

Supplementary Materials

Table S1: Detailed results from literature review [25].

Table S1. Individual learning context.

Individual learning context (I)					
Factor group	Description of supportive/impeding factor	Sup/ Imp	Similar factors	References; theoretical (T) / empirical (E)	Exog. (X) / Endog. (N)
Motivation	1 Disturbance or crisis (e.g., social, economic or environmental crisis)	Sup	G-1; O-1; P-1	E: Leitgeb et al., 2014; T/E: Reed et al., 2013	X
	2 Environmental values based upon a deep understanding of environmental interactions	Sup	O2; P3	E: Leitgeb et al., 2014	N
	3 Relation of experiment or innovation to everyday life	Sup	G-3.4; O-6.3; P-5.1	T/E: Kemp et al., 2007 E: Fam and Mitchell 2013; Leitgeb et al., 2014	N
	4 Aspirations (clear vision and goals)		O-8; P-7	T/E: Reed et al., 2013 E: Leitgeb et al., 2014	N
	5 Curious and critical mindset (i.e., question others and one's own assumptions)	Sup		E: Leitgeb et al., 2014;	N
	6 Inspirations from others to become pro-active (e.g., organizations, family, colleagues)	Sup	O-9; P-8	T/E: Reed et al., 2013 E: Leitgeb et al., 2014	X
Experimental process	7 Application of experimental method	Sup	G-5; O-10; P-9	E: Leitgeb et al., 2014	N/X
	7.1 Flexible and adaptive application of experimental and reflexive methods	Sup	G-7.5; O-13.3; P-13.5	E: Leitgeb et al., 2014	N
	7.2 A continuous process monitoring and evaluation, and reflection on outcomes and process	Sup	G-7.4; O-13.7; P-13.11	E: Leitgeb et al., 2014	N
	7.3 Possibility of no-regret experimentation (i.e., reduce the risk of failure)	Sup	G-5.3; O-10.4; P-9.4	T/E: Reed et al., 2013 (Inv) E: Leitgeb et al., 2014	N/X
Social Interaction Process	8 Engagement of affected actors/users	Sup		E: Lopes et al., 2012	N/X
	8.1 Interactive concepts to inform all stakeholders, and foster learning	Sup		T/E: Kemp et al., 2007 E: Lopes et al., 2012	N/X
	8.2 Simplicity and honesty of the message without a bargaining mentality attached	Sup		E: Lopes et al., 2012; Fam and Mitchell 2013 (Inv)	N
Resources	9 Physical resources (e.g. funding, materials)	Sup	G-9; O-15; P-15	T/E: Reed et al., 2013 E: Leitgeb et al., 2014	N/X
	9.1 Creative usage of what is available (e.g., recycle material)	Sup		E: Leitgeb et al., 2014	N
	9.2 Ability to ask others for help	Sup		T/E: Marschke and Sinclair, 2009 E: Leitgeb et al., 2014	N/X

	9.3 Support from individuals, organizations or programs (e.g. governmental agencies, universities and other intellectual entrepreneurs)	Sup	G-9.1; O-15.1; P-15.1	T/E: Reed et al., 2013 E: Fam and Mitchell 2013; Leitgeb et al., 2014	N/X
	9.4 Natural capital	Sup		T/E: Reed et al., 2013	X
	10 Knowledge and information	Sup	G-10; O-16; P-16		N/X
	10.1 Availability of local or traditional knowledge	Sup	G-10.3	E: Leitgeb et al., 2014	X
	10.2 Measures and infrastructure for knowledge exchange (between practitioners, scientists, ...)	Sup	G-10.1; O-16.1; P-16.1;	T/E: Reed et al., 2013 E: Leitgeb et al., 2014	
	10.3 Measures and infrastructure for knowledge integration (between practitioners, scientists, ...)	Sup	G-10.2; O-16.2; P-16.2	T/E: Reed et al., 2013 E: Leitgeb et al., 2014	N/X

Supportive (Sup) and impeding (Imp) factors of learning in sustainability transition processes related to an individual learning context. Similar factors in other learning contexts are provided by using factor identifiers. Endogenous factors (N) can be implemented in the scope of an individual learning process, while exogenous factors (X) cannot be addressed directly (N/X denotes an ambiguous factor). .

Table S2. Group learning context.

