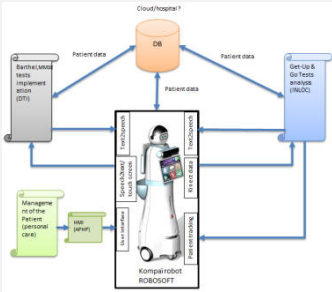



Idea Resume

Solution name:	ARNICA	Coordinator:	Robosoft Services Robots
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Solution Description	Key Features and Functions	Feasibility Assessment
<p>In ARNICA, we use the Kampaï-2 robot as a device helping with Comprehensive Geriatric Assessments. The robot is already being used to assist elderly people at home, in institutions and in hospitals. The Kampaï-1 robot has more than 1000 days of use with real people. The CGA module will be considered as an extension of the robot's functions and sell as an option, as illustrated in the following architecture.</p> <div></div>	<p>Main features of the mock-up using Kampaï robot:</p> <ul style="list-style-type: none"><li>• Weight: &lt; 50Kg;</li><li>• Locomotion: 2 motorized wheels in the center + 2 caster wheels (one front and rear)</li><li>• Overall size: Height x Width x Length = 1330 x 460 x 460 mm</li><li>• Energy: Battery-powered with an autonomy up to 8h</li><li>• Interaction with users: voice and touch screen modalities</li><li>• Language: English and Catalan demonstrated (Phase I), multi-language capabilities (Phase II and III)</li><li>• Mobility: autonomous mode (when mapping is available), follow me, remote control from PC or smartphone</li><li>• Implementation of Barthel/MMSE tests and motion tracking context of the Get up &amp; Go test, the Tinetti Balance and Gait tests</li><li>• Use of EC 95/46/EC Directive's certified Amazon Web Services (AWS)'s Cloud Compliance to store and manage patients data + possibility to interface our system to clinical data management system</li></ul>	<p>The feasibility of the robot itself is not a risk, as it is under development in a few other projects, and being currently industrialized to become a true industrial product.</p> <p>The feasibility of the software part (mainly on-board and Man-Machine Interface) has also been demonstrated in phase 1. It is based on the most advanced web technologies, which make it up to date for along time.</p> <p>We also demonstrated the feasibility of the data management, also based on the most recent tools.</p>

- Use of dashboard to analyze tests results (edit results, correct results, comparison with previous data)

## Critical Uncertainties

If Arnica consortium is optimistic about developing a real product for CGA assessment, we can identify 3 remaining uncertainties which will be addressed in phase 2 :

- The capability of 3D cameras like Kinect of equivalent to deliver useful and exploitable data for gait analysis
- The level of security of the cloud storage we are using, which will require deeper studies
- The type of integration needed in hospitals, including connection to the IT system. We need to define the right level of interface for our system to be able to be deployed in good conditions in as many sites as possible

These uncertainties are critical but not risky, they require advanced developments for the first one, and a better understanding of the market needs and requirements for 2 others.

## Challenges Phase I

## Economic Viability

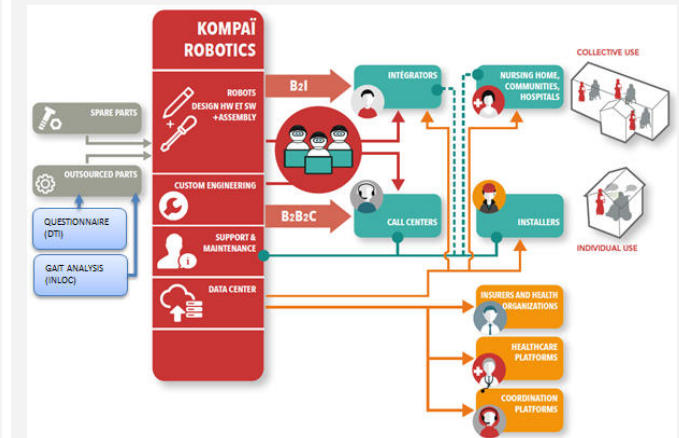
- Costs for public entity: **target sell price is 5-7K€** with the full industrialized Kopaï robot within 3 years + 1,1 K€ per year for maintenance and web subscription
- Market potential: 50 380 robots; 302 M€ of turnover and 30 M€ of profit
- No relevant patents related to the CGA as addressed by ECHORD++ PDTI
- ROI: 60 patients (equivalent to 8,5 days) when the final version of the robot (at 5 k€)
- Go to market strategy: same as the Kopaï robot because the CGA module is an option of Kopaï robot application
- Roadmap: 3 years
- Advantage of our solution: the main advantage of the “CGA package” solution is that it is an option for an existing product, one which can be used by customers for other applications such as cognitive or physical stimulation, communication device, caregiver assistance ... It means that our solution can be used not only for questionnaires, but for other purposes as well, which can help to optimize hospital costs. It also means that the hardware and forthcoming software compatibility will be achieved.

