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**European Network of Funding Agencies
Coordination of National Complexity Research and Training Activities
Thematic Priority: ERA-NET**

D2.3 Involving Industry

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Introduction

It is well known that the academic-industry relationship has its own difficulties and barriers. To determine the industrial perspective of complexity science, an emerging, highly cross-disciplinary area, the challenge is even greater than in more traditional academic fields. This report summarises the efforts of Complexity-NET to learn what complexity science themes interest industry based primarily on feedback from a survey of industrial respondents. Only partner countries in the Complexity-NET ERA-NET, established through the FP6-funded coordinated action, are included.

As well as participating in the coordinated survey, individual Complexity-NET partners have also undertaken national activities to engage industry in complexity science; some of these are also highlighted later in this report. In brief, the Complexity Innovation Network initiative in Denmark, the IRCSET Enterprise Partnership Scheme in Ireland, the industrial communication of NWO's strategy document on complexity science in the Netherlands, and the 2008 EPSRC UK Workshop 'Complexity in the Real World: Grand Challenges for Complexity Science,' have all utilized industry contacts for scoping possible activities which would grow the complexity science community at both the national and European levels.

1. Methodology

To make it possible to relate investigations of industrial interests to the earlier Complexity-NET investigations of the European complexity landscape (ERA-NET Deliverable 2.2), industry contacts were asked to rate the importance of the general complexity science research themes identified in that work in the present study. These research themes were:

1. **Complex networks** (social, infrastructural, logistics, market analysis and risk, etc)
2. **Biological complexity** (cellular processes, reaction-diffusion systems, genomics, evolution, etc)
3. **Environmental complexity** (weather and climate, fluid motion, mixing, natural disasters, etc)
4. **Complex decisions** (optimisation, decision support, control, artificial intelligence, etc)

To sample opinions on the importance of complexity science seen from an industrial perspective, a questionnaire was formulated, requesting on a 1-5 scale from 'not important' to 'very important' an opinion on the importance of the four research themes. In addition, stakeholders' interests in participating in networks with academic complexity science researchers was examined.

a. Selection of companies

The companies to approach were selected in three ways:

1. Complexity-NET partners were asked to provide a list of major companies known to them as well as names of contact persons that could be contacted. It should be noted that only a few partner countries were able to provide strong contacts to their industry base. Table 1 below shows the number of companies and the number of contact persons provided in this way.
2. Companies with a presence in the 11 partner countries and among the world's largest 1000 companies in terms of revenue (2007) were selected and listed.
3. Companies with a presence in the 11 partner countries that were among the world's largest 1250 companies in terms of R&D investment (2007) were selected and listed.

Table 1 shows for every partner country the number of companies and the number of companies where at least one contact person was identified (number of contacts). A contact person here means that we have information on both name and e-mail address. Table 1 also gives the number of (final) responses received (yes or no, see below). The numbers are considered separately for companies selected / not selected directly by the partners as described above.

TABLE 1: Number of companies contacted and responses received.

Country	Partners			Others			Total number of companies	Total number of contacts	Total number of answers
	Number of companies	Number of contacts	Number of answers	Number of companies	Number of contacts	Number of answers			
Belgium	0	0	0	9	7	2	9	7	2
Denmark	54	48	31	0	0	0	54	48	31
Estonia	3	3	1	0	0	0	3	3	1
Greece	17	15	1	4	1	0	21	16	1
Hungary	14	0	0	2	1	0	16	1	0
Ireland	25	25	2	4	2	1	29	27	3
Italy	6	5	1	20	3	2	26	8	3
Netherlands	20	2	0	15	6	3	35	8	3
Portugal	30	2	1	1	0	0	31	2	1
Spain	0	0	0	10	0	0	10	0	0
UK	13	5	2	55	26	6	68	31	8
Total	182	105	39	120	46	14	302	151	53

In Appendix A the companies, the identified contact persons and their e-mails, and the type of response (see below) received from the companies are listed. The list is divided into two sections, one comprising companies selected directly by the partners, and one comprising companies selected because of their size/R&D status.

b. Method of communication

Contact with the selected companies was undertaken in several steps. The number of identified contact persons was strongly limited; consequently the major task was to identify contact persons who actually deal with R&D at a technical level. Initial contact was made either directly through company internet information or by calling the company and asking for R&D. Several e-mails and phone calls were typically necessary in order to improve the list of R&D contacts, which was clearly a very time-consuming activity.

