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What makes University Networks work? Exploring Success Factors and Development Needs

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Abstract

University networks have become a common approach to the implementation and management of projects both in research and higher education. However, the theoretical reasoning and empirical investigation of the determinants that make university networks successful is not yet consolidated. The present study thus takes an exploratory perspective in order to contribute to the debate on what is necessary to make university networks work. We draw on data from a nation-wide survey of German university networks and extract dimensions that have an impact on the stakeholders' perception of what contributes to networks' achievement: a working atmosphere that is rather cooperative than competitive, personal identification with the network, its institutional support and goal attainment. All of these aspects are discussed in the light of theoretical perspectives in order to further develop a theory-driven research agenda.

Keywords: *Networks; identification; cooperation; institutional support; goal attainment.*

1. Introduction

Establishing university networks for the joint acquisition of funding and implementation of projects has become a common management approach both in research and higher education (Goedegebuure, 2012; Gunn & Mintrom 2013; Rocha et al. 2018). The expectation towards such alliances among others is that they help secure a more efficient use of scarce resources, promote mutual learning, and become more competitive as a consortium that combines different sources of expertise. Nonetheless, many networks fall apart after the termination of the respective projects' funding period, even when a longer lasting cooperation had initially been intended. The analysis of university alliances and the determinants of their successful initiation and implementation is an emergent field of study (Fehrenbach & Huisman, 2022). The theoretical reasoning on the factors of success and failure thus is not fully consolidated. For research alliances, Fehrenbach & Huisman (2022) state that little is known about the interplay between network partners' motivations and the organisational set-up (governance structures,

processes, etc.). The present study aims to address such gaps. It reports findings of a national survey of university networks in the field of higher education development in Germany. The analysis is explorative in nature, nonetheless, it aims at contributing to the pending theoretical conceptualization of university networks by identifying predictors of networks' success and their interplay. Theoretical perspectives that help resolve the diverse dilemmas of cooperation in networks (e.g., distrust between the partners, disbalance between investments and returns on investments, etc.) are needed. Preliminarily, we draw on perspectives that are inspired by social capital theory (e.g., adherence to norms of reciprocity; Putnam, 2000). The study focusses on university networks in the field of higher education and specifically on those that are engaged with higher education quality development. Therefore, the study particularly places emphasis on networks that jointly implement activities in management fields like quality assurance, academic development, internationalization etc. It does not involve networks of universities that implement joint degree programmes or other purely academic tasks.

2. Study Design

2.1. Sample

The data were drawn from a nation-wide survey of German universities that had hosted or participated in at least one university network between 2016 and 2022. The survey was implemented under a research project[1] which had set out criteria for what a university network actually is. According to these criteria, we define university networks as institutionalised alliances of universities which pursue the shared goal of contributing to quality enhancement and increasing higher education effectiveness. They are established on a lasting basis and have been initiated by means of (public) subsidies. The cooperation is based on agreements with regard to both the specific objectives of the cooperation, and the processes geared at achieving the shared goals. These processes relate to both the culture of the cooperation (e.g., working in a collegial spirit) at the management and operational levels, and the organisational structure (e.g., boards, responsibilities of the participating universities and their agents). Moreover, the network is visible for external stakeholders, e.g., through a web-page or other channels of communication (Merkt, et al., 2024). By means of a systematic desk research we retrieved 174 university networks that matched the above criteria and were (or still are) active between 2016 and 2022. Representatives of the operational level of the sampled networks were identified through a web search. They were invited to administer the online-survey and to pass the web-link to the survey on to their colleagues who had or still have an active role in the network. The field work was performed in May/June 2022, and the data were collected through an online survey. A reminder was sent out once, two weeks after the initiation of the survey. Respondents

[1] See acknowledgements.

from 62 different networks participated in the network which equals a response rate of 35.6% at the level of networks. The response rate at the level of individual stakeholders cannot be controlled, since the actual number of people that have an active role in the network is unknown. Thus the reported data do not claim to be representative for the entirety of university networks.

