

Old People at Home with Acquired Cognitive Impairment Supported by Assistive Technology – Cost and Benefit Studies

Ulf KEIJER and Greger SANDSTRÖM

The Architectural School
Royal Institute of Technology
Stockholm, Sweden

ulf.keijer@arch.kth.se, greger.sandstrom@jm.se

The presentation

- About the project “At Home with IT”
- The PENG cost-benefit model –
an experimental undertaking
- Benefit – Benefit of the individual
- Benefit in monetary terms
- The process and modifications of the model
- Benefits and costs
- Conclusions

The “At-Home-with-IT” Project

- People with cognitive disorder living in their own homes
- Real-life studies in three Swedish municipalities
- 10-20 individuals (most 60 or older) at each site
- AT and installations in the homes to meet individual needs
- Co-operation between municipal care and house owners
- Expected outcome: “Tool-box” of recommended technology and procedures

Examples of installed AT and equipment

- Memory aids (day planner, day-date clock, away key)
- Safety measures (stove guard, away lock, picture door phone)
- Communication facilitators (picture phone)
- Trouble solvers (locators, adapted TV controller)

Examples of installed AT a



Adapted TV controller



Picture door phone



Picture phone



Magnetic valve
(locked by Away lock)



Day planner

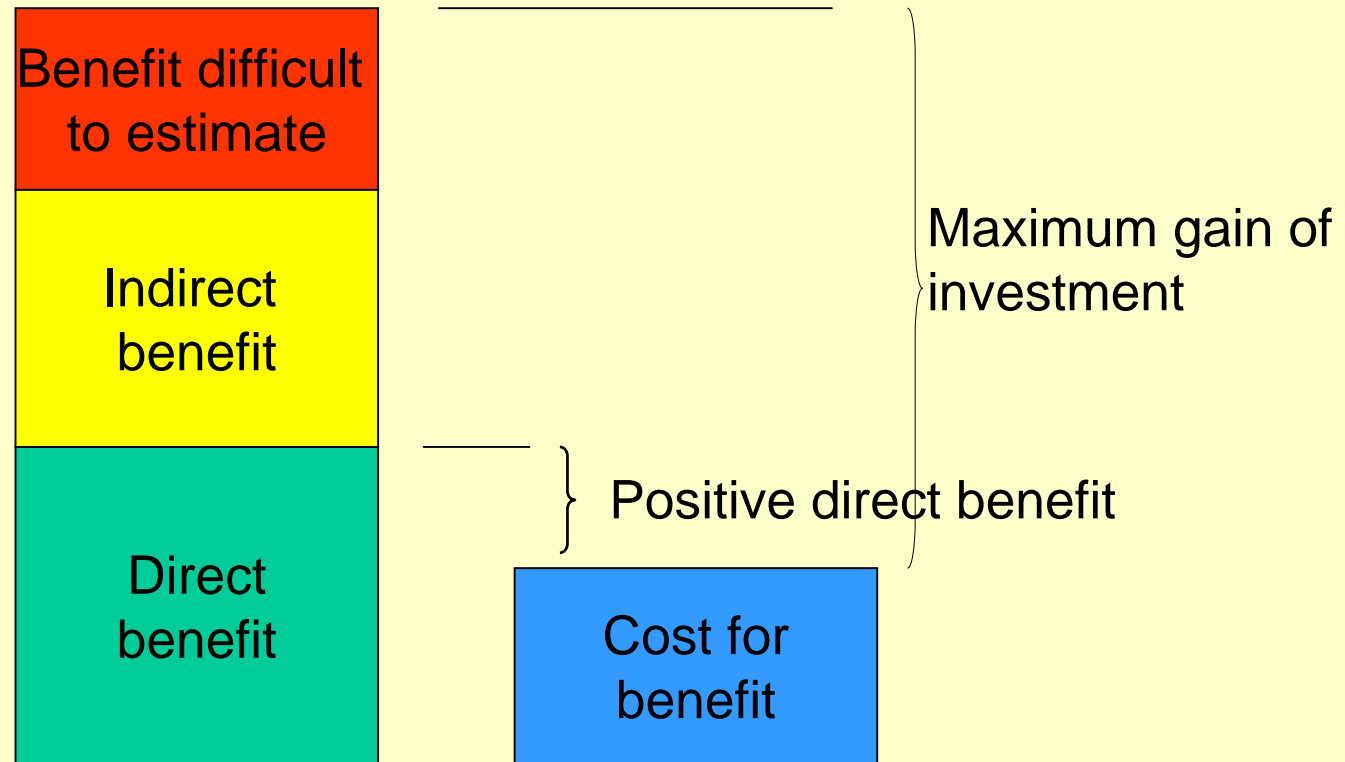


Balcony lock
(locked by Away lock)

The PENG Model

- Developed for estimation of cost vs. benefit of investment in IT systems for regular organisations (business, government, health care, etc.)
- Fast track procedure – with expertise from relevant parties of the organisation (sometimes also customers)
- IT for the benefit of own organisation – not for the customers
- Three or four half-day sessions – 6-10 experts and a monitor

The PENG Model – Benefit and cost in monetary terms