From a total of 302 companies, contacts from 151 companies, or 50% of the companies, were identified. An e-mail explaining the request and questionnaire were then sent to all identified contacts, asking for a feedback.

2. Results of the survey

Table 2A and Table 2B provide an overview of the number and type of responses received from the companies in the survey. The responses are allocated to one of four categories:

1. Communication not established (NE). For the majority of companies, it was not possible to establish contact, i.e. identify a contact person:
 - a. Companies offered no response or only “automatic” responses when contacted through their company e-mail address;
 - b. Companies, even large companies, were not able to communicate in English when contacted via telephone.
2. Communication in progress (IP). Many companies needed considerable time to process our request. Having identified a contact person does not mean that one has identified the “relevant” contact person. In many cases, ERA-NET representatives were referred to other sections of the company. Ultimately we would hope that the list of contact persons will improve on an ongoing basis, providing valuable contact information to the Complexity-NET for further communication in due course.

3. Communication ended with a negative response (No). The “no” responses were quite varied, and it is not clear how many of these responses came from contacts with R&D insight.
4. Communication ended with a positive response (Yes). In a few cases, the “relevant” contact person was identified, and the questionnaire was completed. All those who completed the questionnaire, barring only one, also wanted to participate in future network activities. This provides a good opportunity for Complexity-NET to communicate with these companies on future network activities.

The 27 positive responses received from companies (= response rate 9%), and their view on the four broad research themes, are listed in Table 3. The sample size is small, but it is encouraging to note that all respondents (bar one) believe that one or more of the identified themes of complexity science are important or very important in a user context.

TABLE 2A: Number and type of responses received so far from companies selected directly by the partners.

Partner country	Not established	In progress	Finished	
			Yes	No
Belgium	0	0	0	0
Denmark	6	17	16	15
Estonia	0	2	1	0
Greece	2	14	1	0
Hungary	14	0	0	0
Ireland	0	23	2	0
Italy	1	4	1	0
Netherlands	18	2	0	0
Portugal	28	1	0	1
Spain	0	0	0	0
UK	8	3	2	0

TABLE 2B: Number and type of responses received so far from companies not selected by the partners.

Partner country	Not established	In progress	Finished	
			Yes	No
Belgium	2	5	1	1
Denmark	0	0	0	0
Estonia	0	0	0	0
Greece	3	1	0	0
Hungary	1	1	0	0
Ireland	2	1	0	1
Italy	17	1	1	1
Netherlands	9	3	1	2
Portugal	1	0	0	0
Spain	10	0	0	0
UK	29	20	1	5

TABLE 3: Survey results, rating the importance of complexity science themes on a scale of 1 (not important) to 5 (very important)

T1: Complex networks

T2: Biological complexity

T3: Environmental complexity

T4: Complex decisions

Company name	T 1	T 2	T 3	T 4
Agfa	5	1	4	5
Carlsberg	5	4	3	4
Danisco	4	5	4	4
Lantmännen Schulstad	3	2	2	4
Daka	4	2	3	4
Novozymes	3	5	4	4
H. Lundbeck	2	1	1	2
Ferrosan	4	3	3	3
Dansk Droge	4	2	4	3
Lego	5	1	1	5
Royal Copenhagen	4	1	1	5
DONG Energy	4	3	5	3
Danfoss	2	1	4	3
Grundfos	3	2	5	5
Oticon	1	1	1	4
Brüel & Kjør Sound & Vibration	3	1	4	4
Foss	4	4	4	4
Eesti Energia AS	3	1	5	4
Pyrogenesis	5	3	4	5
HP Palo Alto	5	1	3	3
Merck Sharp & Dohme	5	5	4	4
Itamezz	4	5	3	4
Italia RCS MediaGroup	5	5	5	5
Danone Research - Centre for Specialised Nutrition	2	5	1	3
GlaxoSmithKline PLC	2	5	2	5
AstraZeneca PLC	2	5	2	4
Eurobios	4	2	1	5
Mean value	3,6	2,8	3,0	4,0

On a scale of 1 to 5 from 'not important' to 'very important', the survey responses rated 'complex decisions' most highly, followed by 'complex networks'. This result is perhaps not surprising, given the pervasive importance of complex decision-making and logistics in large business in all industry sectors.

