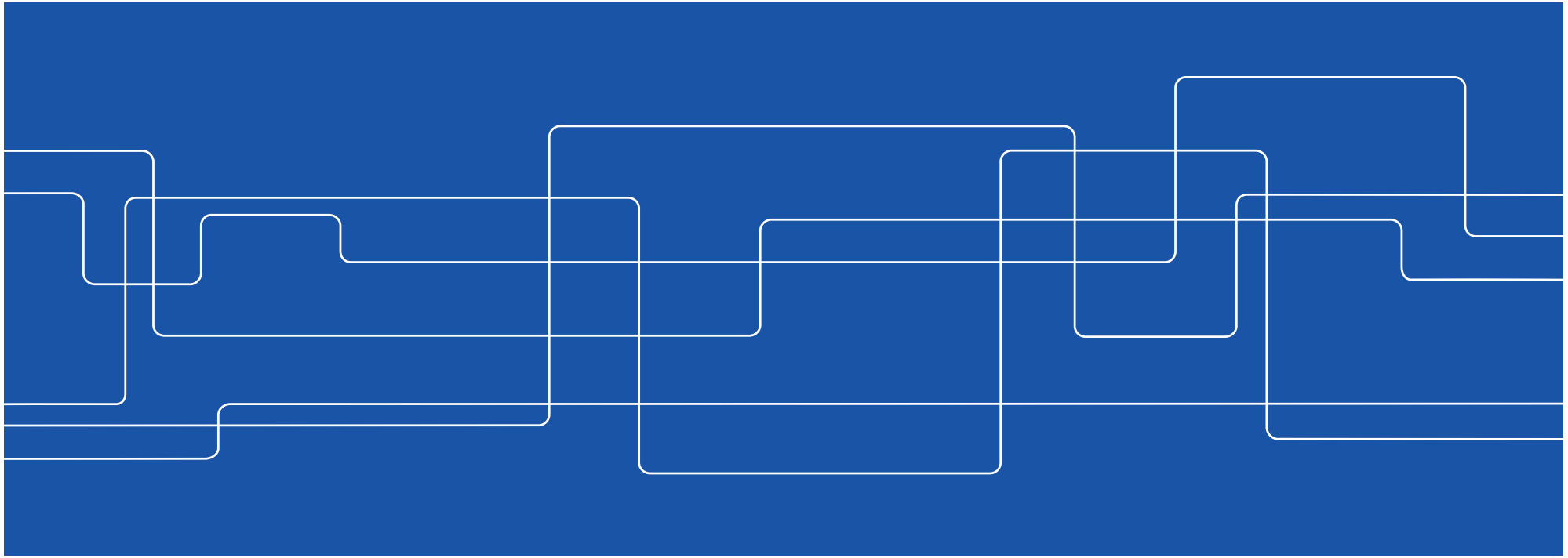
Att hantera risk och osäkerhet i innovation

Mats Magnusson, Professor KTH, matsmag@kth.se

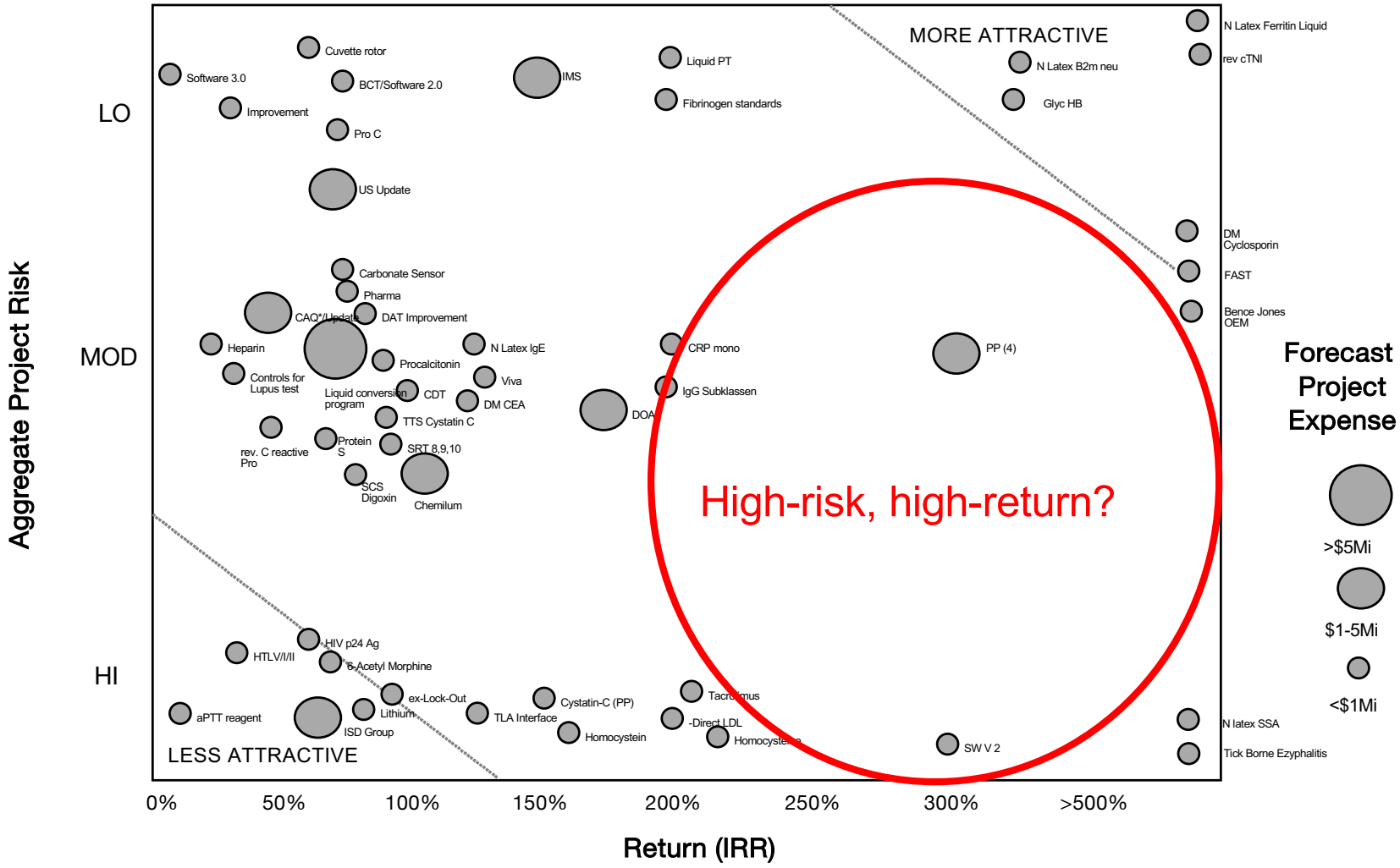
Jennie Björk, Docent KTH, jenniebj@kth.se