Group learning context (G)					
	Description of supportive/impeding factor	Sup/ Imp	Similar factors	References; theoretical (T) / empirical (E)	Exog. (X) / Endog. (N)
Motivation	1 Disturbance or crisis (e.g., social, economic or environmental crisis)	Sup	I-1: O-1; P-1	E: Seyfangd and Longhurst, 2013	X
	2 Change of government	Sup	P-2	T/E: Marschke and Sinclair, 2009	X
	3 Choose topic that arouses attention and motivation	Sup	O-6; P-5	T/E: Brown et al., 2003	N/X
	3.1 Topic that involves a sense of urgency and can be addressed by the group	Sup	O-6.2; P-5.1; P-5.2	T/E: Brown et al., 2003 (Inv); Brown and Vergragt, 2008; Marschke and Sinclair, 2009 (Inv)	N
	3.2 Topic that arouse public expectations in order to induce reputational and prestige risks for the participants	Sup		T/E: Brown et al., 2003	N/X
	3.3 Include innovative and novel topic (too radical innovations might face resistance though)	Sup	O-6.1	T/E: Brown et al., 2003 E: Beers et al., 2014	N
	3.4 Relation to everyday life by choosing a tangible topic	Sup	I-3; O-6.3; P-5.1	T/E: Brown et al., 2003; Brown and Vergragt, 2008; Marschke and Sinclair, 2009; Seyfang and Haxeline, 2012; Davies and Doyle, 2015 E: Alvial-Palacino et al., 2011	N
	4 Commitment due to self-awareness and a feeling of responsibility	Sup	O-7; P-6	T/E: Brown et al., 2003 (Inv); Manring, 2014; Schneider and Rist, 2014	N
Experimental Process	5 Purposeful planning and implementation of multiple experiments	Sup	I-7; O-10; P-9	T/E: Brown et al., 2003; Brown and Vergragt, 2008	N/X
	5.1 Separation of viable from less viable design ideas, e.g. through reality checks	Sup		T/E: Brown et al., 2003 (Inv); Brown and Vergragt, 2008	N
	5.2 Complexity of experiments can overwhelm the project members (i.e., no time to consider group external processes)	Imp		E: Beers et al., 2014	N
	5.3 Enable learning from failures through low-risk experiments	Sup	I-7.3; O-10.4; P-9.4	T/E: Brown and Vergragt, 2008 E: Seyfangd and Longhurst, 2013	N/X
	5.4 Early implementation of prototypes and engagement tools	Sup	O-10.3; P-9.2	T/E: Lopes et al., 2012	N/X
Social Interaction Process	6 Purposeful and pro-active design of participatory processes		O-12; P-12	E: Beers et al., 2014	N/X
	6.1 Purposeful stakeholder selection to achieve vertical and horizontal integration within the process	Sup	O-12.1; P-12.2;	T/E: Brown and Vergragt, 2008; Marschke and Sinclair, 2009; Schneider and Rist, 2014 E: Di Iacovo et al., 2014	N
	6.2 Establish an involvement strategy that defines the engagement of stakeholders to various degrees at different stages of the process (e.g., start with a small homogenous group and bring include further actors later)	Sup	O-12.2; P-12.3;	T/E: Brown and Vergragt, 2008; Schneider and Rist, 2014 (Inv)	N



6.3	Develop conflict mediation and resolution mechanisms	Sup	O-12.4; P-12.5	T/E: Marschke and Sinclair, 2009 (Inv); Espinosa and Porter, 2011; Beers et al., 2014 (Inv)	N
6.4	Effective networking with group-external actors (to receive support)	Sup	O-12.5; P-12.6	T/E: Lopes et al. 2012 E: Seyfangd and Longhurst, 2013	N/X
6.5	Being outwardly oriented and intellectually entrepreneurial by observing related processes (e.g., experiments), bringing in innovative solutions by "outsiders"	Sup	O-11.4; O-12.5; P-10.1	T/E: Brown et al., 2003; Espinosa and Porter, 2011; Lopes et al., 2012 E: Seyfang and Longhurst (Inv), 2013; Beers et al., 2014	N
6.6	Representatives that can speak for a field (e.g., national networking organizations) and consolidate findings	Sup	O-12.6; P-12.7	E: Seyfangd and Longhurst, 2013	N/X
7 Process facilitation			O-13; P-13		N/X
7.1	Discuss process design and rules with participants	Sup	O-13.1; P-13.1	T/E: Marschke and Sinclair, 2009; Lopes et al., 2012; Manring, 2014 (Inv); Schneider and Rist, 2014	N
7.2	Facilitating the emergence of a common language	Sup	P-13.6	T/E: Brown and Vergragt, 2008; Schneider and Rist, 2014 (Inv)	N
7.3	Address power asymmetries	Sup	P-13.4	T/E: Manring, 2014 (Inv)	N/X
7.4	A continuous process monitoring and evaluation, and reflection on outcomes and process	Sup	I-7.2; O-13.7; P-13.11	T/E: Brown et al., 2003; Brown and Vergragt, 2008; Marschke and Sinclair, 2009; Espinosa and Porter, 2011; Lopes et al., 2012;	N
7.5	Flexible and adaptive application of reflexive methods	Sup	I-7.1; O-13.3; P-13.5	E: Alvial-Palacino et al., 2011	N
7.6	Open discussion on limitations and potentials of scientific methods (truly deliberative dialogue)	Sup		T/E: Schneider and Rist, 2014	N
7.7	Creating shared and integrated problem perspective	Sup	O-13.4; P-13.9	T/E: Brown et al., 2003 (Inv); Brown and Vergragt, 2008; Seyfang and Haxeline, 2012; Manring, 2014; Schneider and Rist, 2014	N/X
7.8	Develop a vision of a desirable future	Sup	O-13.5; P-13.10	T/E: Brown et al., 2003 (Inv); Brown and Vergragt, 2008; Espinosa and Porter, 2011; Seyfang and Haxeline, 2012; Davies and Doyle, 2015 E: Seyfangd and Longhurst, 2013 (Inv)	N
7.9	Clarify expectations of participants	Sup	O-13.6; P-13.8	T/E: Brown et al., 2003 E: Seyfangd and Longhurst, 2013; Beers et al., 2014	N
7.10	Attempt of powerful actors to exploit participatory processes for their individual interests	Imp		T/E: Rist et al., 2007	N/X
7.11	Maintain momentum through continuous interactions in regular meetings	Sup	P-13.12	T/E: Schneider and Rist, 2014	N/X
7.12	Take into account needs and interest of all participants	Sup	P-13.3	T/E: Schneider and Rist, 2014	N