Intuitively it seems clear that complexity science should have an important role to play in optimising operational efficiency (and therefore profit) at many levels in industry, which is reflected in these responses. 'Environmental complexity' and 'biological complexity' rated less highly, which perhaps reflects their more specialised areas of user engagement. However, too much emphasis should not be placed on these results, given the small survey sample size (n=27).

3. Additional industry engagement at a national level

Further efforts of Complexity-NET partners have been taken to involve industry in future actions on complexity research. Examples of these initiatives are reported in this section.

a. Denmark

The Complexity Innovation Network initiative is a national initiative in Denmark formed in order to build a network between researchers across traditional disciplines and industrial partners interested in specific areas of complexity science. The network consortium is based around five university institutes and one technological service institute. The network involves at present (December 2008) 33 university institutes, including departments in mathematics, physics, computer science, informatics, chemistry, biology, mechanics, electronics, optics, energy, medicine, finance, economy, market statistics, environment, and communication.

The network has been initiated through four workshops, two including only academics from different disciplines presenting their overall input to complexity science, and two further meetings where industry representatives were invited to discuss their view on the challenges for complexity science. Feedback from 40 companies helped in the preparatory work for these workshops.

A central finding from the workshops was that research themes should be more specifically aimed towards solving specific problems from a user perspective. Themes like "biological complexity" were considered too unclear and not sufficiently problem-driven, in contrast to more defined themes such as "reducing CO₂ emission". Many companies deal with many complex-systems issues that could be of potential interest to academia, but the tasks must be clearly defined to receive interest from industry.

It was also clear from the meetings with industry that "complexity" does not have a conceptual understanding for industries in Denmark. The potential value of complexity science for industry and society has not yet been demonstrated in the form of case studies or 'good-news' stories.

The workshops have led to the formation of an active network which has the aim of being a 'one-stop' portal to complexity science with the following activities: network meetings, thematic workshops, "science dating", study visits, matchmaking, supporting services in the formation of university-industry collaborations, development of competencies, dissemination and internationalisation, and summer schools with industrial perspectives.

In general terms the Danish Ministry of Science, Technology and Innovation has supported 36 innovation networks (2001-2007) and analysed their activities and results. Through their Council for Technology and Innovation, the following 2010 goals are pursued:

- 10% of SMEs (small/medium enterprises) shall collaborate with knowledge institutions (2006: 7%).
- 33% of large enterprises shall collaborate with knowledge institutions (2006: 27%).
- Denmark shall be among the countries in Europe where enterprises collaborate most with knowledge institutions.

In 2006, 2400 different companies participated in activities of the 36 networks. Of these, 1575 companies had less than 50 employees. Approximately 800 companies participated in collaborative projects (research, innovation, competence development). In particular, 139 innovation projects were running in 2006, 563 companies participated (414 with less than 50 employees).

b. Ireland

The Enterprise Partnership Scheme (EPS) is an innovative initiative developed by The Irish Research Council for Science, Engineering and Technology (IRCSET), following the Irish Government's stated objective to develop Ireland as a knowledge economy, as a way of sustaining increases in employment, wealth creation and social well-being in an increasingly competitive global economy.