PENG project work group members

- Occupational therapist, practitioner
- Physical therapist, local municipality
- Representative from municipal housing adaptation
- Manager, elderly care, local municipality
- Co-ordinator, elderly issues, housing company
- AT expert, consultant
- End-user group representative
- Two monitors, university (KTH)

Preparation measures

Modifications of the PENG regular model
in order to form a common platform for the work group

- Standardised personal profiles defined
 - Gunnar, 81, widower
 - Irène, 63, married (profile was not applied)
- Description of eleven AT devices to be considered
- Description of supporting functions of the technology
- Cost of ordinary daily life activities

Gunnar's assumed personal profile

- **Social situation** (widower, 3 children in neighbourhood, previously active in local congregation)
- **Health status/diseases** (generally good health during life, angina pectoris, 3 heart attacks, right leg pain and weakness induces falling, hearing and vision impairment, depression after wife's death)
- **Medication** (several pills twice a day)
- **Personal activities** (early riser, washing, shaving dressing of his own, eats but no cooking, help with shower, reads papers and watches TV, help with purchase of food and clothes, and with visits to relatives, church, etc.)
- **Flat** (3 pieces, balcony, security door, safety alarm)
- **Current assistive technology** (stick, magnifying glass, hearing aid)

Proposed measures for Gunnar

- Proposed adaptations in the flat
 - stove guard
 - motor lock at balcony door
 - away lock
 - away key
 - picture door phone
- Proposed assistive technology
 - door speaker
 - bed alarm
 - guiding floor light
 - locator
 - care call
 - adapted TV controller
 - medication reminder
 - picture phones

