

ASSESSING HOW FARM FEATURES AND FARMERS' PROFILE CONTRIBUTE TO FARM RESILIENCE

RUMIRES Project

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AGRIFOOD RESEARCH AND TECHNOLOGY CENTRE
OF ARAGON

Reference: *Prat-Benhamou, A., Soriano, B., Ondé, D., Lizarralde, J., Mandaluniz, N., Gaspar-García, P., Mena-Guerrero, Y., Mancilla-Leyton, J.M., Martín-Collado, D. (2023, 30th August). Assessing how farm features and farmers' profile contribute to farm resilience. Oral presentation. 74th Joint international congress of animal science (EAAP). 26th August – 1st September, Lyon, France.*

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What is resilience?

“Ability to ensure the provision of the **system functions** in the face of increasingly complex and accumulating **economic, social, environmental and institutional shocks and stresses**, through capacities of **robustness, adaptability and transformability**”

Meuwissen et al., 2019

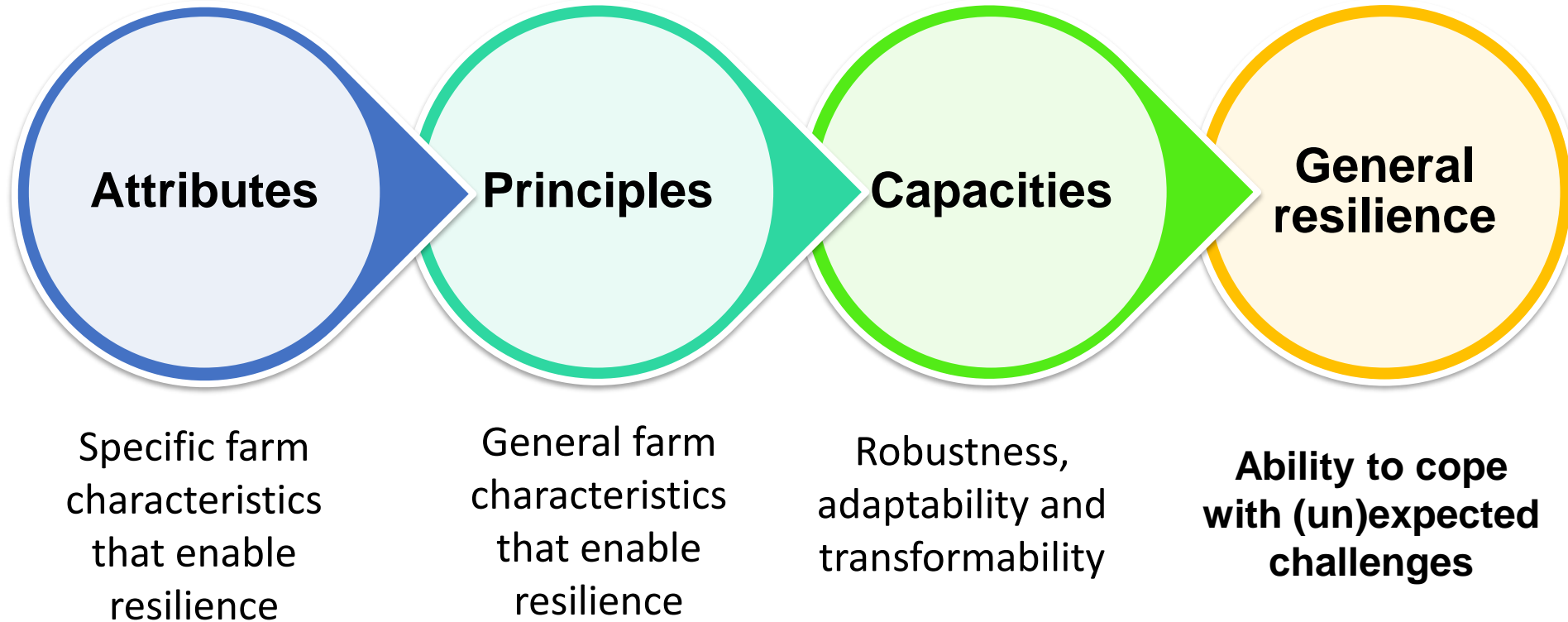


RESILIENCE IS A LATENT PROPERTY

Systems' characteristics that enable farm resilience:

- **Resilience principles:** generic system characteristics
- **Resilience attributes:** specific system characteristics

How can farms achieve resilience?