	8 Leadership	Sup	O-14; P-14	T/E: Marschke and Sinclair, 2009 (Inv); Manring, 2014	N/X
	8.1 Unwillingness to take risks	Imp		T/E: Marschke and Sinclair, 2009; E: Brown et al., 2003	N/X
	8.2 Representatives of organizations can show risk-avoiding behavior, if they do not have a string backing by their organization	Imp		E: Brown et al., 2003	N/X
Resources	9 Physical resources (e.g. funding, materials)	Sup	I-9; O-15; P-15	T/E: Rist et al., 2007; Brown and Vergragt, 2008; Seyfang et al., 2014 E: Seyfangd and Longhurst, 2013;	N/X
	9.1 Support from individuals, organizations or programs (e.g. governmental agencies, universities and other intellectual entrepreneurs)	Sup	I-9.3; O-15.1; P-15.1	T/E: Brown et al., 2003; Marschke and Sinclair, 2009	N/X
	10 Knowledge and information	Sup	I-10; O-16; P-16	E: Bos et al., 2013	N/X
	10.1 Creation of a knowledge infrastructure and interfaces to enable knowledge exchange (e.g., media reports, key publications, conferences and workshops, lecture tours,...)	Sup	I-10.2; O-16.1; P-16.1;	T/E: Rist et al., 2007; Marschke and Sinclair, 2009; Espinosa and Porter, 2011; Lopes et al., 2012; Seyfang et al., 2014; E: Seyfangd and Longhurst, 2013;	N
	10.2 Measures and infrastructure for knowledge integration (between practitioners, scientists), e.g. through online resources	Sup	O-16.2; P-16.2	T/E: Seyfang and Haxeline, 2012; Manring, 2014 ; Schneider and Rist, 2014 E: Seyfangd and Longhurst, 2013	N/X
	10.3 Availability of local or traditional knowledge	Sup	I-10.1;	T/E: Marschke and Sinclair, 2009;	X
	10.4 Lessons and best practices from other projects and initiatives	Sup		T/E: Brown et al., 2003; Seyfang and Haxeline, 2012	X
	11 Trust between and legitimacy of stakeholders (e.g., based upon previous collaboration)	Sup	O-17; P-17	T/E: Marschke and Sinclair, 2009; Manring, 2014 (Inv)	N/X

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Table S3. Organizational learning context.

Organizational learning context (O)					
	Description of supportive/impeding factor	Sup/ Imp	Similar factors	References; theoretical (T) / empirical (E)	Exog. (X) / Endog. (N)
Motivation	1 Disturbance or crisis (e.g., social, economic or environmental crisis)	Sup	I-1; G-1; P-1	T/E: Suurs and Hekkert, 2009; Mitchell, 2013; Karadzic et al., 2014; T: Edwards, 2009	X
	2 Societal values that favor sustainability (e.g., general perception that sustainability characteristics are an important product characteristic)	Sup	I-2; P-3	T/E: Cramer and Loeber, 2004; Kemp et al., 2007; Suurs and Hekkert, 2009; Johnson et al., 2011; Grin, 2012; Mitchell, 2013; Waltz and Köhler, 2014;	X
	3 Sustainability-oriented institutions, formal laws, regulations, and norms	Sup	P-4	T/E: Cramer and Loeber, 2004; Kemp et al., 2007; Suurs and Hekkert, 2009; Johnson et al., 2011; Grin, 2012; van Mierlo et al., 2013; Karadzic et al., 2014 (Inv); Waltz and Köhler, 2014,	X
	4 Externalities (undesired effects are not included in market price)	Imp		T/E: van Mierlo et al., 2013	X
	5 Lock in into an overly specialized industry with high investments, competition and government support	Imp		T/E: van Mierlo et al., 2013; Karadzic et al., 2014;	N/X
	6 Choose topic that arouses attention and motivation	Sup	G-3; P-5		N/X
	6.1 Innovation that is likely to be applied widely (e.g., in further countries) (i.e., prospect of future profits)	Sup	G-3.3	T/E: Johnson et al., 2011; Waltz and Köhler, 2014	X
	6.2 Consider technological capability and expertise of organization	Sup	G-3.1; P- 5.1; P-5.2	T/E: Waltz and Köhler, 2014	N
	6.3 Ensure motivation within organization, e.g. through providing tangible benefits (e.g., getting started with small but concrete sub-projects), or translating insights gained to current practices and cultures	Sup	I-3; G-3.4; P-5.1	T/E: Cramer and Loeber, 2004; Espinosa and Porter, 2011; Molla, 2013	N/X
	6.4 Provide motivation for networking, e.g. through highlighting common interest or tangible benefits	Sup	P-5.2	T/E: Karadzic et al., 2014;	N/X
	7 Commitment due to self-awareness and a feeling of responsibility	Sup	G-4; P-6	T/E: Woollorton, 2004; Molla, 2013; Karadzic et al., 2014 (Inv)	N/X
	7.1 Communicate and discuss problems within organization i.e. explain the complexity of issues	Sup		T/E: Karadzic et al., 2014	N
	7.2 Ability of critical self-reflection (by members of organization)	Sup	I-5; G-4; P-6	T/E: Woollorton, 2004	N/X
	7.3 Widely applied practices that are not put into question	Imp		T/E: van Mierlo et al., 2013	N/X
	8 Setting a sustainability vision for the organization by top management	Sup	I-4; P-7	T/E: Espinosa and Porter, 2011 E: Young, 2010 T: Edwards, 2009	N