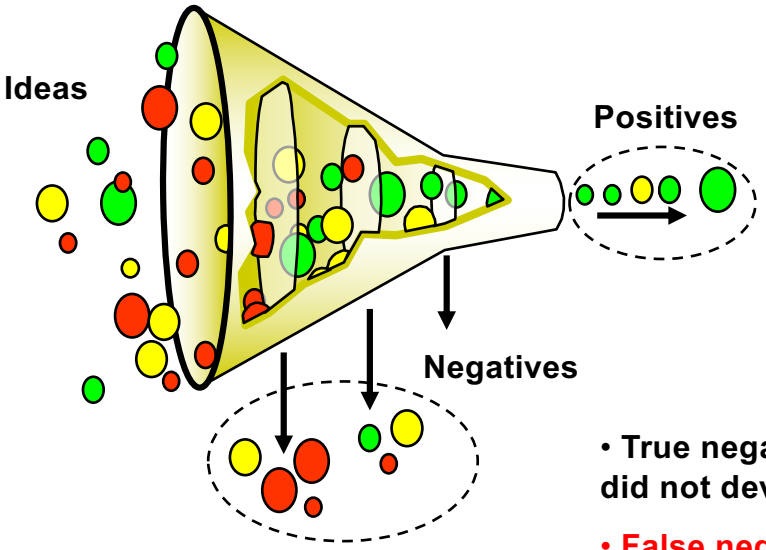
Agenda

- Risktagande och Innovationsekonomi
- Prioritering och val av innovationsidéer/projekt
- Risktagande i innovation - drivkrafter och effekter
- Innovationer med hög nyhetshöjd

A typical Risk vs. Return Matrix



False positives and False negatives



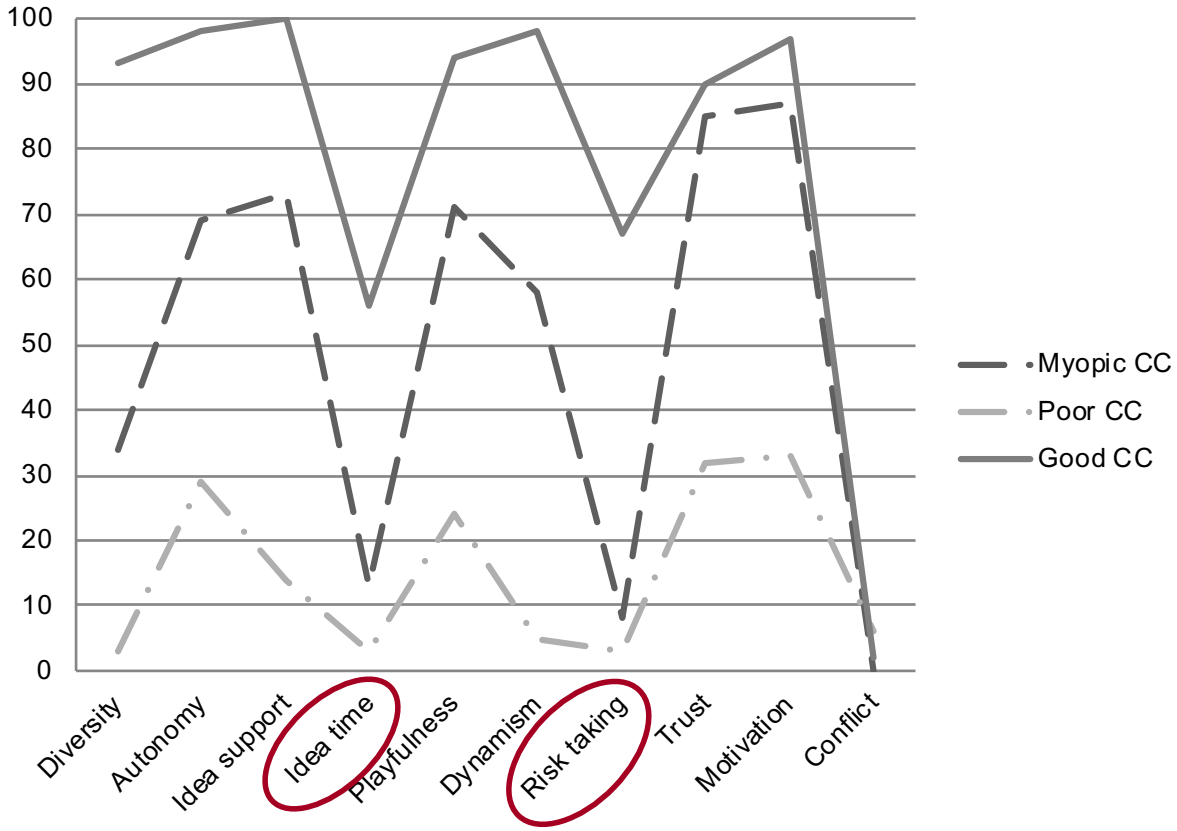
- True positives – launched and received well on the market. However, mainly incremental innovation
- False positives – launched but not received well on the market.
- True negatives – we save money since we did not develop and launch these ideas.
- False negatives – we stop ideas that would generate a lot of money in the future. These could e.g. create new markets. Among the false negatives we frequently find more uncertain and risky initiatives such as disruptive ideas and breakthrough innovations.