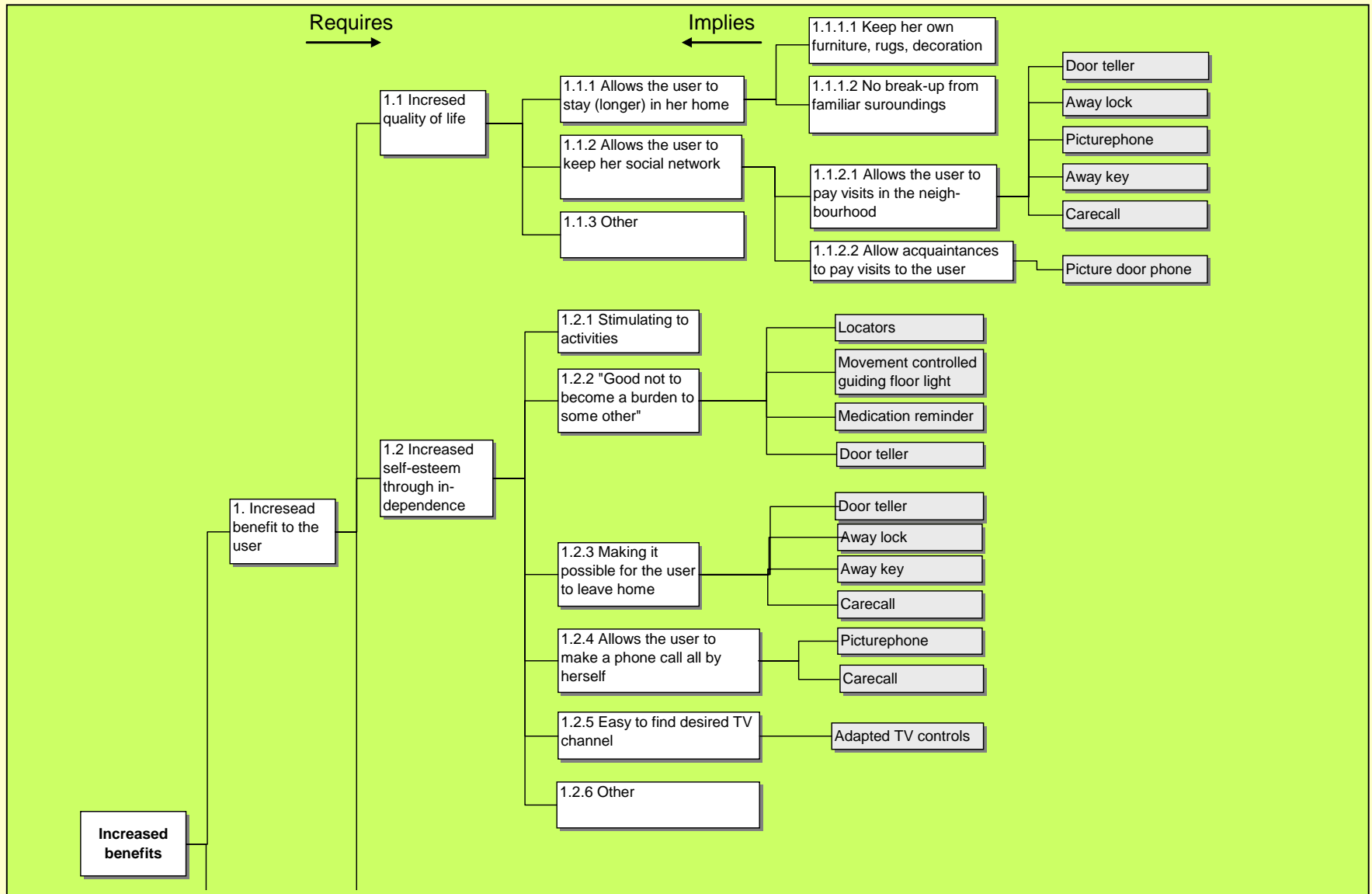
Session activities and work group decisions

- a) demonstration of proposed assistive technology
- b) the common task lying ahead was discussed thoroughly
- c) the PENG model and its purpose was described and made understood
- d) target beneficiaries were decided (end-users, relatives, house owner, care providers, local community)
- e) what is end-user benefit? The group made up its mind:
 - quality of life
 - self esteem (by augmented independence)
 - safety (the feeling of)
 - security (the objective fact)
- f) benefits were also defined for relatives, carers, etc.
- g) common assessment of every day costs was listed

Every day services – Reference costs

Service and cost (1 € = 10 SEK)	€per day	€per month	€per year
Ordinary lunch at a restaurant in Stockholm	6,50		
Public transport (in Stockholm wider area)	1,20	36	
Alarm package (detached house)	0,85	26	
Broadband subscription	0,80	25	
Cable TV subscription	0,65	20	
TV license (public service)	0,60		198
Daily newspaper (subscription)	0,50	15	
Cinema ticket	0,30	9	
Train trip 70 km (return ticket)	0,40	13 (per trip)	
Fixed phone connection subscription	0,50		150
Municipality home service (prescription)	2,00-5,00	~ 1600	
Transportation service (prescription)	1,00	~ 300	
Medication	0,60		180
Medicare	0,30		90

