thinking was the established mindset for too long on both sides. We repeated like a mantra that the Germans do not bring along ready-made knowledge for the cities of tomorrow, but that we have to generate that knowledge together." (PP38)

The concentration of resources in the hands of the German partners; the power over the project's direction, the imbalances in view of available time as well as the inequalities in view of the type of partners in many projects thereby reinforced *patterns of thinking and social typifications* reminiscent of colonial times and a model of cooperation that the BMBF's discourse of cooperation on eyelevel had originally tried to overcome, including binaries such as rich vs. poor, expert vs. lay person, master vs. servant, modern vs. to-be-developed, donors vs. recipients. Although this might not have been an intended consequence of the BMBF's policy discourse, the accompanying practices thus served to maintain a specific order of reality (Keller 2013).

Beyond these perpetuations of obsolete, disrespectful mindsets, the project practices also had consequences on the potential effects. If transdisciplinary, participatory research is key to implementation, ownership may arise not only through supplying own funds, but also through the level of involvement in the project, the feeling of being an active contributor of valuable work and knowledge. As a partner of the Megacities project in Peru stated, who was simultaneously involved in an EU-funded FP7 project that funded the Peruvian partners as well:

> "In the EU-project, we are more involved because there we do the research ourselves, and we coordinate a work package. This is more horizontal and equal. We are all investigators. The community people are investigators – all types of knowledge are considered valid. All partners have the same budget" (PP01).

In the end, enabling joint knowledge creation seems more important for ownership and cooperation on eyelevel than the source of funding. For a balanced partnership, the endowment of partners with equitable funds, whichever source these may stem from – the BMBF, third parties or the partner country's government – thus seems to be key.

9.3   High expectations, low conceptualisation

Although the ministry raised high expectations in view of creating impact through the research projects, the BMBF's level of conceptualisation of how projects cause impacts, its theory of innovation, was rather low. As chapter 9.2 shows, transdisciplinarity and cooperation on eyelevel were conceptualized as modes of research cooperation conducive to producing the outcomes desired. Next to applying these principles of cooperation, no further ex-ante criteria for creating effects were available to the projects. Mechanistic and simplistic ideas of how innovations developed

and succeeded as results of the projects funded seemed prevailing. A member of the Megacities advisory board illustrated his impression that the BMBF clung to a linear notion of innovation, without taking into account the barriers hindering their implementation in context coined by different interests and systemic resistance to change:

> "You have got a problem, look at it really well, find a solution, and then the problem is solved? Well, no! [...] Technical solutions are one part. But in introducing them into a system, if they concern deeper change, then you deal with economic interests and political influence [...] Real change is always met with massive opposition. Change processes have to be designed and accompanied, that is different from developing a solution. Which is important, as well. But the idea for a solution does not lead to its implementation." (EE06)

In the BMBF's conceptualisation as stated in FONA, innovation fails because the financial risk to make use of promising research results is too high for the business partners involved, which therefore require additional funding:

> "[E]ven promising research and development findings often lead to a dead end: many a solution that is technically feasible is not actually put into practice. This is due to the high entrepreneurial risk, combined with the necessary increase in scale from the laboratory or technical centre to the pilot and demonstration scale." (BMBF 2015e: 7)

This is a quite simplistic explanation which lacks reflection about other systemic factors determining successful innovation or transformation. The lack of reflection on impact, innovation and implementation harshly contrasts with high expectations of outcomes as impact of the projects (ch. 9.1, 10.2). In their emphasis of producing outcomes, the BMBF especially pushed for visibility. Different BMBF employees, involved in IWRM as well as in the Megacities funding initiative, stressed their expectations of touchable, physical results, as this quote illustrates: "I met all IWRM projects in Leipzig and strongly emphasized that we want to see results. Not just publications and travelling, but tangible results." (PA14)

I maintain that the focus on visible, physically observable outcomes and solutions enabled the BMBF to better demonstrate that their funding measures had an impact. The tendency to favour visible, easily graspable results over more complex solutions can be explained as a result from previous policies for cooperation with developing countries and emerging economies which produced irrelevant data and research results, useful only for the careers of the German scientists involved – a form of research cooperation that had been criticized by development practitioners in the past (interview with PT01). In consequence, favouring visible results also was used as a strategy to prove that public money was spent effectively. Especially on the background of the BMBF's competition with other ministries (ch. 8), being

able to highlight policy successes, showing proofs of investing public money wisely, is perceived as crucial.

Focusing on solving concrete technical problems and solutions through its research projects – rather than addressing systemic issues of sustainable development in partner countries or fostering these may be a consequence of the need to show policy success as well. At the same time, accentuating visibility further favours technical solutions and thus re-enforces the BMBF core discourse. Social, non-technical solutions, such as governance schemes – let alone effects on other systemic levels, such as sustainable innovation systems abroad – are often more complex and not as easily visible or understandable as a technical, physical solution, such as a waste water plant. Additionally, the effects of non-technical solutions are more difficult to measure, and their impact is often harder to trace. As has been argued in view of the adverse effects of performance measurement in development cooperation, a strong focus on a specific issue – such as visible results in the BMBF's case – often causes tunnel vision among the projects as an adverse effect. Issues that are measured, or in the BMBF's case strongly emphasized, are focused on at the expense of aspects attributed with less importance (Holzapfel 2016: 7). The strong push for traceable, visible outcomes consequently influenced the type of solutions searched within the projects (ch. 10).

The focus on results caused a high pressure on the projects to succeed in view of the implementation of solutions created in the earlier stages of the projects. While stressing impact, a reflection about the potential factors conducive to or impeding impact was not encouraged. Even in the Megacities initiative, which in comparison to IWRM was open towards any type of output and encouraged a transferability of results, the BMBF did not expect deeper scientific reflections about the conditions and context of impact as a type of transformation knowledge but emphasized transformative research (on differences between transformation and transformative research, see WBGU 2011). Instead of turning the implementation of results, the innovation or transformation process into research questions, concrete results were to be implemented. This affected the type of knowledge production within the projects substantially (ch. 10).

The strong emphasis of producing technical results also touches some deeper questions about applied research (funding). What does it imply for the nature of science if a failure to produce an innovation is seen as a failure of a research project? If so, what distinguishes it from implementation-oriented projects of development cooperation? Should science, especially in view of the freedom of science, be shaped into an instrument of technological solutions? And what consequences would this have for the ability of the science system as such to cope with global challenges of all kinds, including complex, non-technological problems?

Beyond these philosophical questions touching the nature of science, neglecting the potentials of reflecting about innovation as well as about failures of pro-

ducing innovation also forfeits a big potential to generate transferable transformation knowledge for global sustainability. Reflections about implementation and innovation processes; about enabling conditions and reasons for failures, about researchers' roles in facilitating innovations and implementation should turn into research questions of funded projects, instead of conceptualizing success exclusively as a visible innovation.