Incremental ideas
Border-line ideas
Radical and Disruptive ideas

10 dimensions of creative climate

Source: Ekvall, 1996

Obstacles for innovation



Source: Stetler et al., 2014

Avoiding uncertain innovation activities?

- ”A firm’s new product development process should maximize the likelihood of projects being both technically and commercially successful.” (Schilling, 2010, p. 6)
  - Is this true?
- Would anyone be willing to take responsibility for an innovation activity with a truly uncertain outcome?
- Is there an objective measure of uncertainty of innovation projects/ideas?

Balancing ”failures” and ”lost opportunities”?

When there is uncertainty about demand, firms run two basic economic risks:

- Costs of over-production
- Lost sales caused by under-supply

The balancing of these risks should be based on the specific economics of the business, but is normally skewed by our way of measuring and accounting for economic results.

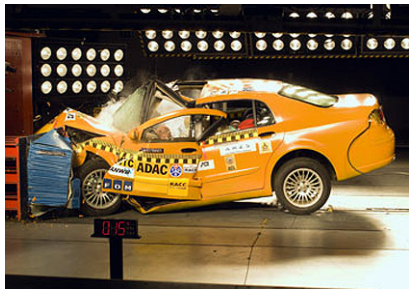
In terms of innovation this can be translated to the balancing of:

- Costs for unused ideas and non-resulting innovation experiments/projects
- Lost innovation opportunities

For innovation there is a bias towards attending to the costs of non-resulting innovation experiments/projects and a neglect of lost opportunities. The latter are hardly measurable and nobody is responsible for them.

What is the cost of our innovation activities?

Cost of deployed resources



Cost of delays

Cost of lost opportunities

What to do?

Understand your innovation economics!

Estimate the costs of lost opportunities

Ensure that economically correct risks are taken

- Make sure that enough high-risk projects/ideas are selected

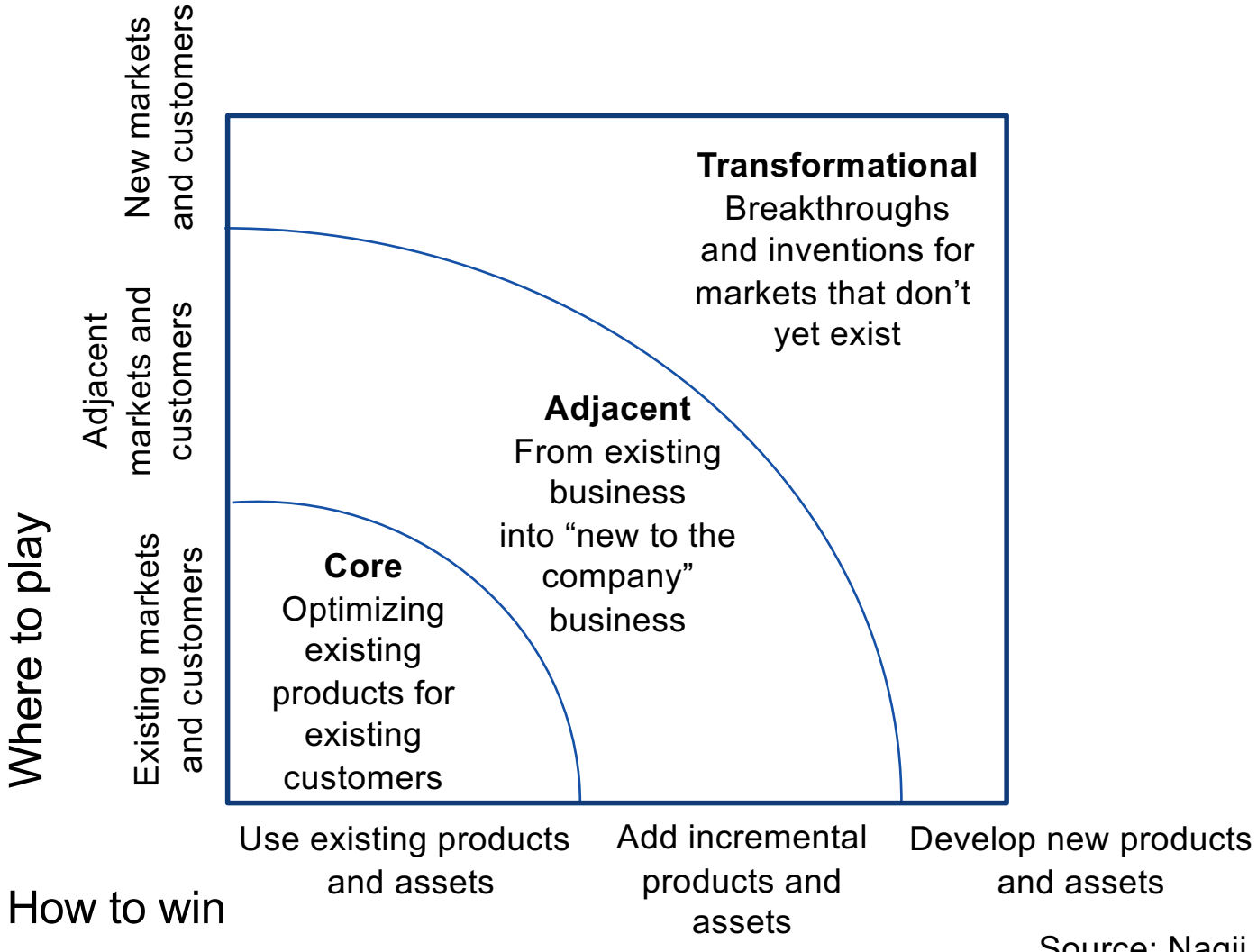
Support experimentation and innovation failure