How can we assess farm resilience?

Resilience cannot be directly measured:

- **Objective approach:** independent of farmers' judgement

Fixed results of farm characteristics

- **Subjective approach:** dependent of farmers' perceptions

Contextual and personal factors



Enables to account for farmers' opinions

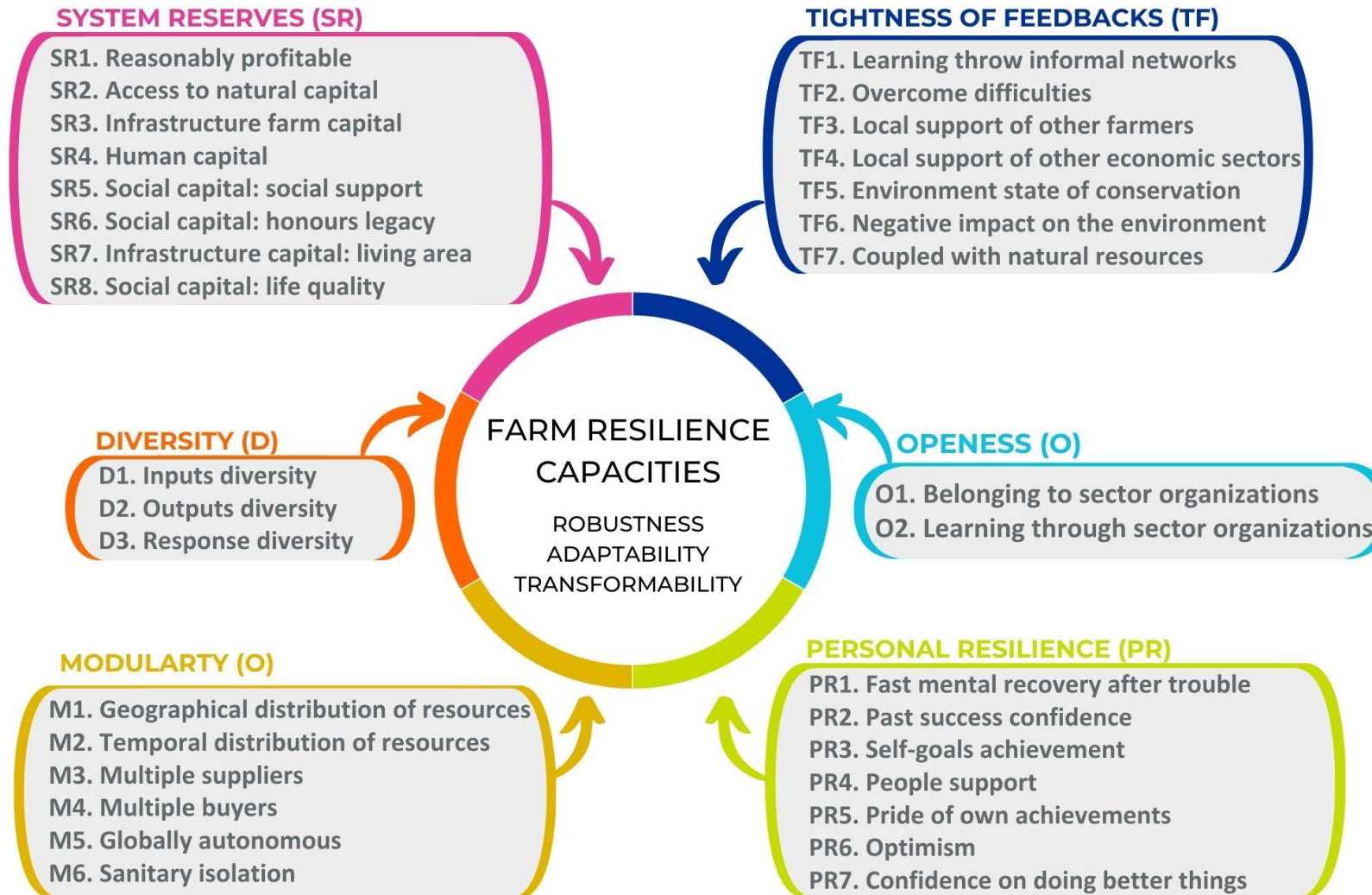


Objectives

1. Test the **relation** between **robustness, adaptability and transformability** and **resilience principles and attributes**