The challenge of involving industry with academic research is a daunting task, with companies slow to see the actual benefits that can arise from a collaboration such as access to potential future employees and maximising potential for innovation. In the Enterprise Partnership Scheme the enterprise co-funds postgraduate scholarships and postdoctoral fellowships, among the most promising researchers in Ireland. The scheme was established in 2004, with over 100 scholars participating. For the Complexity-NET survey IRCSET asked 25 EPS companies about the Complexity research themes, with the hope that the industry relationship had already been established, whether or not they were known to be interested specifically in complexity science.

c. Netherlands

A position paper on complexity science has been formulated by the NWO to connect the Dutch research councils and the scientific community to Complexity-NET. This document has been disseminated to the Dutch scientists at a dedicated workshop on complexity science. Additionally, NWO has sent the starting document out to relevant national contact persons within companies and institutes, and has visited several of them to further present the theme and negotiate their possible future involvement. Following these activities, a number of companies and institutes have expressed their interest in complex systems science by means of a letter of support to NWO (in Dutch):

- Neuroscience Campus Amsterdam, www.vumc.nl; especially interested in the sub-themes 'Micro-Macro' and 'Networks'
- TNO ICT, www.tno.nl; the research groups Quality of Service and Media Mining are especially interested. TNO is willing to participate actively, for example by contributing to symposia and organising a workshop at TNO.
- Philips (English letter in Appendix B), www.philips.nl.
- Royal Netherlands Meteorological Institute (KNMI), www.knmi.nl; expressed the importance of complexity science for their research on multi-scale weather systems and climate research.
- Thales Research & Technology Netherlands, www.thalesgroup.com/netherlands; multidisciplinary research on all sorts of aspects of complex dynamical systems is the central theme of the research portfolio of Thales Research & Technology Netherlands and of the Delft Cooperation on Intelligent Systems (D-CIS) lab. The focus is on the realization of the next generation complex information systems. Thales Netherlands intends to support the theme's programmes actively with financial means as well as research capacity, in cooperation with academic researchers; they are willing to help in the realization of project at the national and European level.
- Logica Management Consulting, www.logica.nl; expressed the importance of Complex Systems Science as it matches issues raised by their costumers from a range of sectors.
- Dutch Railways (NS) Reizigers B.V., www.ns.nl; especially interested in the sub-theme 'Micro-Macro'.

Additional support letters are expected at the time of writing from:

- Development Laboratories (Devlab), www.devlab.nl
- KPN, www.kpn.com
- KAS BANK, www.kasbank.com

Within NWO the following research councils support the theme on complex systems science:

- The division for Physical Sciences (NWO representative for Complexity-Net)
- The division for Chemical Sciences
- The division for Social Sciences
- The division for Earth and Life Sciences
- The Technology Foundation STW
- The Netherlands ICT Research and Innovation Authority

d. United Kingdom

In May 2008 the UK Engineering and Physical Science Research Council (EPSRC) held the workshop 'Complexity in the Real World: Grand Challenges for Complexity Science.' The workshop brought together academics, industry representatives and policymakers to inform EPSRC future funding strategy in complexity science.

In brief, the conclusions from the workshop were as follows:

- Complexity science can play a major role in tackling a number of real-world challenges.
- However, there are several barriers to progress that need to be overcome:
 - Negative attitudes and lack of knowledge of stakeholders
 - Current technical limitations
 - Restrictions of governance
- Complexity science can help to overcome the barriers by providing a framework within which complex systems can start to be understood, as well as tools and techniques to tackle the technical issues.
- The research community is ready to engage with real-world challenges.

4. Conclusions

The survey showed that academic/funding agency engagement with industry without carefully cultivated contacts is difficult, particularly in an emerging, cross-disciplinary area like complexity science, where terminology and definitions can be problematic. In order to improve collaborations with industry, researchers and funding agencies must invest the necessary time in actively forming suitable industrial contacts.

The survey represented a good starting point for Complexity-NET engagement with industry, but highlighted the difficulty in engaging industry at an international level: national approaches remain in some ways more effective.

Nevertheless, where appropriate contact was made in the survey, it was clear that industrial interest in complex-systems approaches is high. The survey responses rated the theme 'complex decisions' most highly, followed by 'complex networks'. This result perhaps reflects the pervasive importance of complex decision-making and logistics in large business in all industry sectors. However, it was also clear from the national activities reported that users respond best to a problem-driven approach, and that discussion of very broad research themes can be unhelpful.

