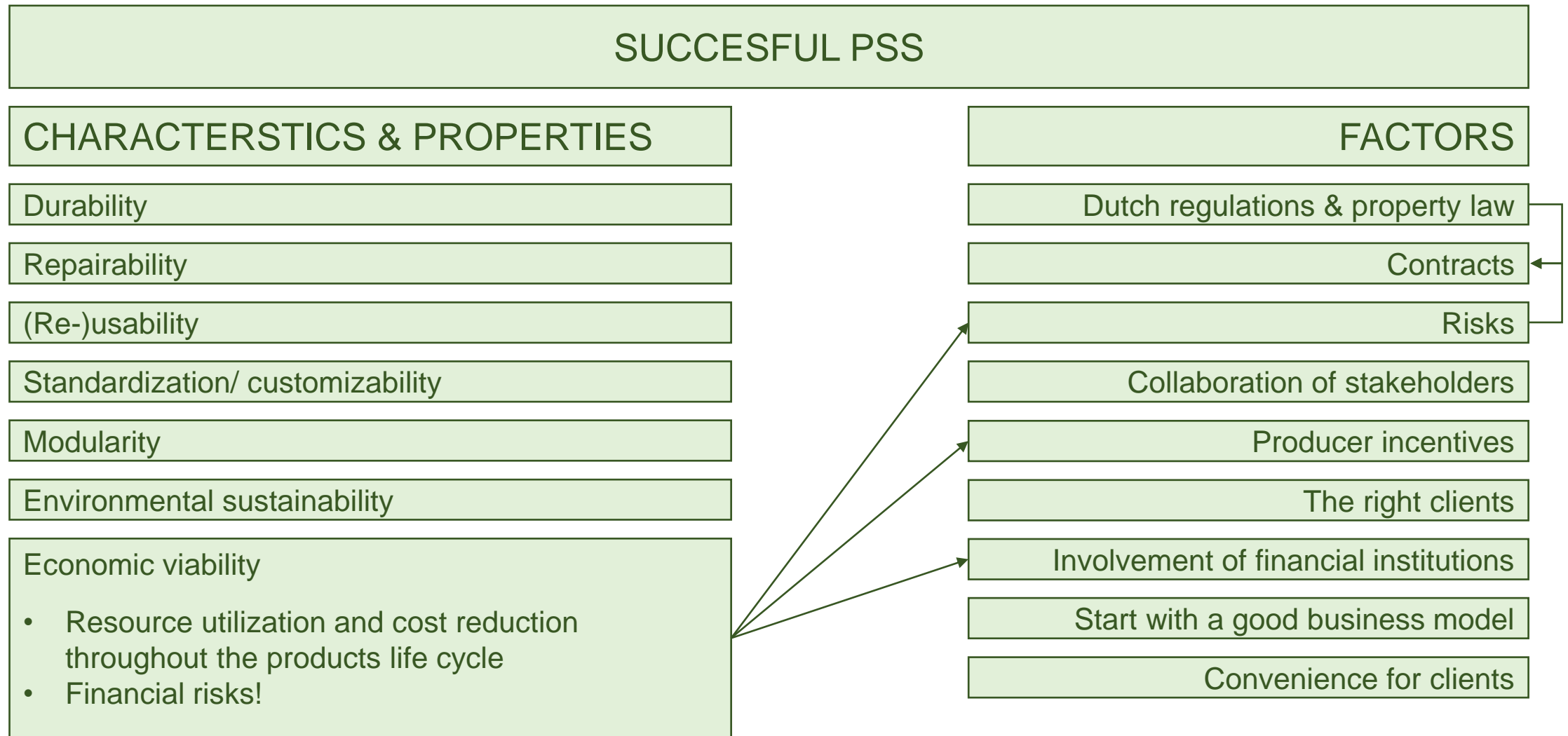
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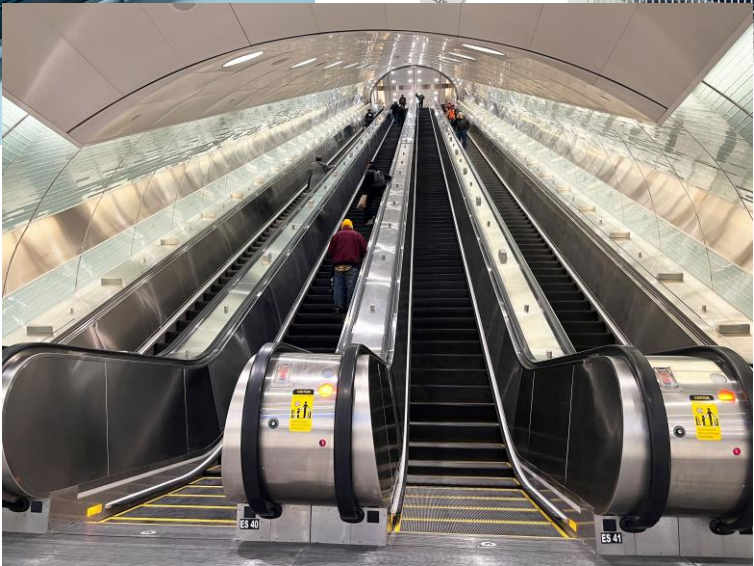
“Not all products are equally agreeable with PSS, the suitability of a product depends on all characteristics, properties & factors”