2. Test if **farmers' personal resilience** is linked to the perception of the three resilience capacities



Materials and methods: attributes and principles



Based on *Resilience Alliance, 2010; Cabell y Oelofse, 2012; Meuwissen et al., 2019; Paas et al., 2021*

Materials and methods: data

Survey data

Face to face
Small ruminants farmers in Spain

Area	Nº farmers
Andalucía	53
Aragón	57
País Vasco	41
Extremadura	9
TOTAL	160

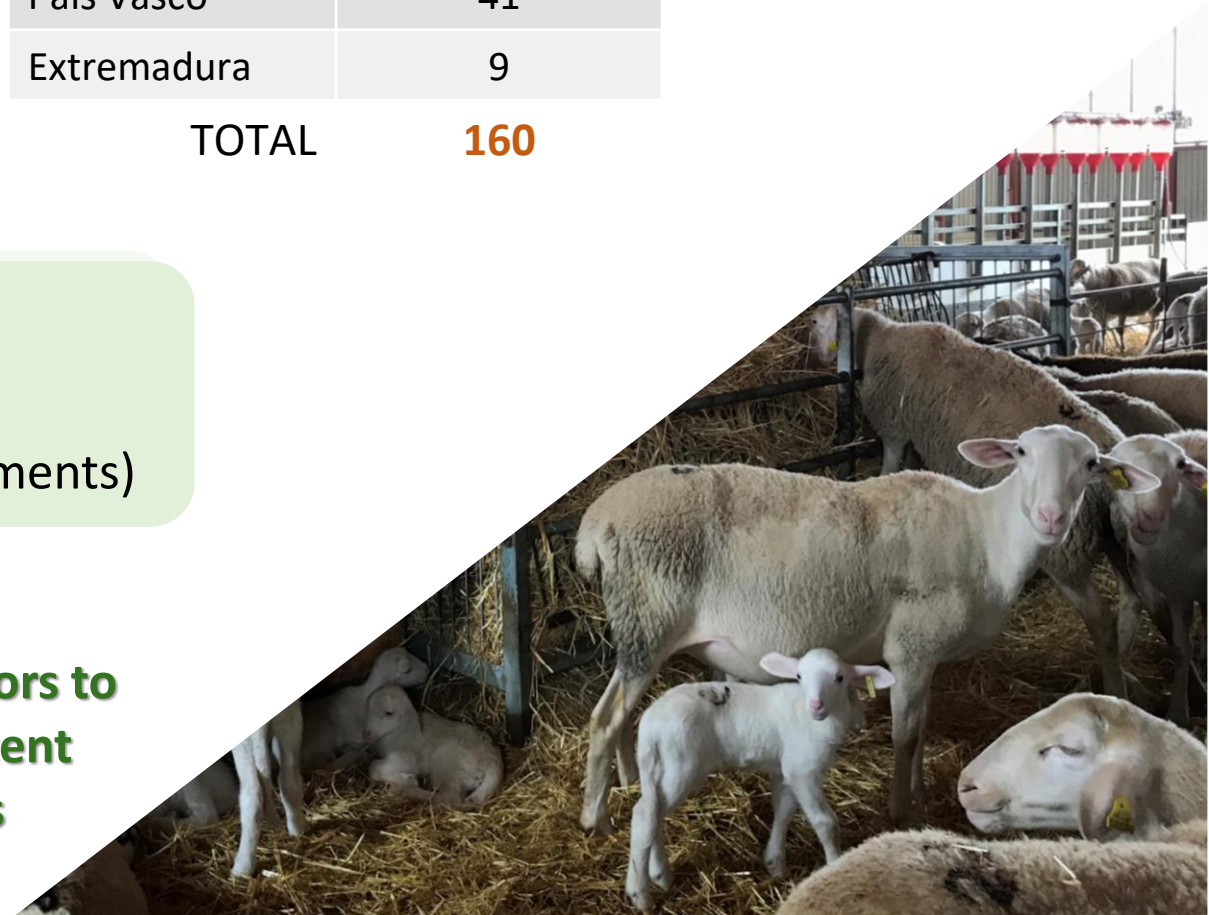
Farmers self-assessed:

1. Farm **attributes** (27 statements)
2. **Robustness, Adaptability and Transformability** (3 statements)

LIKERT-SCALE

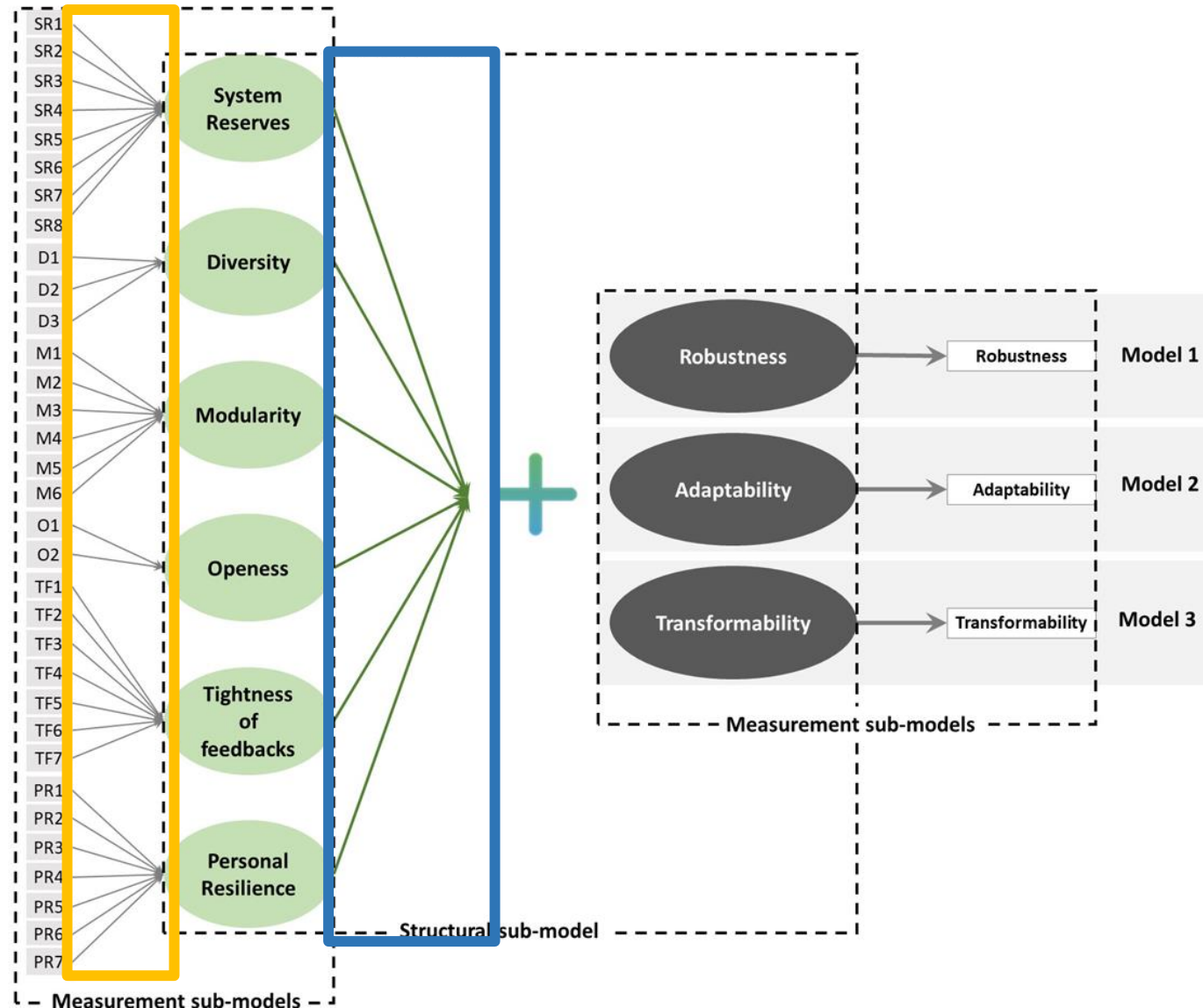
1- I strongly agree
7- I strongly disagree