	9 Existence of forerunners	Sup	I-6; P-8	T/E: Grin, 2012	X
Experimental Process	10 Purposeful planning and implementation of multiple experiments (practical and organizational)	Sup	I-7; G-5; P-9	T/E: Suurs and Hekkert, 2009; Espinosa and Porter, 2011; Karadzic et al., 2014	N/X
	10.1 Being open towards different technical solutions	Sup		T/E: Johnson et al., 2011; Waltz and Köhler, 2014;	N
	10.2 Creation of partially protected socio-technical experiments in which various actors exchange knowledge, information and experience	Sup	P-9.3; P-9.5	T/E: Espinosa and Porter, 2011; Bos et al., 2013; Ceschin, 2013	N/X
	10.3 Engage stakeholders (e.g., users) in experiments	Sup	G-5.4; P-9.2	T/E: Alvial-Palacino et al., 2011; Espinosa and Porter, 2011; Bos et al., 2013	N/X
	10.4 Low regret experiments (e.g., due to low-tech characteristics of technology)	Sup	I-7.3; G-5.3; P-9.4	T/E: Suurs and Hekkert, 2009	N/X
Social Interaction Process	11 Organizational structures that support participation				N/X
	11.1 Interactive culture within organizations that cuts across horizontal and vertical structures of the organization	Sup	P-10.3	T/E: Woolderton, 2004; Mitchell, 2013	N/X
	11.2 Linking bottom-up process and top down ratification and dissemination of the most promising innovations (i.e., use synergies between command and control and a more participatory network approach)	Sup	P-12.4	T/E: Espinosa and Porter, 2011 E: Young, 2010	N/X
	11.3 Skills for active networking and collaboration (e.g., effective communication skills)	Sup	P-10.6	E: Young, 2010 T/E: Karadzic et al., 2014 (Inv)	N
	11.4 Actively engage in networking activities (other actors in the value chain, consumers, government,...)	Sup	P-10.1	T/E: Cramer and Loeber, 2004; van Mierlo et al., 2013	N
	12 Purposeful and pro-active design of participatory processes (for collaboration and networking)	Sup	G-6; P-12	T/E: Cramer and Loeber, 2004; Espinosa and Porter, 2011; Johnson et al., 2011; Ceschin, 2013; van Mierlo et al., 2013; Karadzic et al., 2014; Waltz and Köhler, 2014 E: Young, 2010; Ornetzeder and Rohracher, 2013	N/X
	12.1 Careful selection of actors for participation/collaboration/networking through an analysis of actors and innovations	Sup	G-6.1; P-12.2	T/E: Ceschin, 2013	N
	12.2 Establish an involvement strategy that defines the engagement of stakeholders to various degrees at different stages of the process	Sup	G-6.2; P-12.3	T/E: Woolderton, 2004; Alvial-Palacino et al., 2011	N
	12.3 Actively look for events in the landscape, and align/link the process and innovations	Sup		T/E: Ceschin, 2013	N
	12.4 Develop conflict mediation and resolution mechanisms	Sup	G-6.3; P-12.5	T/E: Woolderton, 2004; Karadzic et al., 2014	N
	12.5 Limited opportunities to influence actors beyond organization	Imp	G-6.4; P-12.6	T/E: Mitchell, 2013	X
	12.6 Forming of organizations to coordinate networking and consolidate findings		G-6.6; P-12.7	T/E: Suurs and Hekkert, 2009; Bos et al., 2013 E: Ornetzeder and Rohracher, 2013	N/X
	13 Process facilitation		G-7; P-13		N/X
	13.1 Discuss process design and rules with participants	Sup	G-7.1; P-13.1	T/E: Karadzic et al., 2014;	N