We conclude that in future other more proactive methods of industry engagement are required. Examples might include targeted workshops and other networking activities, and stronger dissemination efforts on the benefits of complexity science, such as case studies.

5. Future strategy

To conclude Task 2.3, we consider here ideas to progress industry engagement in the remaining year of the ERA-NET project, and to foster national and international links with industry for the longer term. Rather than continuing this activity under Task 2.3, the partners have agreed that some funds under Workpackage 5 (Dissemination) might be allocated to cover any such further activities, which will be formally agreed at the partners' meeting in June 2009.

1. To hold a targeted thematic workshop with a high level of industrial participation.

One possible concrete aim of such a workshop could be to form a European complexity innovation network to drive the complex systems research agenda forward and influence policymakers. National networks might also be developed as a consequence.

- International working groups in specific themes might be formed, each to have responsibility for further, focussed brokerage events and dissemination activities; membership would be according to national priorities.
 - Activities of the innovation network might include:
 - a. Scoping workshops to discuss new themes or areas of industrial and interdisciplinary interest;
 - b. Brokerage workshops to establish new collaboration between industry and public research across traditional disciplines: matchmaking etc;
 - c. Study tours to research labs or manufacturing centres;
 - d. Competence development, clarifying the need for new competencies, research, education and development of a framework to improve collaboration between industry and public research;
 - e. Dissemination activities, such as a newsletter, to include recruitment of new network participants and dialogue with other innovation networks on an international basis.
 - Funding options for such a network need to be explored by the partners.
2. To produce a number of case studies of complexity science in the real world (building on ongoing efforts).
 3. To produce a Complexity-NET booklet for broader dissemination activities, with a focus on real-world problems.

Appendices

Appendix A

List of companies identified for the survey, the identified contact persons and their e-mails, and the type of response received. The list is divided in two sections, one on companies selected directly by the partners, and one on companies not selected by the partners.

List of companies (partners)

Company name	Contact person	E-mail	Answer type
Belgium			
Denmark			
Carlberg	Esko Pajunen, Research Manager	esko.pajunen@carlsberg.com	YES
Danisco	Leif Kjærgaard, Chief Technology Officer	leif.kjargaard@danisco.com	YES
Arla Foods	Henrik Jørgen Andersen, Research Manager	henrik.jorgen.andersen@arlafoods.com	IP
Tulip	Peter Philipp Hansen, Production Manager	pph@tulip.dk	NO
DMA	Claus Fertin, cand. agro., PhD. CEO	cf@danishmeat.dk	IP
Lantmännen Schulstad	Tina Lindeløv, Development, Manager	tina.mette.s.lindelov@lantmannen.com	YES
Odense Marcipan	Johnny Engberg	engberg@odense-marcipan.dk	NO
Daka	Kjær Andreasen, CTO	ka@daka.dk	YES
AAK			NE
Toms	Hanne Heimdal, Manager, Quality and Environment		NE
Gumlink	Rikke Mikkelsen, Vice President		NE
Bisca (Kelsen)	Lars Bentsen	lwb@kelsenbisca.com	NO
Haldor Topsøe	Jens Rostrup-Nielsen, Research Manager	jrn@topsoe.dk	NO
Novozymes	Ole Kirk, Vice President, Strategic R&D Affairs	OKI@novozymes.com	YES
Chr. Hansen	Lars Henriksen, Process Development		NO
H. Lundbeck	Klaus P. Bøgesø, Vice President	KB@lundbeck.com	YES
Leo Pharma	Poul R. Rasmussen, Executive Vice President	poul.rasmussen@leo-pharma.com	NO
Novo Nordisk	Mads Krosgård Thomsen, CEO	mkt@novo.dk	NO
Ferrosan	Malene Metz Mørch, Group Director	malm@ferrosan.com	YES
Ferring Pharmaceuticals	Marianne Kock, Senior Vice President	mkc@ferring.com	IP
Dansk Droge	Kirsten Bjerregaard Hasselstrøm	kbh@danskdroge.dk	YES
ALK-Abello	Jørgen Nedergaard Larsen, PhD.	JNL@dk.alk-abello.com	NO
Alpharma	Steen Rasmussen	Steen.rasmussen@alpharma.dk	IP
Coloplast	Peter Samuelsen, Research Manager	dkps@coloplast.com	NO
LEGO	Morten Juel Willemann, Senior Director	Morten.Juel@lego.com	YES
Superfos	Benny Nielsen		NE
Brødrene Hartmann	Kim Kronborg Christiansen, CTO		NE
Junckers Industrier	Jesper Winther	jew@junckers.dk	IP
Sapa Profiler	Flemming Larsen	flemming.larsen@sapagroup.com	NO
Glud & Marstrand	Brian Nielsen, CTO	brn@glud-marstrand.com	NO
NKT	Søren Isaksen, Ph.D. CEO	soren.isaksen@nkt.dk	NO
Flügger	Bjørn Larsen	bjla@flugger.com	NO
Saint-Gobain Isover	Erling Jessen, Development,	erling.jessen@saint-gobain.com	IP