POTENTIAL



SUITABLE





Careful evaluation of each product necessary!
An in-depth research into each product!
Pilot projects!





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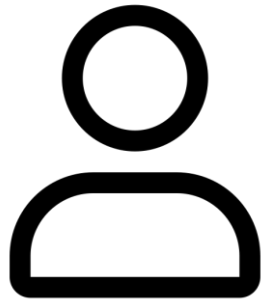
**IMPLICATIONS,
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**CONCLUSION &
ADVICE**

Sustainability,
Contracts,
Design & Materials,
Financing,
Market Mismatch,
Company Readiness,
Risk & regulations,
And stakeholders



Sustainability,



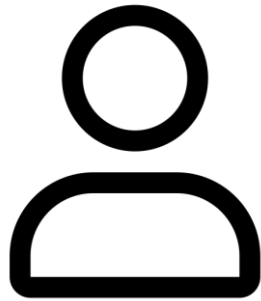
“But well to set up a whole circularity strategy with such a party. That just costs an enormous amount of money, if it's just a very big investment so we have refrained from going ahead with that for the moment. I don't want to say that we are ignoring circularity”



Sustainability,
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Contracts,



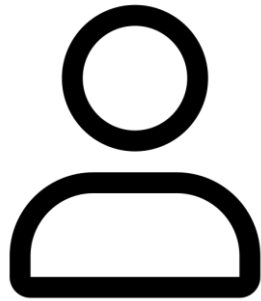
"I personally am not a fan of leasing at all. No, I think, if you, or if you don't have the money, then you shouldn't buy it, I think, and otherwise just pay for it all at once."



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Design & Materials,



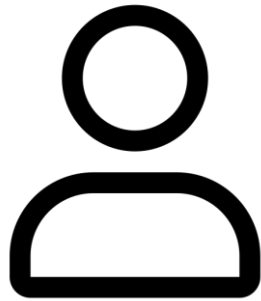
“It is no longer trendy and according to the building code, for example, doors must have a certain height. Well, doors of the past are much lower than what doors are today. So they don't fit.”



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Financing,



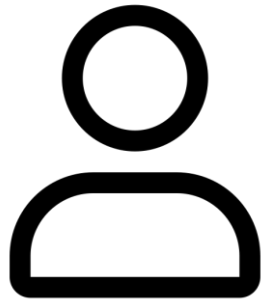
“Just wondering: what does it get us? It costs a lot in the first few years to invest, because you actually have to pre-finance everything and how does that continue? I don't think I can just enter into a leasing contract as a company with an individual, I think. Then a credit check has to be done as well.”



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Market Mismatch,



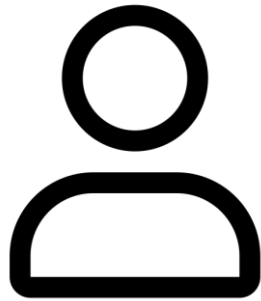
I think with us, customers are not waiting for that. I think, we are in high end. And those people pay with ease, so those people are not waiting for that.



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Company Readiness,



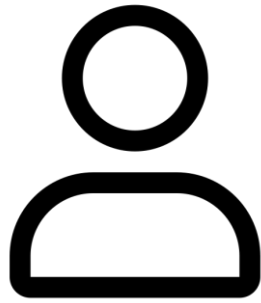
"Well, then we are just available as customer service, but there is not a service department that comes on site to fix things, for example. We are currently not big enough to set up a whole department for that, those with service technicians"



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Risk & regulations,



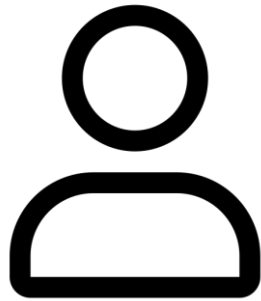
“Everything hinges on how user interacts with a kitchen.”



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And stakeholders



“But I know a lot of manufacturers, or at least I usually talk to manufacturers, and they say: but what happens to my product, end of life? They don't even know what happens to it”





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IMPLICATIONS

This research can be used as a guide for businesses looking for PSS implementation.