Proxy indicators to
measure latent
variables



Materials and methods: analyses

Structural Equation models performed



Weight coefficients per attribute assigned to each principle

Path coefficients per principle to each principle

Materials and methods: data and analyses

Weight coefficients per attribute assigned to each principle

Latent variable (Principles)	Indicator (Attributes)	Models		
		Robustness	Adaptability	Transformability
System Reserves	Reasonably profitable	0.535*	0.679**	0.617*
	Access to natural capital	0.205	-0.583**	0.175
	Infrastructure farm capital	0.140	0.435*	0.477*
	Human capital	0.008	-0.219	-0.091
	Social capital: social support	0.281	0.233	0.32
	Social capital: honours legacy	0.274	0.198	0.209
Diversity	Infrastructure capital: living area	0.423*	0.117	-0.345
	Social capital: life quality	0.036	0.187	-0.135
	Inputs diveristy	-0.084	-0.223	-0.078
Modularity	Outputs diversity	-0.295	-0.351	0.125
	Response diversity	1.030***	1.034***	0.987***
Openess	Geographical distribution of resources	0.438	0.313	-0.048
	Temporal distribution of resources	0.518	-0.396	0.125
	Multiple suppliers	-0.679	-0.107	-0.027
	Multiple buyers	0.433	0.33	0.810*
	Globally autonomous	0.503	-0.806	0.516
	Sanitary isolation	-0.266	0.513	-0.020
	Belonging to sector organizations	-0.16	-0.096	-0.882
Tighness of feedbacks	Learning through sector organizations	1.062	1.040	1.014
	Learning throw informal networks	0.046	-0.200	-0.314
	Overcome difficulties	0.940***	0.865**	0.508*
	Local support of other farmers	0.118	-0.071	-0.060
	Local support of other economic sectors	0.224	0.221	0.687**
	Environment state of conservarion	-0.215	-0.324	0.048
	Negative impact on the environment	-0.144	-0.087	0.117
	Coupled with natural resources	0.152	0.39	0.307
Personal Resilience	Fast mental recovery after trouble	0.231	0.224	0.473*
	Past success confidence	0.177	-0.037	0.213
	Self-goals achievement	-0.396	0.193	-0.023
	People support	0.311	-0.008	0.323
	Pride of own achievements	0.053	0.425*	-0.313
	Optimism	0.771***	0.408*	0.475
	Confidence on doing better things	0.097	0.172	0.174

Path coefficients per principle to each principle

Latent variable	Robustness model		Adaptability model		Transformability model	
	Path coefficients	f ²	Path coefficients	f ²	Path coefficients	f ²
System	0.204*	0.049	0.182*	0.042	0.117	0.014
Reserves						
Diversity	0.202*	0.051	0.197*	0.048	0.183*	0.035
Modularity	0.134	0.026	0.197	0.053	0.091	0.010
Openess	0.005	0.000	0.001	0.000	0.079	0.008
Tighness of feedbacks	0.202*	0.051	0.161	0.034	0.191*	0.036
Personal resilience	0.246**	0.039	0.283**	0.105	0.149*	0.024
R ²	0.350		0.394		0.232	
Q ²	0.130		0.180		0.007	

Results and discussion

Capacities

Principles

Attributes

Robustness
Adaptability

Transformability

Personal
resilience

- Optimism

Diversity

- Response diversity

Robustness
Adaptability

System
reserves

- Reasonably profitable
- Infrastructure capital of the living area (Robustness)
- Access to natural capital and Infrastructure farm capital (Adaptability)