	Manager		
Gyproc	Søren Kilmose, Plant Manager	soren.kilmose@gyproc.com	IP
Ecco		emk@ecco.com	NO
Royal Copenhagen	Niels Erik Andersen, Vice president, Supply Chain	nea@royalcopenhagen.com	YES
Mærsk Olie og Gas	Jep Brink, Executive Vice President	lra@maerskoil.dk	NO
Vestas Wind Systems	Bjarne Sandager Nielsen, Senior Vice President	BJS@vestas.dk	IP
DONG Energy	Martin Wittrup Hansen, Group Support	marwh@dongenergy.dk	YES
Alfa Laval	Christian Thomsen	christian.thomsen@alfalaval.com	IP
Danfoss	Georg Nissen, Business Development Manager	gen@danfoss.com	YES
Grundfos	Peter Elvekjær, Group senior vice-president	pelvekjaer@grundfos.com	YES
Oticon	Thomas E. Christensen, CTO	tec@oticon.dk	YES
Rambøll	Bent Feddersen, Manager, Competences	BF@ramboll.dk	IP
FLSmidth & Co	Jørgen K. H. Knudsen, General Manager	joek@flsautomation.com	IP
Brüel & Kjær Sound & Vibration	Finn Kryger Nielsen, Innovation Manager	FKNielsen@bksv.com	YES
Bang & Olufsen			NE
Foss	Steen Kjær Andersen, Senior Manager R&D	ska@foss.dk	YES
Danske Bank	Cato Baldvinsson	cbal@danskebank.dk	IP
Nykredit Markets	John Madsen	joma@nykredit.dk	IP
Nordea Bank Denmark	Tom Holflod	Tom.Holflod@nordea.com	IP
Jyske Bank	Ivan Stendahl Hansen	ivan-hansen@jyskebank.dk	IP
Sydbank	Allan Nørholm	alno@sydbank.dk	IP
Industriens Pensionsforsikrin	Jan Østergaard, Manager, Investments	jos@ipf.dk	IP
Estonia			
Eesti Energia AS	Jaanus Arukaevu	jaanus.arukaevu@energia.ee	YES
Merx AS	Valdis Parts	valdis@merx.ee	IP
Hansapank AS	Robert Kitt	robert.kitt@hansa.ee	IP
Greece			
4Plus	George Tselikis (CEO)	tselikis@4plus.com	IP
DATECBOS	Dimitris Stamelakos	info@datec.gr	IP
Energotech	Chris Vouros (CEO)	energogr@otenet.gr	IP
Environmental Protection Engineering S.A.	Nikos Chrysanthopoulos	r&d@epe.gr	IP
HELECTOR S.A.	Dr. Ioannis Boukis	i.boukis@helector.gr	IP
Hellenic Aerospace Industry			NE
INTERGEO E.P.E	Dr. Christos Vatseris	thessaloniki@intergeo-consulting.com	IP
INTRACOM S.A.	Iraklis Kitsonas	iraklis.kitsonas@intracom.gr	IP
MARAC ELECTRONICS SA	Antonis Kantidakis	kantidakis@marac.gr	IP
PyroGenesis SA	Dr.Michalis Vardavoulias	mvardavoulias@pyrogenesis.com	YES
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SOL ENERGY HELLAS S.A.	Elias Nomikos (M. Director)	info@solenergy.gr	IP
Terna Energy S.A.	Emmanuel Perakis	perakis@terna.gr	IP
TerraMentor E.E.I.G.	Dr. George Sideris	terramen@otenet.gr	IP
THORAX ANTISEISMIC SA	Vassilios Ligouras		NE
ZENON S.A.	V. Spais	v_spais@zenon.gr	IP
Hungary			
OTP Bank			NE
K&H Bank			NE
CIB Bank			NE
Raiffeisen Bank			NE
Erste Bank			NE
Morgan Stanley			NE
Magyar Telekom			NE