Legal professionals & policymakers use the insights for law reform & addressing current restrictions.



LIMITATIONS

Scope of data collection

More in-depth exploration of product life cycles

Pilot projects



FUTURE RESEARCH

Product specific research and pilot projects

In-depth examination of the legal framework

Potential role of technology





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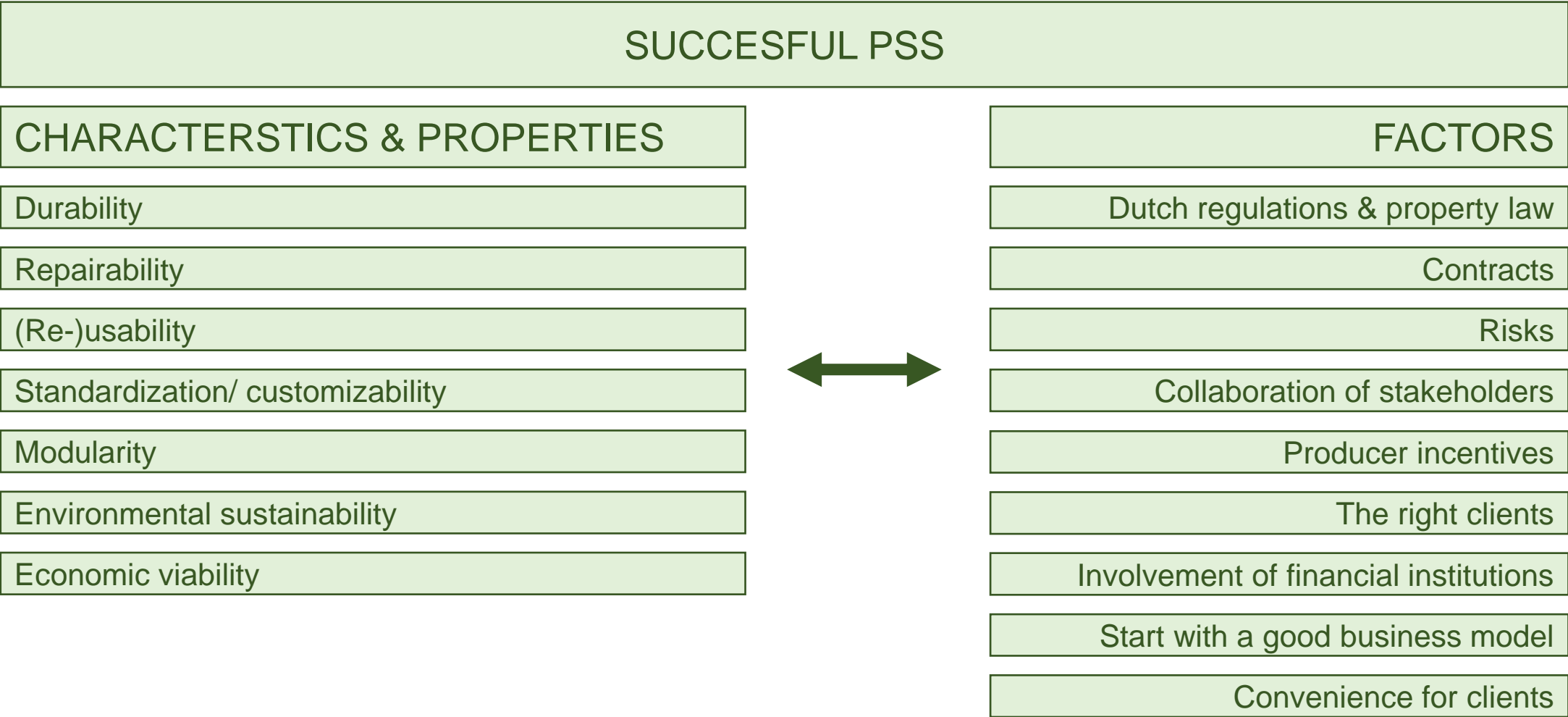
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How can Product-Service Systems (PSS) be applied in the built environment and expanded to their fullest potential?





POTENTIAL

The readiness of companies and stakeholders

Lacking necessary logistics

Awareness of the circular economy



LEGAL ADJUSTMENTS

Making the transition towards a circular economy smoother

Changes of current laws to prevent unintentional ownership transfers



ADVICE

For each project an extensive investigation in the life cycle of the product and company readiness

Do pilot projects

Identify risks and recognize the barriers

Collective action of all stakeholders



BUILDING A CIRCULAR ENVIRONMENT - USING PRODUCTS AS A SERVICE TO CREATE



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QUESTIONS?