	13.2 Informal meetings and networks	Sup	P-13.2	E: Young, 2010; Ornetzeder and Rohrer, 2013	N
	13.3 Flexible and adaptive application of reflexive methods	Sup	I-8.1; G-7.5; P-13.5	T/E: Ceschin, 2013; T: Edwards, 2009	N
	13.4 Creating shared and integrated problem perspective	Sup	G-7.7; P-13.9	T/E: Ceschin, 2013; Karadzic et al., 2014;	N/X
	13.5 Collaborative vision development	Sup	G-7.8; P-13.10	T/E: Alvial-Palacino et al., 2011; Ceschin, 2013	N
	13.6 Clarify expectations of participants	Sup	G-7.9; P-13.8	T/E: Ceschin, 2013	N
	13.7 A continuous process monitoring and evaluation, and reflection on outcomes and process	Sup	I-7.2; G-7.4; P-13.11	T/E: Alvial-Palacino et al., 2011; Espinoza and Porter, 2011; Bos et al., 2013; Ceschin, 2013	N
	14 Leadership (democratic leadership, problem-solving attitude, readiness to assume risks, capacity to network and negotiate; communication skills, listening capacity; an interest in change and the ability to foresee, understanding of complex patterns)	Sup	G-8; P-14	T/E: Molla, 2013; Karadzic et al., 2014 (Inv); Wooltorton, 2004 (Inv) E: Young, 2010	N/X
	14.1 Defensive type of leadership: articulate (too) many problems to manage and for which they can offer no practical solutions	Imp		T/E: Karadzic et al., 2014	N/X
	14.2 Actively nurture and highlight importance of bottom-up initiative development	Sup		T/E: Espinosa and Porter, 2011	N
	14.3 Rhetoric-reality gap: sustainability is supported by management but practical support is low	Imp		T/E: Wooltorton, 2004	N/X
Resources	15 Physical resources (e.g. funding, materials)	Sup	I-9; G-9; P-15	T/E: Cramer and Loeber, 2004, Wooltorton, 2004 (Inv); Espinosa and Porter, 2011; Bos et al., 2013; E: Young, 2010 (Inv)	N/X
	15.1 Support from individuals, organizations or programs (e.g. governmental agencies, universities and other intellectual entrepreneurs)	Sup	I-9.3; G-9.1; P-15.1	T/E: Suurs and Hekkert, 2009; Grin, 2012; Ceschin, 2013	N/X
	15.2 Own financial resources of an organization	Sup		T/E: Suurs and Hekkert, 2009	N/X
	15.3 Infrastructure (roads, cyber infrastructure)	Sup	P-15.2	T/E: van Mierlo et al., 2013	X
	16 Knowledge and information	Sup	I-10; G-10; P-16	T/E: Ceschin, 2013; Molla, 2013 E: Ornetzeder and Rohrer, 2013	N/X
	16.1 Creation of a knowledge infrastructure and interfaces to enable knowledge exchange (e.g., conferences, seminars, workshops, ...)	Sup	I-10.2; G-10.1; P-16.1	T/E: Suurs and Hekkert, 2009; Espinosa and Porter, 2011; van Mierlo et al., 2013 E: Young, 2010	N
	16.2 Methods and infrastructure for knowledge integration (between practitioners, scientists, ...)	Sup	G-10.2; P-16.2	van Mierlo et al., 2013	N/X
	16.3 Lack of metrics that measure progress toward sustainability	Imp	P-16.3	E: Young, 2010	N/X
	17 Trust between and legitimacy of stakeholders	Sup	G-8; P-14	T/E: Alvial-Palacino et al., 2011; Karadzic et al., 2014;	N/X

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Table S4. Policy learning context.

Policy learning context (P)					
Factor groups	Description of supportive/impeding factor	Sup/ Imp	Similar factors	References; theoretical (T) / empirical (E)	Exog. (X) / Endog. (N)
Motivation	1 Disturbance or crisis (e.g., social, economic or environmental crisis)	Sup	I-1; G-1; O-1	T/E: Chapin et al., 2006; Kemp et al., 2007; Suurs and Hekkert, 2009; van Mierlo et al., 2010; Quist et al., 2011	X
	2 Change of government	Sup/Imp	G-1	T/E: Ison and Watson, 2007; Kemp et al., 2007 (Imp); Nevens et al., 2013 (Imp); Colvin et al., 2014; Hoppmann et al., 2014; Di Iacovo et al., 2014 (Imp)	N/X
	3 Societal values and trends that favor sustainability	Sup	I-2; O-2	T/E: Kemp et al., 2007; Johnson et al., 2011; Grin, 2012	X
	4 Legislation that prescribes a participatory approach (e.g. WFD) and allows flexibility (i.e., regarding decision-making)	Sup	O-3	T/E: Diduck and Mitchell, 2003; Ison and Watson, 2007; Dedeurwaerdere, 2009; Suurs and Hekkert, 2009; Johnson et al., 2011; Herrfahrdt-Pähle and Pahl-Wostl, 2012; Colvin et al., 2014;	N/X
	5 Choose topic that arouses attention and motivation	Sup	G-3; O-6	E: Olsson et al., 2004b	N/X
	5.1 Relation to a pressing problem that stakeholders face in everyday life by choosing a tangible topic	Sup	I-3; G-3.1; G-3.4; O-6.3	T/E: Ison and Watson, 2007; Kemp et al., 2007; de Bruijne et al., 2010; van Mierlo et al., 2010 E: Bos and Brown, 2012; Evans and Karvonen, 2014	N/X
	5.2 Action orientation and tangible impacts of participation	Sup	G-3.1; G-5.4; O-6.2;	T/E: Diduck and Mitchell, 2003 (inv); Cramer and Loeber, 2004; Marschke and Sinclair, 2009 (inv); E: Nevens and Roorda, 2014	N
	5.3 Lack of knowledge about a topic by the public	Imp		T/E: Einsiedel et al., 2013	N/X
	6 Commitment due to self-awareness, openness to other perspectives, and a feeling of responsibility and interdependency	Sup	G-4; O-7;	T/E: van Mierlo et al., 2010; van Mierlo et al., 2013 E: Nevens and Roorda, 2014;	N/X
	7 Motivate stakeholders through visionary and strategic leadership	Sup	I-4; O-8	T/E: Quist et al., 2011; Bos and Brown, 2012; Nevens et al., 2013; van Mierlo et al., 2013 E: Olsson et al., 2004b	N
Experimental Process	8 Existence of forerunners and prime movers	Sup	I-6; O-9	T/E: van Mierlo et al., 2010; Grin, 2012; Di Iacovo et al., 2014; van Mierlo et al., 2013;	X
	9 Purposeful planning and implementation of multiple experiments	Sup	I-7; G-5; O-10	E: Nevens and Roorda, 2014;	N/X
	9.1 Flexibility regarding outcomes (i.e., being not too goal but process oriented)	Sup		T/E: Herrfahrdt-Pähle and Pahl-Wostl, 2012	N