2.2. Methodological approach and research questions

University networks' success as such, and also the respectively relevant determinants can be interpreted as latent constructs which elude an immediate empirical observation or measurement: respondents may weigh the different aspects of networks' success differently, they may have different understandings of what contributes to a successful network, etc. We thus deliberately dispensed to base the analyses on theory-driven hypotheses and made preliminary assumptions instead, concerning the relative meaning of different (latent) aspects for the achievement or *success* of university networks (path diagram in figure 1). Since the study is exploratory in nature, we did not develop hypotheses to be empirically tested. Nonetheless, based on the notions of social capital we anticipated that aspects such as the extent to which respondents consider the working atmosphere as cooperative and reciprocal (latent variable *cooperation*). We further expected that 'success' is a function of the extent to which stakeholders can identify themselves with the network (latent variable *identification* in the path diagram in figure 1); of the level of *goal attainment*; and of the *institutional support* which the network enjoys by the superiors of the respective university. In order to analyse these latent variables in terms of their relative relevance for network success, we assigned indicator variables which is the observations that were performed by means of the survey. Table 1 displays the properties (specifications, descriptive statistics) of the latent variables' measurements. For the statistical analysis of the respective relationships between latent variables (direct, indirect, and total effects), we performed a partial least square (PLS) based structural equation model estimation with smartPLS software (Ringle et al., 2022). PLS modelling is less sensitive against violations of model assumptions, such as a small sample size or the normal distribution of the data (ibid.) and is thus appropriate, given the sample's properties.

3. Results

3.1 Measurement model

The measurement ('outer model' represented by the rectangles in the path diagram) specifies the relation between the latent variables and the respectively assigned indicator variables. The

Table 1. Properties of the variables in the model.

Latent construct	Measurement variables	Variable specifications (5-point Likert scale from (1) 'does not apply/do not agree at all' to (5) 'fully applies/fully agree')*	Mean / St.-Dev.
Success	innovation	'The network has a high innovative capability'	2.85 / 1.07
	overall	'All in all the network was/is successful'	3.15 / 0.86
	relevance	'Results are relevant for quality development'	2.91 / 1.08
identification	coop. again	'I would join the network again'	3.30 / 1.13
	enjoy work	'Generally, I enjoy working in the network'	3.27 / 0.96
	identify	'All in all, I can identify myself with the network'	2.87 / 1.20
	person. dev.	'The cooperation helped me progress personally'	3.13 / 1.07
goal attainment	new fields	'We were able to tap new action lines'	2.98 / 0.97
	solutions	'We developed solutions to practical problems'	3.20 / 0.96
	strategies	'We developed strategies for higher education'	2.88 / 1.11
	tentative	'The network has tentatively achieved its goals'	3.03 / 1.01
cooperation	needs	'Needs of staff members were appreciated by all'	2.71 / 1.02
	reciproc.	'Staff were eager to reciprocate support'	2.84 / 0.90
	relations	'Relationship: competitive vs. cooperative'	3.47 / 0.72
	support	'I had access to other staff's support at any time'	3.31 / 0.87
institutional support	adjust	'It was possible to adjust goals, when necessary'	3.10 / 0.87
	facilitate	'The network facilitated difficult projects'	3.02 / 1.14

* table 1 provides English translations of the German-language items that were used in the survey.

coefficients represent the effect of the latent construct on the respective indicator variable. All indicators take on desirable values. The additional tests for the evaluation of the measurement model's reliability and validity largely confirm its appropriateness. The values for Cronbach's α and for the composite reliability (ρ_c) are above the threshold value of .50 with the exception of the latent variable *institutional support,* implying the need for further elaboration The values for the average extracted variance (AVE) however, are confirming all constructs' validity.

3.2 Structural Model

For the evaluation of the structural model ('inner model', represented by elliptic shapes in the path diagram), we're assessing the path coefficients; the coefficient of determinantion (R^2) which is a measure of the amount of variance in the endogenous latent variables that is explained by the impact of the exogenous latent variables; and the effect size (f^2) as a measure of the relative impact of the exogenous on the endogenous variables (Hair et al., 2022).