E.On Hungary			NE
MOL			NE
Ericsson Hungary			NE
Delta Elektronik			NE
Econet			NE
Theridion Network Research			NE
Pannon			NE
Ireland			
Amideon/Sera Scientific	Eoin Sugrue	eoin@amideon.com	IP
Archport	Eunan McGlinchey	eunan.mcglinchey@dcu.ie	IP
Beocare	Eoin Collins	e.collins@beocare.ie	IP
GlaxoSmithKline (Cork)	Siobhan Creedon	Siobhan.M.Creedon@gsk.com	IP
BioBode	Scott O'Connor	scottoconnor@eircom.net	IP
Alcon	Barry Walsh	barry.walsh@alconlabs.com	IP
HP Palo Alto (California)	Amip Shah	amip.shah@hp.com	YES
HP Manufacturing Ltd (Galway)	Barry Hogan	barry.hogan@hp.com	IP
HP European Software Centre (Leixlip)	Donie O'Keeffe	Donie.OKeeffe@hp.com	IP
Dairymaster	Joseph Walsh	Joseph.Walsh@staff.ittralee.ie	IP
Schering Plough	Stephen Rush	stephen.rush@spcorp.com	IP
BT Research	Kevin Swale	kevin.swale@bt.com	IP
Byrne Looby Partners	John Byrne		IP
Cytec Engineered Materials	Alex Baidak	Alex.Baidak@cytec.com	IP
The Digital Hub	Michael Hallissy	mhallissy@thedigitalhub.com	IP
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Intel	Pádraig P'Murchú	padraig.s.omurchu@intel.com	IP
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Merck Sharp & Dohme	Tom O'Ceallaigh	tom_oceallaigh@merck.com	YES
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Alterra			NE
CQM			NE
GE Plastics			NE
Holland Railconsult			NE
LogicalCMG			NE
Oce-Nederland			NE
Ortec Consultants			NE
Mosanto Holland			NE
Prorail			NE
Corus			NE
Campina			NE
NXP			NE
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Telecom Italia			NE
FastWeb			NE
IMMSI			NE
Piaggio & C			NE
Sorin			NE
Finmeccanica SpA			NE
ERG SpA			NE
Edison SpA			NE
Saipem SpA			NE
Italmobiliare SpA			NO
Italcementi SpA			NE
Luxottica Group			NE
Generale Industrie Metallurgiche SpA			NE
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Altadis SA			NE
Industria de Diseno Textil SA			NE
Ebro Puleva SA			NE
Gamesa Corporacion Tecnologica SA			NE
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Datum: 19 september 2008

Dear Dr. Zandee,

I would like to inform you that Philips Research would warmly welcome the creation of the NWO theme Dynamics of Complex Systems.

We expect that a number of our researchers, in collaboration with the academic partners, will participate in the research activities of this theme. Research in the field of Complex Systems is extremely important for Philips. Relevant applications range from protein networks in cells and complex metabolic regulation systems in humans to sensor networks in smart homes. Progress in understanding the dynamics and treatment of complex systems will have a far reaching effect on the solution of the most challenging technological and bio-medical problems.

Sincerely yours,

Pieter Wierenga
CEO Philips Research