	9.2 Limited view/ focus on technical experimentation	Imp	G-5.4; O-10.3	T/E: Bos and Brown, 2012; Hoppmann et al., 2014	N
	9.3 Learning and coordination between the experiments/projects, (e.g. through case study comparison to define lessons learnt and scientific evaluation of previous failed programs)	Sup	O-10.2	E: Olsson et al., 2004b; Bos and Brown, 2012 T/E: Albert and Vargas-Moreno, 2010; Farrelly and Brown, 2011 (Inv)	N/X
	9.4 Low regret experiments (allow for failures)	Sup	I-7.3; G-5.3; O-10.4	T/E: Kemp et al., 2007; Nevens et al., 2013 E: Nevens and Roorda, 2014;	N/X
	9.5 Development of innovation networks around a societal problem through the design of innovation experiments (technical, but also management and governance)	Sup	O-10.2	T/E: Chapin et al., 2006; Voß et al., 2009; Bos and Brown, 2012; Nevens et al., 2013	N/X
	9.6 Linking experiences from different levels, such as local groups with national and international lobbying efforts	Sup		T/E: Chapin et al., 2006; Bos and Brown, 2012;	N/X
Social Interaction Process	10 Political structures that support participation: consideration of various interest and values	Sup			N/X
	10.1 Policy entrepreneurs who act in a more strategical and instrumental way	Sup	G-6.5; O-11.4	T/E:; Suurs and Hekkert, 2009 T: Brundiers et al., 2013 E: Pahl-Wostl et al., 2013; Nevens and Roorda, 2014;	N/X
	10.2 Consider policies as social innovation processes	Sup		T/E: Voß et al., 2009	N
	10.3 Multi-level (vertical) and multi-sectoral (horizontal) dialogue between policy implementers and policy makers	Sup	O-11.1;	T/E: Colvin et al., 2014; Di Iacovo et al., 2014 E: Olsson et al., 2004b	N/X
	10.4 Dominance of command-and-control or market paradigms	Imp		T/E: Dedeurwaerdere, 2009; Farrelly and Brown, 2011; Colvin et al., 2014; Nevens et al., 2013; E: Nevens and Roorda, 2014;	N/X
	10.5 Lock-in effects through encrusted power structures and actor networks	Imp		T/E: Herrfahrdt-Pähle and Pahl-Wostl, 2012; Di Iacovo et al., 2014; Colvin et al., 2014 T: Pahl-Wostl et al., 2007;	N/X
	10.6 Skills for active networking and collaboration (e.g., within network)	Sup	O-11.3	T/E: von Malmborg, 2007; van Mierlo et al., 2010; Wittmayer and Schöpke, 2014; Di Iacovo et al., 2014; Goldstein et al., 2015 T: Brundiers et al., 2013	N/X
	10.7 Acknowledge diversity (institutions, economy, lifestyles, culture, perspectives) to deal with uncertainty and change	Sup		T/E: Chapin et al., 2006; van Mierlo et al., 2010; Johnson et al., 2011; Grin, 2012	N
	11 Policy Instruments				N/X
	11.1 Influence the contextual forces that may affect firms' strategies and initiatives;	Sup		T/E: Cramer and Loeber, 2004; van Mierlo et al., 2013	N/X
	11.2 Influence public opinion, e.g., by involving local media	Sup		T/E: Suurs and Hekkert, 2009 E: Olsson et al., 2004b	N/X
	11.3 Broad and early stakeholder participation to broaden and link networks and assure transparency and democratic legitimacy	Sup		T/E: Chapin et al., 2006; von Malmborg, 2007; Voß et al., 2009; van Mierlo et al., 2010; Farrelly and Brown, 2011; Quist et al., 2011 (also inverse); Bos and Brown, 2012; Grin, 2012;	N