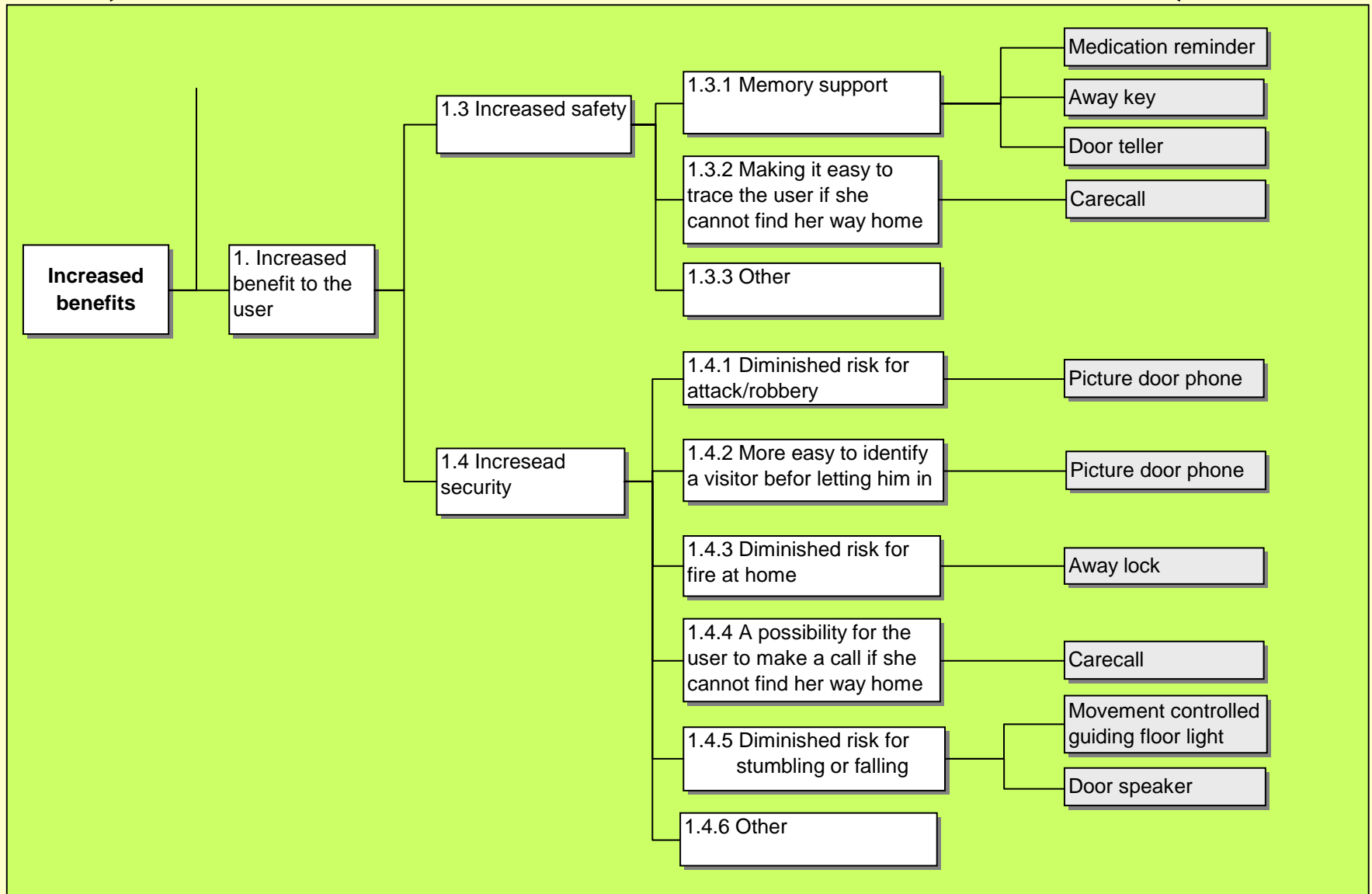
Work sheet (section)