- Attend to both innovation potential and innovation output
- Distinguish between different innovation projects/ideas based on their level of uncertainty
- Create an organization that supports risk-taking

Key aspects of innovation project/idea evaluation and selection

- What are the goals for innovation?
- What evaluation criteria are used?
- Who performs the evaluation?
- What does the evaluation process look like?

The Innovation Ambition matrix



Source: Nagji and Tuff, 2012

Frequent issues related to criteria

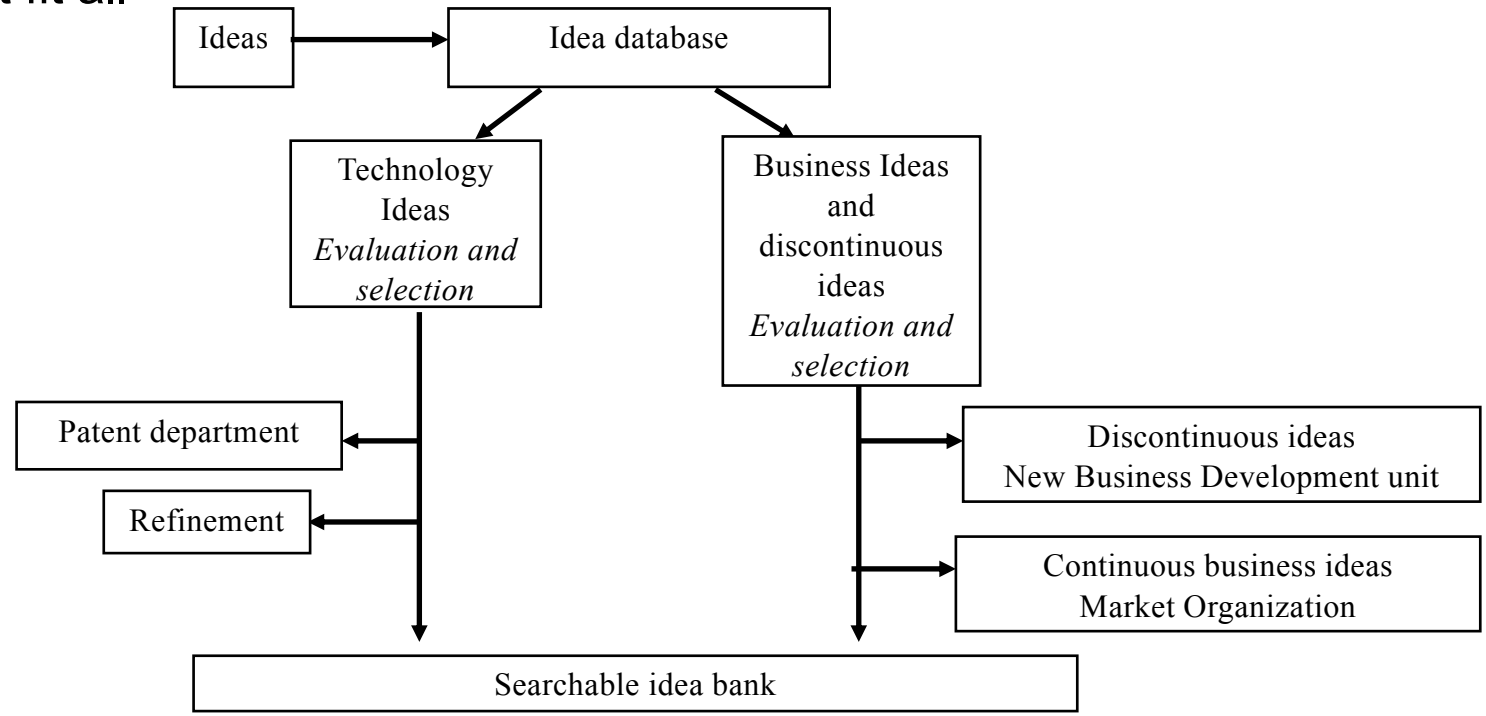
- Innovation goals often missing or not used in evaluation
- Investments in innovation are uncertain and have different objectives
- Measures often biased towards projects with low uncertainty
- Indirect and systemic effects of innovation projects are not considered to a suitable extent

Who performs the evaluation of innovation projects/ideas?

- Business unit management
- R&D management
- Expert(s)
- Evaluation committee
- Crowd

Frequent issues related to ”who”

- Most decision makers focus on short term performance and incremental innovation
- Nobody represents the ”unborn” businesses
- Crowdsourcing events can get hijacked
- ”One size doesn’t fit all”



Source: Sandström and Björk, 2010

Results from experiments in two research projects at KTH (Måsen and Baluns)

Måsen

Project performed 2014-2017 by researchers at Integrated Product Development, KTH

Funded by Vinnova

Collaboration with four Swedish companies

Focus on goal-setting and measurement for innovative product development

Baluns

Project performed 2016-2018 by researchers at Integrated Product Development

Funded by Vinnova

Collaboration with two Swedish MNCs

Focus on uncertainty management in R&D

Study 1 – Evaluation of innovation ideas

- Experiment in a medium-sized Swedish manufacturing company.
- Four groups of 4-5 persons involved in innovation activities at the company
- 8 company specific innovation project ideas (4 radical and 4 incremental, 4 product-focused and 4 service-focused)

Step 1: Individual assessment (using 14 different criteria, Likert-scale 1-7) and prioritisation through allocation of resources:

- Rating of novelty, value creation, risks, investments, competence etc.
- Distribution of a total of 100 points to the different ideas

Step 2: Group assessment and prioritisation using the same method

Step 3: Self-assessment survey regarding the company´s use of goals and project portfolio management + individual career, problem solving attitude etc.