The path coefficients in the model can be interpreted in correspondence with the β-weights in OLS regression models or as the relative contribution of an exogenous variable to the explanation of the variance in the endogenous variable(s). All path coefficients are statistically significant ($p < .001$).

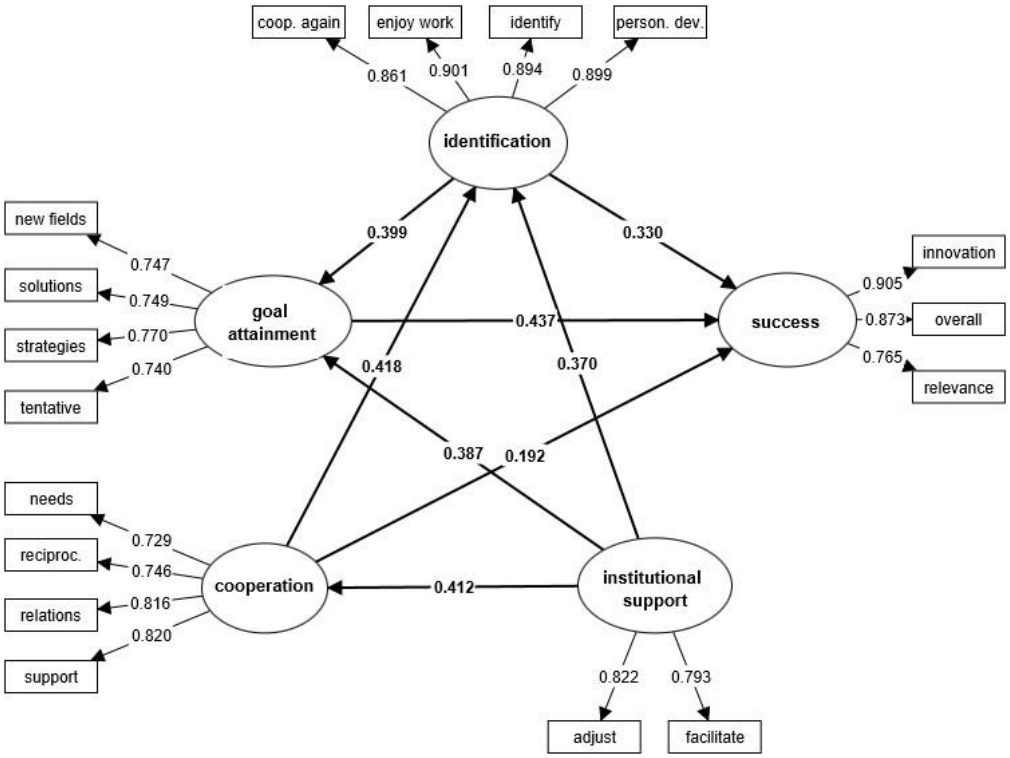

Figure 1. Path diagram of the estimated model (standardized coefficients).

The adjusted value for R^2 of *success* as the ultimate dependent (or endogenous) variable is .657 which means that almost two thirds of the variance in *success* are explained by the impact of variables that represent stakeholders' identification with the network (latent variable *identification*), their assessment of the working atmosphere in the network as cooperative (*cooperation*), and features of the network's ability to reach its goals (*goal attainment*). Additionally, indirect effects from *institutional support* over *cooperation*, *goal attainment*, and *identification* contribute to the R^2 value in success which means that a positively perceived institutional support contributes to a cooperative working atmosphere that supports the stakeholders' identification with the network.

All in all, the model in its current state contributes considerably to the explanation of what the relevant aspects of university networks' success are. Also the other endogenous latent variables are well explained by the assigned exogenous variables, with adjusted R^2 values of .432 for identification, .471 for goal attainment, and .165 for cooperation.