				Herrfahrdt-Pähle and Pahl-Wostl, 2012; Bos et al., 2013 (Inv); van Mierlo et al., 2013 E: Pahl-Wostl et al., 2013 (Inv); Evans and Karvonen 2014; Nevens and Roorda, 2014 T: Brundiers et al., 2013	
11.4	Foster transdisciplinary research processes to include actors from science and practice	Sup		T/E: Albert and Vargas-Moreno, 2010; Johnson et al., 2011; Bos and Brown, 2012; Nevens et al., 2013; Wittmayer and Schöpke, 2014; Di Iacovo et al., 2014 E: Olsson et al., 2004b; Evans and Karvonen, 2014 T: Adomßent, 2012; Kueffer et al., 2012; Brundiers et al., 2013;	N
	12 Purposeful and pro-active design of participatory processes		I-8; G-6; O-12		N/X
12.1	Responsibility for the design and implementation of public involvement programs by a neutral party (i.e., avoidance of tailoring the process to service special interest)	Sup		T/E: Diduck and Mitchell, 2003; Marschke and Sinclair, 2009 (inv); van Mierlo et al., 2010; Di Iacovo et al., 2014; T: Voß and Bornemann, 2011; Brundiers et al., 2013	N/X
12.2	Purposeful selection of stakeholders (e.g., innovative 'regime' actors and frontrunners from 'niche' contexts)	Sup	G-6.1; O-12.1	T/E: Voß et al., 2009; Bos and Brown, 2012; Bos et al., 2013; van Mierlo et al., 2013; Nevens et al., 2013; Di Iacovo et al., 2014 E: Olsson et al., 2004b; Nevens and Roorda, 2014	N
12.3	Establish an involvement strategy that defines the engagement of stakeholders to various degrees at different stages of the process (e.g., start with a homogenous group of stakeholders)	Sup	G-6.2; O-12.2	T/E: Bos and Brown, 2012; Nevens et al., 2013; van Mierlo et al., 2013; Di Iacovo et al., 2014; E: Nevens and Roorda, 2014 (Inv)	N
12.4	Striking a balance between orchestrated and self-organized action (e.g., informal processes) and ensure their linkage	Sup	O-11.2	T/E: Nevens et al., 2013; Colvin et al., 2014 E: Pahl-Wostl et al., 2013 (Inv)	N
12.5	Develop conflict mediation and resolution mechanisms	Sup	G-6.3; O-12.4	T/E: Diduck and Mitchell, 2004; Albert and Vargas-Moreno, 2010; Nevens et al., 2013; Di Iacovo et al., 2014 (Inv); Wittmayer and Schöpke, 2014 E: Olsson et al., 2004b; T: Voß and Bornemann, 2011; Brundiers et al., 2013	N
12.6	Collaborating with national and international non-governmental organizations	Sup	G-6.4; O-12.5	E: Olsson et al., 2004b	N/X
12.7	Include 'boundary spanners' and bridging organizations that connect groups, centers and levels	Sup	G-6.6; O-12.6	T/E: Cramer and Loeber, 2004; Bos and Brown, 2012 E: Olsson et al., 2004b; Pahl-Wostl et al., 2013 T: Brundiers et al., 2013	N/X
	13 Process facilitation	Sup	G-7; O-13	T/E: Wittmayer and Schöpke, 2014	N/X
13.1	Discuss process design and rules with participants	Sup	G-7.1; O-13.1	T/E: Diduck and Mitchell, 2003; Cramer and Loeber, 2004; van Mierlo et al., 2010; Wittmayer and Schöpke, 2014 E: Olsson et al., 2004b; Evans and Karvonen, 2014 T: Voß and Bornemann, 2011	N



	13.2 Informal meetings and networks	Sup	O-13.2	T/E: Cramer and Loeber, 2004; Ison and Watson, 2007; Bos and Brown, 2012; Colvin et al., 2014 E: Pahl-Wostl et al., 2013	N
	13.3 Explicitly address alternative framings from all stakeholders during participation processes	Sup	G-7.12	T/E: Cramer and Loeber, 2004; de Bruijne et al., 2010 (inv); van Mierlo et al., 2010; E: Evans and Karvonen, 2014 (inv)	N
	13.4 Address power asymmetries	Sup	G-7.3	T/E: Diduck and Mitchell, 2003 (inv); Voß et al., 2009 (inv); de Bruijne et al., 2010 (inv); Colvin et al., 2014 T: Voß and Bornemann, 2011 (also inverse); Brundiers et al., 2013	N/X
	13.5 Flexible and adaptive application of reflexive methods	Sup	I-7.1; G-7.5; O-13.3	T/E: Diduck and Mitchell, 2003; Cramer and Loeber, 2004; Chapin et al., 2006; Kemp et al., 2007; de Bruijne et al., 2010; Einsiedel et al., 2013; van Mierlo et al., 2013; T: Pahl-Wostl et al., 2007	N/X
	13.6 Facilitating the emergence of a common language (i.e., avoidance of technical language and methods)	Sup	G-7.2;	T/E: Diduck and Mitchell, 2003 (inv); van Mierlo et al., 2010 (inv)	N
	13.7 Continuously adaptation of the process design (e.g., activities, stakeholder selection, methods...)	Sup		T/E: Kemp et al., 2007; Bos et al., 2013; Einsiedel et al., 2013; Nevens et al., 2013 E: Nevens and Roorda, 2014;	N
	13.8 Clarify expectations of participants and goals of the process	Sup	G-7.9; O-13.6	T/E: Einsiedel et al., 2013 E: Olsson et al., 2004b	N
	13.9 Creating shared and holistic problem perspective	Sup	G-7.7; O-13.4	T/E: Grin, 2012; Nevens et al., 2013	N/X
	13.10 Collaborative vision development	Sup	G-7.8; O-13.5	T/E: ; Johnson et al., 2011; Quist et al., 2011 (also inverse); Frantzeskaki et al., 2012; Nevens et al., 2013; van Mierlo et al., 2013; Di Iacovo et al., 2014 E: Nevens and Roorda, 2014; Goldstein et al., 2015	N
	13.11 A continuous process monitoring and evaluation, and reflection on outcomes and process	Sup	I-7.2; G-7.4; O-13.7; P-13.11	T/E: Chapin et al., 2006; Dedeurwaerdere, 2009; Albert and Vargas-Moreno, 2010; de Bruijne et al., 2010; Nevens et al., 2013; van Mierlo et al., 2013; Hoppmann et al., 2014; Wittmayer and Schäpke, 2014 E: Olsson et al., 2004b; Nevens and Roorda, 2014	N
	13.12 Continuity of participatory process, e.g. through institutionalization of learning process and capacity building within participating organizations	Sup	G-7.7	T/E: Kemp et al., 2007; von Malmberg, 2007 (inv); Farrelly and Brown, 2011; Quist et al., 2011 (also inverse); Herrfahrdt-Pähle and Pahl-Wostl, 2012; Einsiedel et al., 2013; van Mierlo et al., 2013 (Inv); Colvin et al., 2014; Wittmayer and Schäpke, 2014	N/X
	14 Leadership (e.g., by champions / key stakeholders)	Sup	G-8; O-14	T/E: von Malmberg, 2007; Farrelly and Brown, 2011; Quist et al., 2011 (also inverse) E: Olsson et al., 2004b; Bos and Brown, 2012	N/X
	14.1 Facilitating information flows between different levels of governance	Sup		E: Olsson et al., 2004b; Bos and Brown, 2012	N