- The same experiment has thereafter been replicated in a Swedish MNC, as well as with students in our Master's track in Innovation Management and Product Development, consistently generating similar results.

Measuring the uncertainty of innovation ideas

- The level of disagreement among evaluators is not simply a matter of ideas being considered incremental or radical
- The level of disagreement (calculated from the variance of individual evaluations) represents an objective measure of the uncertainty of the evaluated innovation ideas
- The level of disagreement for an idea can be used to enrich the analysis of the innovation ideas and thereby increase the possibility to address them in a way suiting their specific character and development needs
  - More appropriate management support
  - Failure handling

Prioritising ideas individually and in groups

- There is an overall tendency towards prioritising incremental ideas
- Uncertain ideas are downplayed compared to more certain ideas in group discussions
- The value of group-based evaluation depends on its details. There are a number of negative effects of group evaluation and prioritisation:
  - Discussion may be dominated by single individuals
  - Excessive search for consensus
  - Individual information and interpretations may get lost

Study 2 - Drivers and effects of innovation risk-taking

Research setting:

Data were collected in a Swedish MNC as part of a (very well performed) Master's thesis project on innovation culture.

Analysis of risk-taking aspects was performed by Sonia Giaccone (University of Catania) and Mats Magnusson and the results were presented at the international CINet conference in 2018.

The survey:

Variables measured by multiple items.

Questions developed and validated in previous research (Amabile et al., 1996; Oke, 2013; Goffin and Mitchell, 2010; Ekvall 1996).

Each item measured by a five-point Likert scale.

Sample:

Survey was performed in 12 companies/sites within the MNC's six divisions and one central unit.

Judgement sampling technique was adopted.

A total of 583 usable survey answers were obtained.

Research Questions

RQ 1: What are the effects of risk-taking propensity on innovation performance?

RQ 2: Which organizational factors (antecedents) enable employees' risk-taking propensity?

RQ 3: Which relationships exist between antecedents of employees' risk taking and innovation performance of the firm?

Drivers of risk-taking propensity

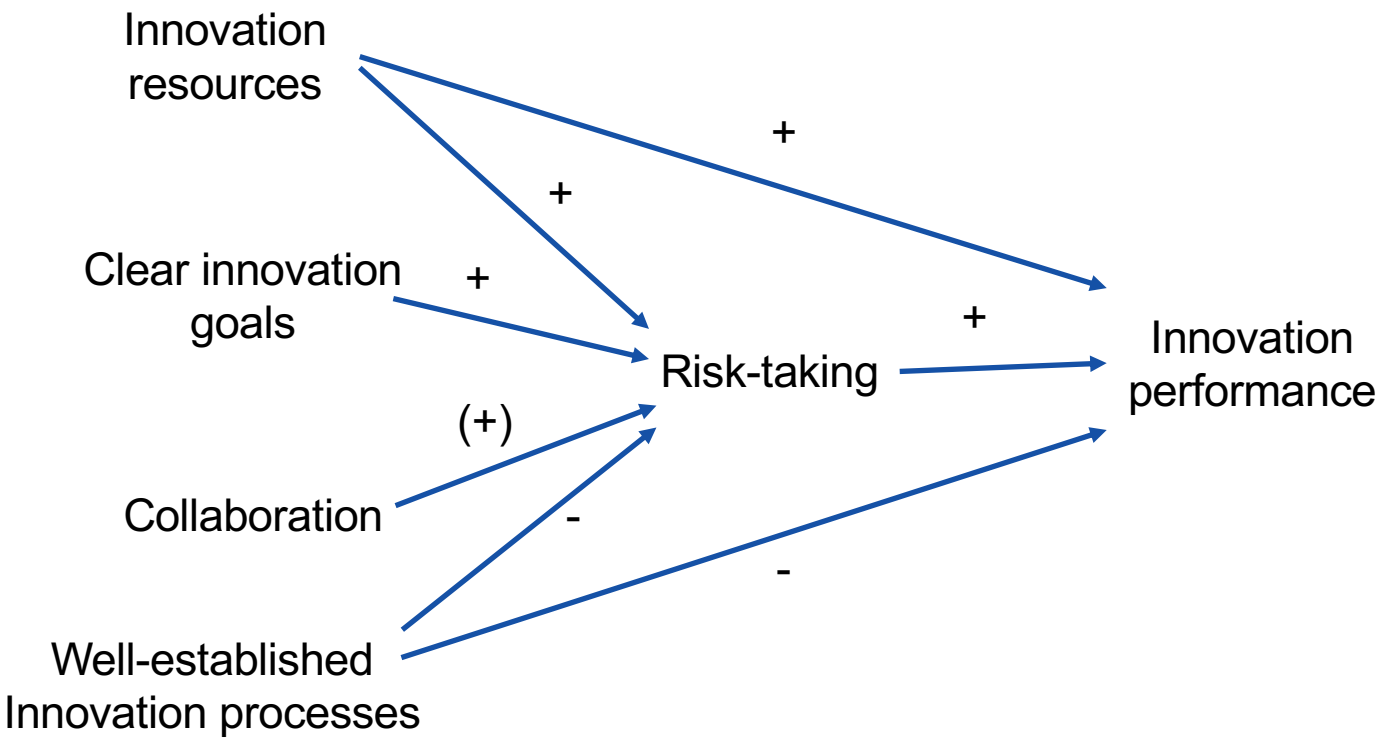
Based on extant literature, we identified five antecedents of risk-taking propensity:

- availability of organizational resources,
- innovation support activities,
- clear innovation goals,
- well-established innovation process, and
- collaboration.