## End-User Involvement

## Potential Impact

Kopaï's business model (see the figure below) is not the direct sale of the questionnaire module, but rather its integration into the robot package. This will significantly increase the number of sales in the primary market of home care, if the feature proves itself to be as necessary and useful as it seems to be.

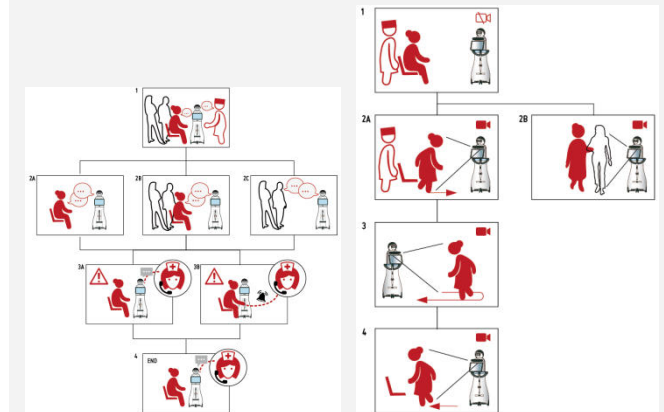
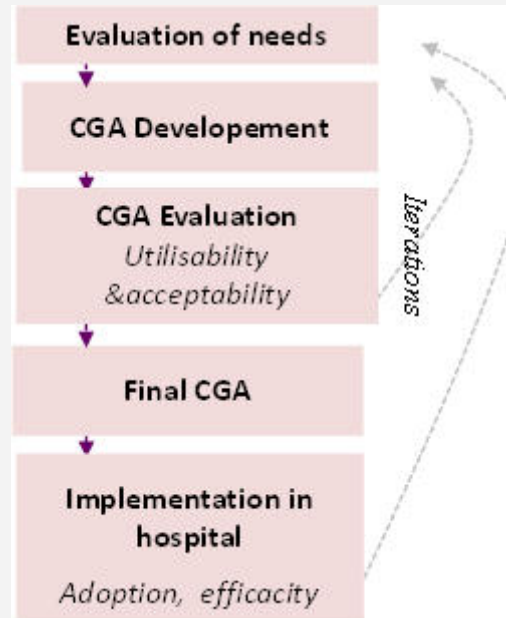
### Business model of Kopaï



## Idea Sketch

- Concept Design of the CGA module
- Realization of the muck-up implementing this concept design
- First validation of this muck-up by Broca hospital our end-user partner.

In ARNICA project we are using co-development techniques, as we did for Kompaï. Through partners like Broca Hospital, we are applying an end-user driven design approach and involve end-users (patients, relatives and health professionals) regularly in the development process in order to receive feedbacks from a clinical perspective. Our work is conducted within a multi-dimensional framework including medical, social and ethical expertises. We have adapted the traditional methods of human-computer interaction research to work effectively with older and frail adults with cognitive deficits taking into account their abilities, motivations and limitations.



CGA Questionnaire

CGA Get UP & Go Tests

We analyzed each test, and developed a new and specific process in which the robot can be used to optimize time of medical staff.

While the Barthel can be totally done by the robot, in the MMSE and Get Up and Go, the robot is like an assistant of the physician, guiding him through the questionnaire and possible answers, and giving him a quick access to the previous data to compare.

The basic ideas are twofold :

- Save time, the robot does the job when possible
- Replace existing devices such as computer, keyboard, table ... using the robot's interface