Transformability

Tightness of
feedbacks

- Local support of other economic sectors
- Overcome difficulties

Conclusion

- Resilience **principles and attributes** contribute differently to resilience capacities
- **Optimism** and **Response diversity** are key for **perceived resilience** assessments
- **Profitability** is relevant for **robustness and adaptability**
- **Local support of other economic sectors** and **Overcome difficulties** are key for **transformability**

THANKS FOR YOUR ATTENTION

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Funded by:



Extra materials

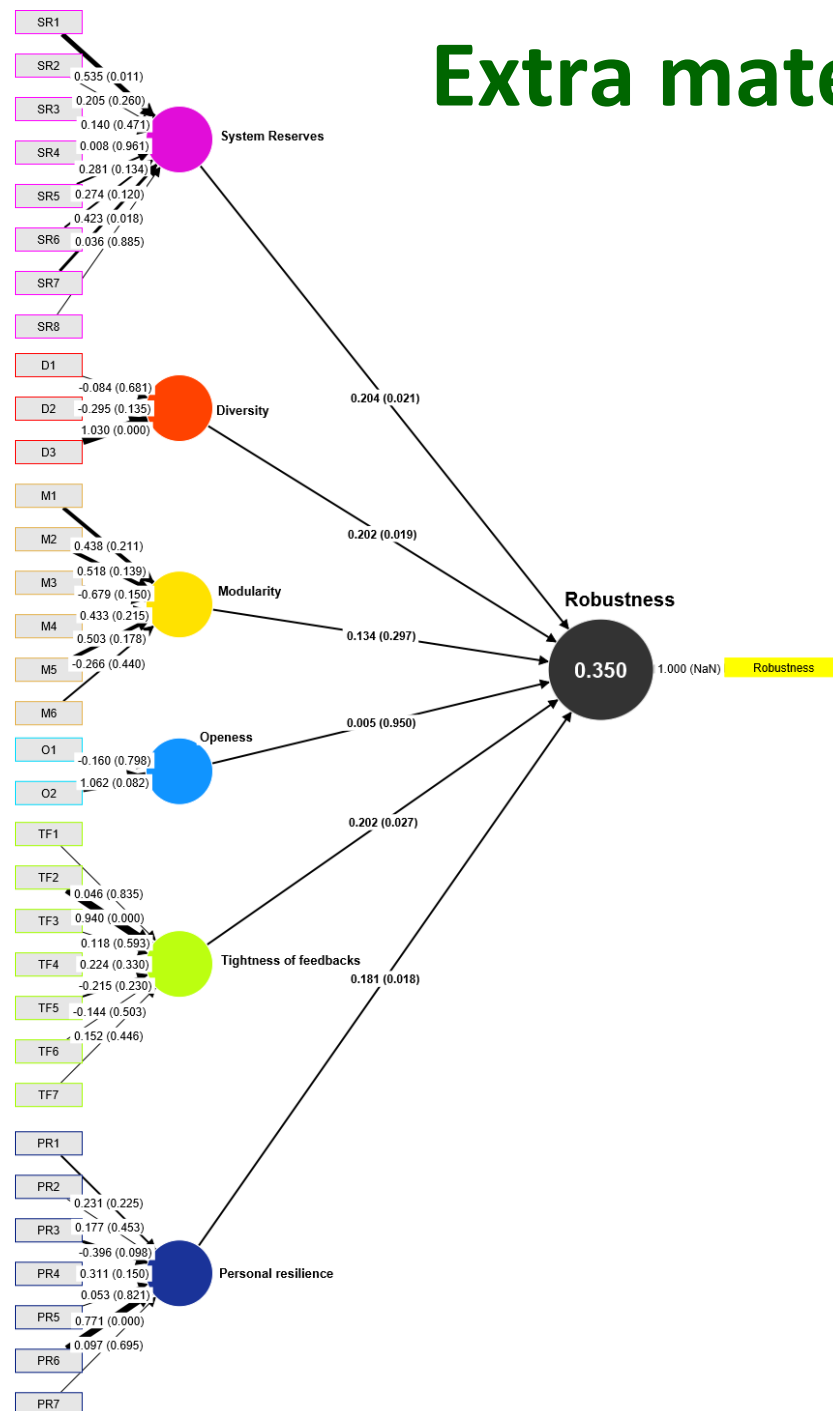
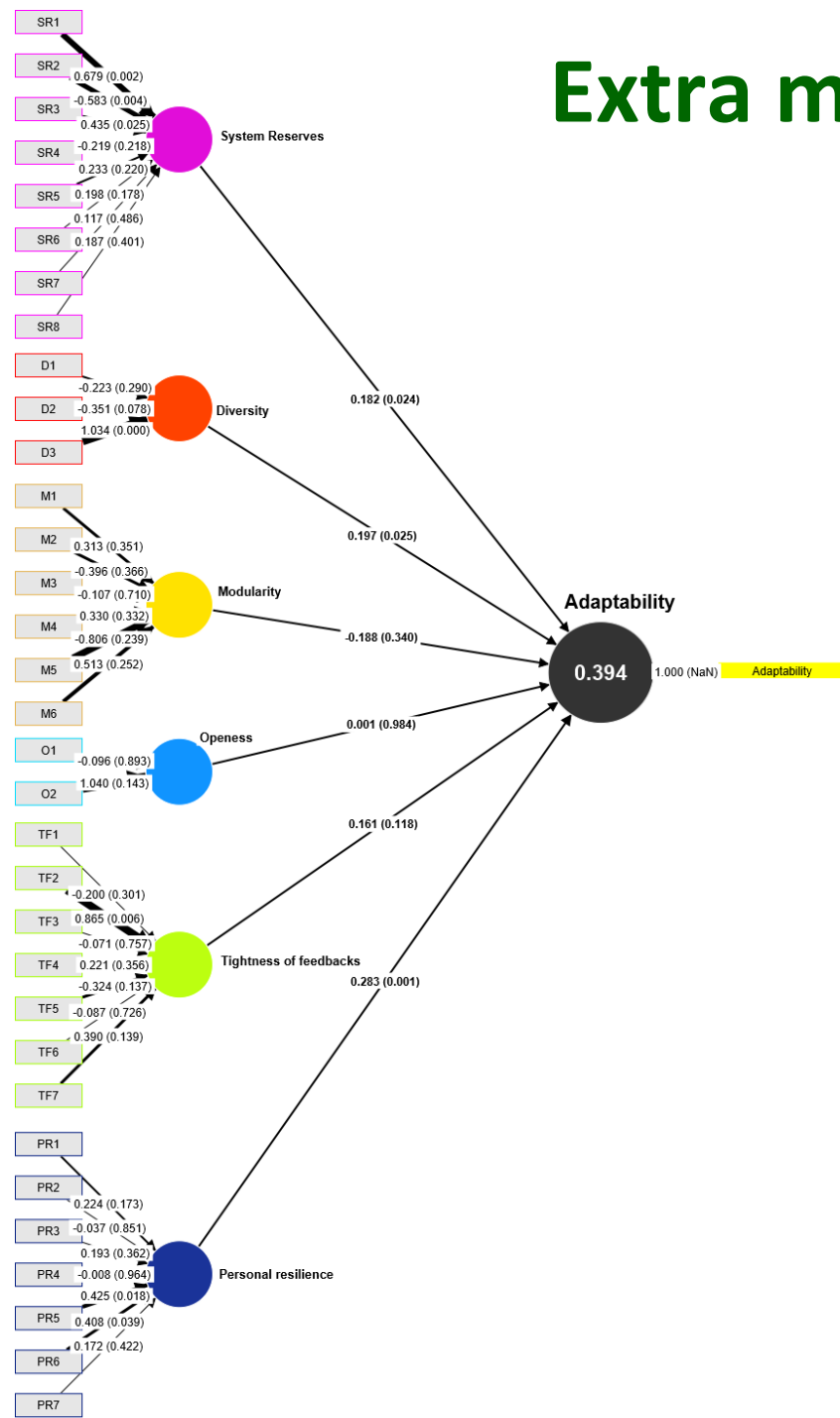


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Extra materials

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