	14.2 Mobilizing funding when needed	Sup	P-9.6; P-10.3	E: Olsson et al., 2004b	N/X
Resources	15 Physical resources (e.g. funding, materials)	Sup	I-9; G-9; O-15	T/E: von Malmborg, 2007; Quist et al., 2011 (also inverse); Bos and Brown, 2012; Bos et al., 2013; Nevens et al., 2013 (Inv) E: Olsson et al., 2004b	N/X
	15.1 Support from individuals, organizations or programs (e.g. governmental agencies, universities and other intellectual entrepreneurs)	Sup	I-9.3; G-9.1; O-15.1	T/E: Cramer and Loeber, 2004; Quist et al., 2011; Hoppmann et al., 2014; Colvin et al., 2014 (inv) E: Nevens and Roorda, 2014	N/X
	15.2 Modern infrastructure (roads, cyber infrastructure)	Sup	O-15.3	T/E: Chapin et al., 2006; van Mierlo et al., 2013 E: Evans and Karvonen, 2014 (inv)	N/X
	15.3 Participant funding mechanisms to redress the resource imbalance	Sup		T/E: Diduck and Mitchell, 2003	N/X
	16 Information and knowledge	Sup	I-10; G-10; O-16	T/E: Suurs and Hekkert, 2009; Einsiedel et al., 2013 (inv)	N/X
	16.1 Creation of a knowledge infrastructure and interfaces to enable knowledge exchange (e.g., media reports, key publications, conferences and workshops, lecture tours,...)	Sup	I-10.2; G-10.1; O-16.1	T/E: Cramer and Loeber, 2004; Chapin et al., 2006; Ison and Watson, 2007; von Malmborg, 2007; Albert and Vargas-Moreno, 2010; de Bruijne et al., 2010; Johnson et al., 2011; Bos and Brown, 2012; Einsiedel et al., 2013; Nevens et al., 2013; Colvin et al., 2014; Wittmayer and Schöpke, 2014 E: Olsson et al., 2004b T: Kueffer et al., 2012	N
	16.2 Methods and infrastructure for knowledge integration (between practitioners, scientists, ...)	Sup	G-10.2; O-16.2;	T/E: ; Albert and Vargas-Moreno, 2010; Johnson et al., 2011; Nevens et al., 2013; van Mierlo et al., 2013; Di Iacovo et al., 2014 E: Olsson et al., 2004b; Nevens and Roorda, 2014 T: Pahl-Wostl et al., 2007; Adomßent, 2012; Brundiers et al., 2013	N/X
	16.3 Definition of useful sustainability indicators		O-16.3	T/E: Suurs and Hekkert, 2009; Albert and Vargas-Moreno, 2010	N/X
	17 Trust (between and legitimacy of stakeholders and institutions)	Sup	G-11; O-17	T/E: Cramer and Loeber, 2004; van Mierlo et al., 2010; Bos et al., 2013; Einsiedel et al., 2013; Nevens et al., 2013 E: Olsson et al., 2004b; Nevens and Roorda, 2014 T: Pahl-Wostl et al., 2007	N/X

Supportive (Sup) and impeding (Imp) factors of learning in sustainability transition processes related to a policy learning context. Similar factors in other learning contexts are provided by using factor identifiers. Endogenous factors (N) can be implemented in the scope of a policy learning process, while exogenous factors (X) cannot be addressed directly (N/X denotes an ambiguous factor).

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