The f^2 test statistics confirms the effects of the exogenous on the endogenous variables (direct effects) as shown in table 2. Unsurprisingly, the strongest effect is the one of *goal attainment*

on *success*. Attaining an activity's goals is naturally an important aspect for stakeholders' appraisal of that particular activity as a successful one. However, all latent variables in the model exhibit medium size or at least small effects (Chin 1998) which means that they exhibit substantial explanatory power with regard to university networks' successful implementation.

Table 2. f^2 statistics for the latent constructs.

Latent constructs (direct effects)	f^2
cooperation => identification	.258
cooperation => success	.072
goal attainment => success	.346
identification => goal attainment	.216
identification => success	.169
institutional support => cooperation	.205
institutional support => goal attainment	.203
institutional support => identification	.202

3.3 Overall model evaluation

PLS modelling does not provide a simple overall goodness-of-fit indicator (Hair et al. 2021) which is why for an overall model assessment, the above outlined parameters need to be evaluated in their entirety. With regard to most of the parameters under evaluation, the suggested model performs well. Exceptions are measures of the internal consistency (reliability, validity) of the latent variable *institutional support* (Cronbach's α). With regard to all other parameters, also *institutional support* as a latent variable seems to be a meaningful aspect of university networks and their success. Nonetheless, the weaknesses with regard to the assigned indicators suggest the need for further elaboration of this particular latent construct.

4. Discussion

Notwithstanding an existing need to further elaborate on the model design, the current state of the analysis serves the purpose of the exploratory study very well. The estimated latent variables function as powerful predictors of the overall construct of university network *success*. In this sense, one can say that networks are more successful, if they manage to establish a working atmosphere that is perceived as a cooperative one. A rather cooperative than competitive working situation helps raising the *identification* with the network which is in turn contributing to its *goal attainment*. The role of *institutional support* in the sense of university leaderships that are actively backing the network and promote the achievement of the previously set goals, remains comparatively unclear. Most probably, this is due to the structure of the available data, in which the operational level constituted the actual target audience of the survey and not those respondents in management positions and with a responsibility for support provided by management levels to the actual implementation of the respective networks.

The identified latent constructs can also be related to already established theoretical concepts in order to contribute to a more theory-driven reasoning on university networks in the long run. *Cooperation* in the conceptualization we chose here, embraces the willingness of stakeholders from the different participating university network partners to provide reciprocal support. This notion provides an interface with social capital theory which can generally be seen as an appropriate perspective when social networks are involved (Putnam, 2000; 2001).

Identification may be further analyzed from a psychological angle, e.g., in terms of the theory of self-determination and autonomy (Ryan & Deci, 2017) which is centred around the concepts of the intentionality of and the motivation for a specific behavior or action. The authors differentiate between intrinsic and extrinsic motivation and interpret intrinsic motivation as a representation of self-determined action. Such type of action is meeting the psychological need for autonomy. In the case of the *identification* of actors with a university network, it would be worthwhile to analyse the level to which specific activities at the operational level of the network, can be attributed to such self-determination or in other terms, what specifically are the sources of the identification with the network. Respective knowledge may help fostering a working atmosphere that is conducive to staff *identification* and *cooperation*.

Goal attainment could be thought to be of noble social science theoretical descent, since it forms one of the four functionalities of social systems in the work of Talcott Parsons (1951). In the present understanding however, *goal attainment* is not meant as a process through which activities are mobilized with the aim of attaining a particular goal by different actors in a shared labor approach. It is rather meant as the outcome of such processes, in the sense that solutions to problems have been found jointly, strategies have been developed, new fields of activity have been identified, etc., as is implied by the indicator variables that form this particular latent construct.

Nonetheless, when exploring the conditions under which university networks are able to achieve their previously set goals, one could still take a structure-functionalist perspective for further inquiry into the determinants of university networks' successful acting. In the same vein one could finally look at the role of *institutional support* or its meaning for the establishment of a well-functioning working level and its relation. Finally, it can be concluded that university networks are a complex phenomenon that requires taking a multidimensional perspective that combines actor-centred approaches (e.g., cost-benefit analyses by individual and corporate actors; social networks) with rather system-theoretical perspectives (e.g., universities as organisations; governance arrangements).

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