Requires
→

Work sheet (section)

←
Implies



Well-being in monetary terms (benefit per day)

Increased benefit as €per day (1 €= 10 Swedish krona)

Beneficairies: 1. The user					2. Relatives/friends								3. Others										
A T Device	1.1		1.2		1.3		1.4		2.1		2.2		2.3		3.0		4.0		5.0		Ave- rage	High value	Sum
	Quality of life		Indepen- dence		Safety		Security		Increased safety		Time saved		Less problems with user		Landlord benefit		Care provid benefit		Benefit in neighbourhood				
Adapted TV controller			.30																		0.01	0.30	0.30
Picture door phone	.13					.15	.05	.05								.25					0.02	0.15	0.58
Away lock	.25		.20			.15		.05											.40		0.05	0.25	1.05
Away key			.30		.35																0.30	0.35	0.65
Carecall	.50		.50	.15	.50	.50		.50				.30									0.13	0.50	2.65
Door teller		.05	.20		.15	.05													.05		0.03	0.20	0.45
Locators			.13									.05									0.01	0.13	0.13
Medication reminder			.20		.35				.10	.10	.10			.05							0.04	0.35	0.90
Picture phone	.05	.10	.05	.15									.10								0.02	0.15	0.35
Floor light			.40			.55		.50													0.07	0.55	1.45
Bed alarm								.35									.30				0.03	0.50	0.65

Cost reduction (monetary terms)

(cost reduction per day)

For whom:	1. The user						2. Relatives/friends						3. Others														
A T Device	1.1		1.2		1.3		2.1		2.2		2.3		3.0			4.0			5.0			Ave- rage	High value	Sum			
	Less falling		Less anxiety		Control of outgoing		Lower insurance		Less anxiety and stress				Landlord cost reduction			Care provider cost reduction			Neighbourhood diminished cost								
Adapted TV controller																					0	0	0				
Picture door phone			.20													.05	.10				.02	0.20	0.35				
Away lock							.10		.20				.10	.10					.10		.03	.20	0.60				
Away key			.20																		.01	.20	0.20				
Carecall									.05	.15									.20		.02	.20	0.25				
Door teller	.20				.10				.10	.05	.10					.05	.15	.05	.10	0.50	.20	.05	.20	0.95			
Locators																.15					.01	.15	0.15				
Medication reminder																.20	.20				.02	.20	0.40				
Picturephone			.30													.10					.02	.30	0.40				
Floor light	.20								.20							.20					.03	.20	0.60				
Bed alarm					.10				.05	.10	.05	.15				.05	.10			.05	.20	.04	.20	0.20			

Investment cost and time for pay-back

A T device	Invest- ment (€)	Comment	Days for pay-back
Adapted TV controller	68	Easily programmable	247
Picture door phone	975	Incl. installation cost	1048
Away lock	1.197	Incl. installation cost	725
Away key	269	Excl. development cost	316
Care call	531		183
Door teller	312		223
Locators	54		193
Medication reminder	75		58
Picture phone	30		40
Floor guiding lights	~200	Reflecting tape better	146
Bed alarm	~2000	Connected to carer	2118

Conclusions

- The applied method leads eventually to figures which could serve as a basis for decision-making in a particularly soft scientific and practical environment
- This is a first attempt only, more practice of the method is required, with different sets of professionals
- The outcome of the method should be scrutinised and verified against different types of user benefit studies (observation of test persons, control groups, etc.)

Thank you for your attention