Drivers and effects of innovation risk-taking

- Risk-taking has a clear significant effect on innovation performance.
- Availability of human- and financial resources has a positive effect on both risk-taking and innovation performance.
- Collaboration has a positive effect on risk-taking and innovation performance.
- Clear innovation goals have a positive effect on risk-taking, but no direct effect on innovation performance.
- A well-established innovation process has a significant negative effect on both risk-taking and innovation performance.

Drivers and effects of innovation risk-taking - summary of findings

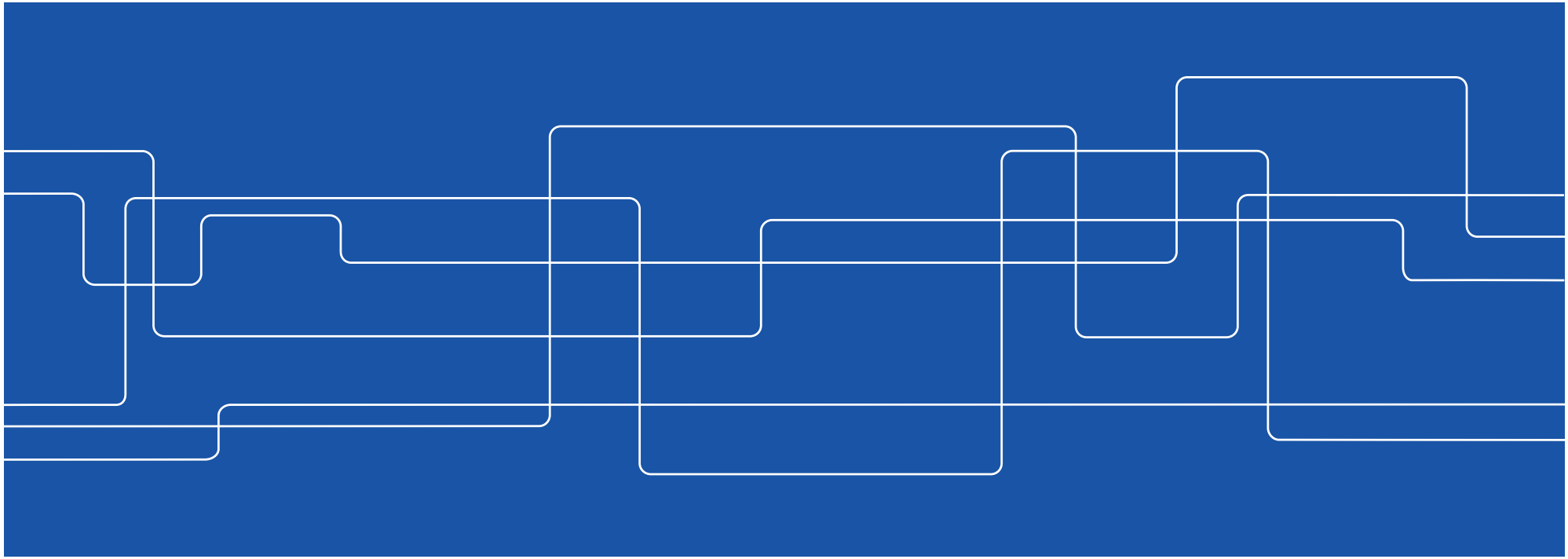


Supporting risk-taking - practical examples

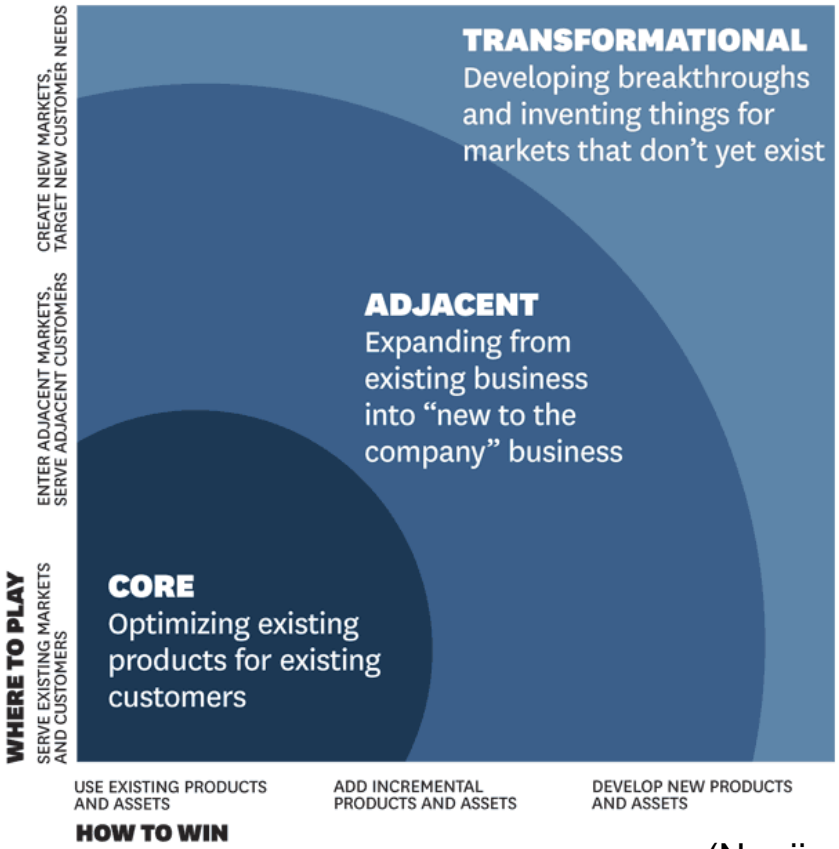
- Evonik: Top management members have to invest part of their bonuses in new ventures
- Perstorp: Idea ombudsman and President's fund
- Swedish IT company: Use time equivalent to what is spent on drinking coffee to run extremely high-risk innovation projects (5-10% chance of success)

Innovationer med hög nyhetshöjd

Nyligen avslutat Vinnovafinansierat projekt: ”Flödesorienterad Innovationssupport”



Innovationsprojekt med högnyhetshöjd



(Nagji and Tuff, 2012)

Innovationsprojekt med högnyhetshöjd

Radikala Innovationer

Produkter och teknik som har stor inverkan på marknaden när det gäller att:

- erbjuda helt nya fördelar
- eller signifikanta (dvs 5 till 10 gånger) prestandaökningar
- eller signifikant reduktion (dvs 30 till 50%) i kostnad

(Leifer et al., 2000)

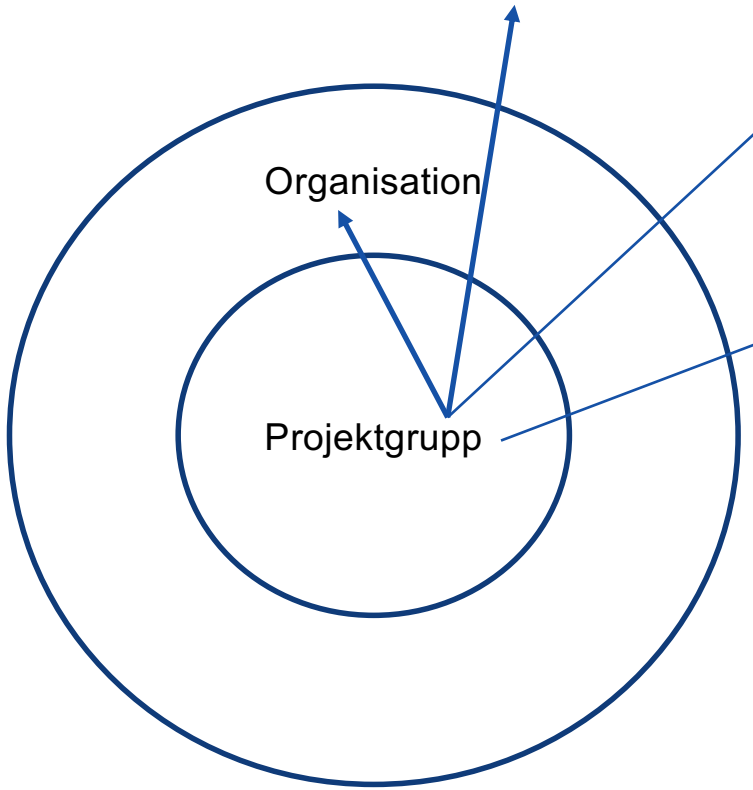
Studien i korthet

- 6 innovationsprojekt med hög nyhetshöjd
- Intervjuer och *project journey mapping*
  - Hinder och möjliggörare
    - Node enablers: 636
    - Node hinders: 330
- Analys av flöde, hur framskrider dessa projekt
- Analys av mekanismer, vad behöver dessa projekt vad kan vi lära av dem

Nilsson, S., Björk, J., & Karlsson, A. (2018). Developing radical innovations: Introducing Tangibility, Tolerance and Tightness. In *25th Innovation and Product development management conference, IPDMC:*

Karlsson, A, Björk, J., &. Nilsson, S. Realizing bottom-up radical innovation – deliberate acts directing and diverting attention over time (under review)

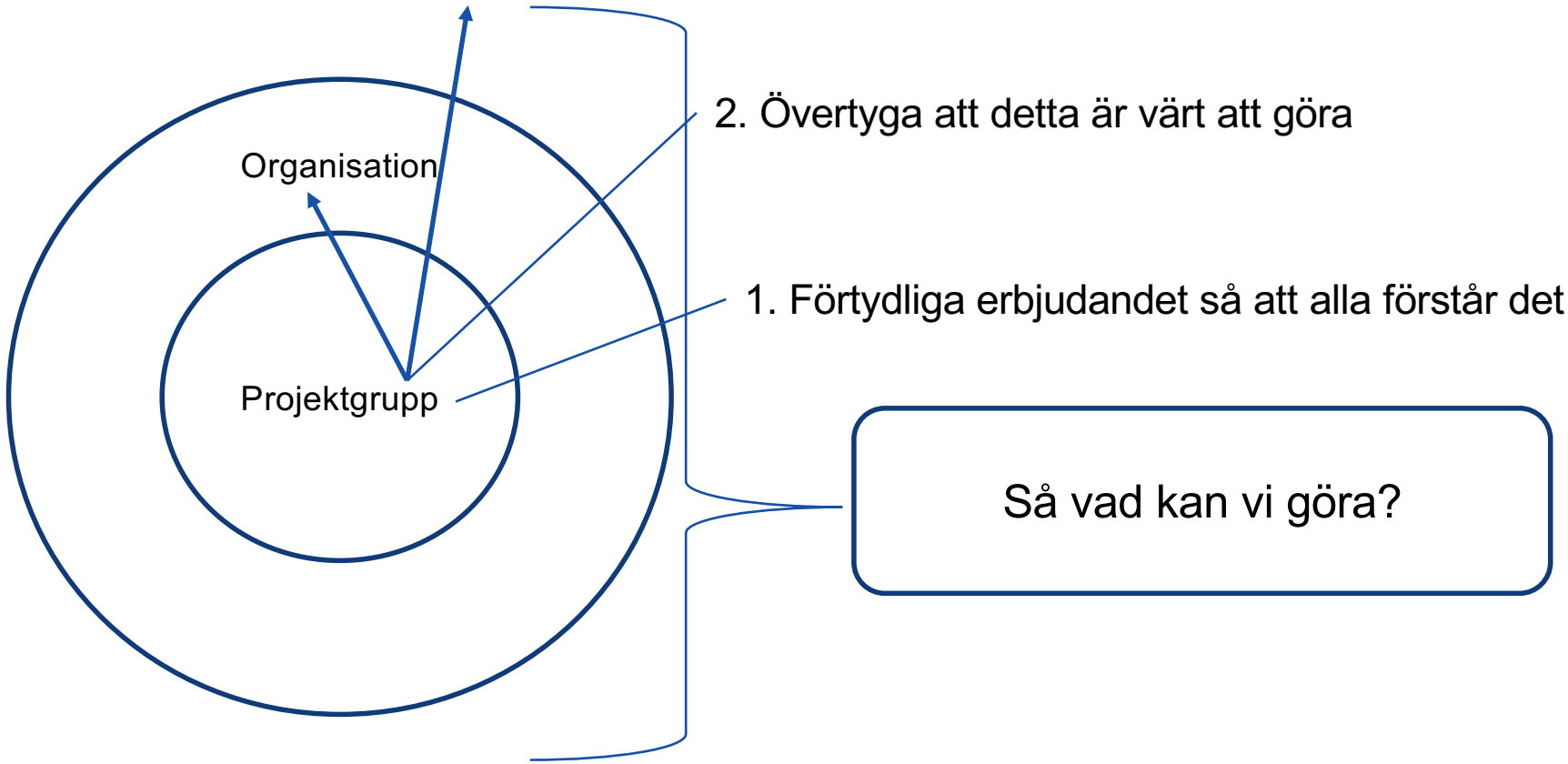
De kritiska görandena - enkelt sagt handlar det om två saker



2. Övertyga att detta är värt att göra

1. Förtydliga erbjudandet så att alla förstår det

De kritiska görandena - enkelt sagt handlar det om två saker



Mekanismer och nytänkande innovationsprojekt

- Om vi kör in radikala projekt i befintliga system och processer för projekt brukar vi effektivt döda dem
- Vi behöver sätt att hantera detta på – *som både möjliggöra framskridandet av projektet och att den kritiska nyhetshöjden består* – detta är en balansakt som inte är trivial
- Hantera att den är osynlig och osäker, och att den väcker motstånd/utmanar befintligt, och att den faller utanför rådande styrramar och strukturer
- 3 mekanismer hjälper oss: påtaglighet, tolerans och frihetsgrad *(tangability, tolerance and tightness)*

Påtaglighet

Tydliggöra:

- vilken utformning den bör ha
- vilket kundvärde den adresserar
- på vilket sätt den kan skapa ekonomiskt värde för organisationen

En hög grad av icke-påtaglighet eller icke-observerbarhet (osynlighet) skapar:

- skepsis, förvirring, missförstånd och öppnar upp för många tolkningar i en organisation
- Uppfattas riskfylld och osäkert

Påtaglighet

Verktyg, metoder och arbetssätt för denna mekanism är att tillhandahålla bevis på konceptet genom att:

- utforma, genomföra och presentera testdata från laboratoriet eller fältet (kund)
- identifiera lämpligt applikationsområde /affärsfall
- Identifiera hur man bäst kan integrera med befintlig teknik, processer, produktservice system
- tillhandahålla intern och extern utbildning

Prototyper – både för testning och kommunikation

Visualiseringstekniker

Tolerans

Denna mekanism syftar till att hantera osäkerheten för nytänkande idéer när det gäller hur de påverkar t ex:

- befintlig marknad/kund
- varumärke
- pågående projekt
- interna kompetenser
- företagsstrategi

En hög grad av osäkerhet skapar:

- rädsla för risker och för att misslyckas
- att ens egna projekt eller expertis blir mindre värderat vilket leder till motstånd mot idén

Tolerans

Målet med att ha tillgång till verktyg/metoder och arbetssätt för denna mekanism är att skapa tolerans för (tillit till) idén och få människor att inte bara se risker utan också ta de positiva effekterna av idéns potential i beaktande genom att:

- involvera experter med specifika kompetenser längs projektet
- skapa uppmärksamhet och stöd från ledningen
- få tillgång till viktiga intressenter
- hantera beroenden på andra projekt / partners
- hantera konsekvenserna av prioritering mellan projekt

Frihetsgrader

Nytänkande idéer och projekt kräver andra frihetsgrader i relation till befintliga krav, processer och strukturer.

En hög grad av frihet kan skapa störningar, avvikelser och variationer som leder till frustration i organisationen.

Frihetsgrader

Målet är att kunna ha så hög grad av frihet som möjligt för att behålla det unika hos de nytänkande idéerna och ändå anpassa dem för att behålla styrfart genom att:

- tillåta avvikelser från befintliga formella processer
- delegera projektets administration till specifika roller
- se till att passera kritiska formella kriterier (säkerhet, nyckelintegrationer) säkerställa spårbarhet av testresultat (för att stödja beslutsfattande) ställa tydliga prestationsmål
- hantera befintliga standarder

Innovationsprojekt med hög nyhetshöjd

Att hantera innovationsprojekt med hög nyhetshöjd kräver balansering av unikhet och anpassning.

För att göra detta behöver vi arbeta med hur man hanterar påtaglighet, hur man hantera tolerans och hur man hanterar frihetsgrad i styrningen för projekt av hög nyhetshöjd.