Building **R**adio frequency **ID**entification for the **G**lobal **E**nvironment

Training Requirements Analysis

Authors: GS1 Global Office

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About the BRIDGE Project:

BRIDGE (**B**uilding **R**adio frequency **ID**entification for the **G**lobal **E**nvironment) is a 13 million Euro RFID project running over 3 years and partly funded (€7,5 million) by the European Union. The objective of the BRIDGE project is to research, develop and implement tools to enable the deployment of EPCglobal applications in Europe. Thirty interdisciplinary partners from 12 countries (Europe and Asia) are working together on : Hardware development, Serial Look-up Service, Serial-Level Supply Chain Control, Security; Anti-counterfeiting, Drug Pedigree, Supply Chain Management, Manufacturing Process, Reusable Asset Management, Products in Service, Item Level Tagging for non-food items as well as Dissemination tools, Education material and Policy recommendations.

For more information on the BRIDGE project: www.bridge-project.eu

This document:

We set out to identify the potential target audience, the potential content, and the different delivery methods and mechanisms to answer the future training needs of a global community of EPC/RFID technologies users with a diversity of learning styles; and once defined, to analyze the most immediate subsets of needs.

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Introduction

Overview of Work Project 12, and on Task 12.1

BRIDGE (***B**uilding **R**adio Frequency **ID**entification Solutions for the **G**lobal **E**nvironment*) is a three-year RFID application research and development project funded by the European Commission.

Work Package 12 of the BRIDGE framework treats Training Activities, and will provide a blended learning solution on the technology and applications, combining Information Days (Roadshows), Webinars, e-Learning and other training delivery mechanisms, to the active and future users of the Electronic Product Code.

Resulting training programmes will be contained on the GS1 LEARN system, an operational, functioning online training system that supports student administration, content translation, training kits, e-learning and curricula/certification functionalities.

Work package 12 will run from Months 1 – 36 (*July 2006 to June 2009*) of the BRIDGE project.

Within Work Project 12, Task 12.1 has the specific objective to **identify and analyze the requirements** for training.

We set out to identify the potential target audience, the potential content, and the different delivery methods and mechanisms to answer the future training needs of a global community of EPC/RFID technologies users with a diversity of learning styles; and once defined, to analyze the most immediate subsets of needs.

In order to collect and analyze the training requirements, information, input and feedback was sought from a selected group of persons and organisations representatives of the overall target market for training. The group was composed of BRIDGE consortium participants, EPCglobal experts, academics, corporate members of GS1 EPCglobal, executives from targeted sectors already using EPC/RFID standards, and consumer and business groups. As of the date of submission of this report, input and feedback was solicited from 50 persons representing 40 organisations or companies; 35 of these persons from 20 of these organisations or companies provided their input or feedback in writing, by telephone, or both.

1 Training, versus Outreach and Communication

Helpful thoughts for other uses

Training is commonly defined as the action of teaching a person or group of people a particular skill or set of knowledge. We took care, while preparing the analyses in this report, not to cross the line between identifying needs for training, and identifying needs better suited to communication, publicity, or advertising efforts.

Nevertheless, in the course of our work, while asking questions about what information needed to be known or shared, interviewees spontaneously shared thoughts and ideas that do not truly have their place in training modules of the kind that will be addressed by BRIDGE Work Project 12.

Such input could provide ideas and food for thought for:

- Outreach and awareness actions, such as those that might be part of Work Project 13, "Dissemination & Adoption Tools,"
- Public policy outreach actions, such as those that might be part of Work Package 15, "Innovation & Policy,"
- Communication and advertising actions

We have deemed it worthwhile, then, to include these non-training thoughts in a special section of this report, which will be brought to the particular attention of the relevant Work Package Leaders.

2 The Training Requirements Matrix

Visualising the feedback

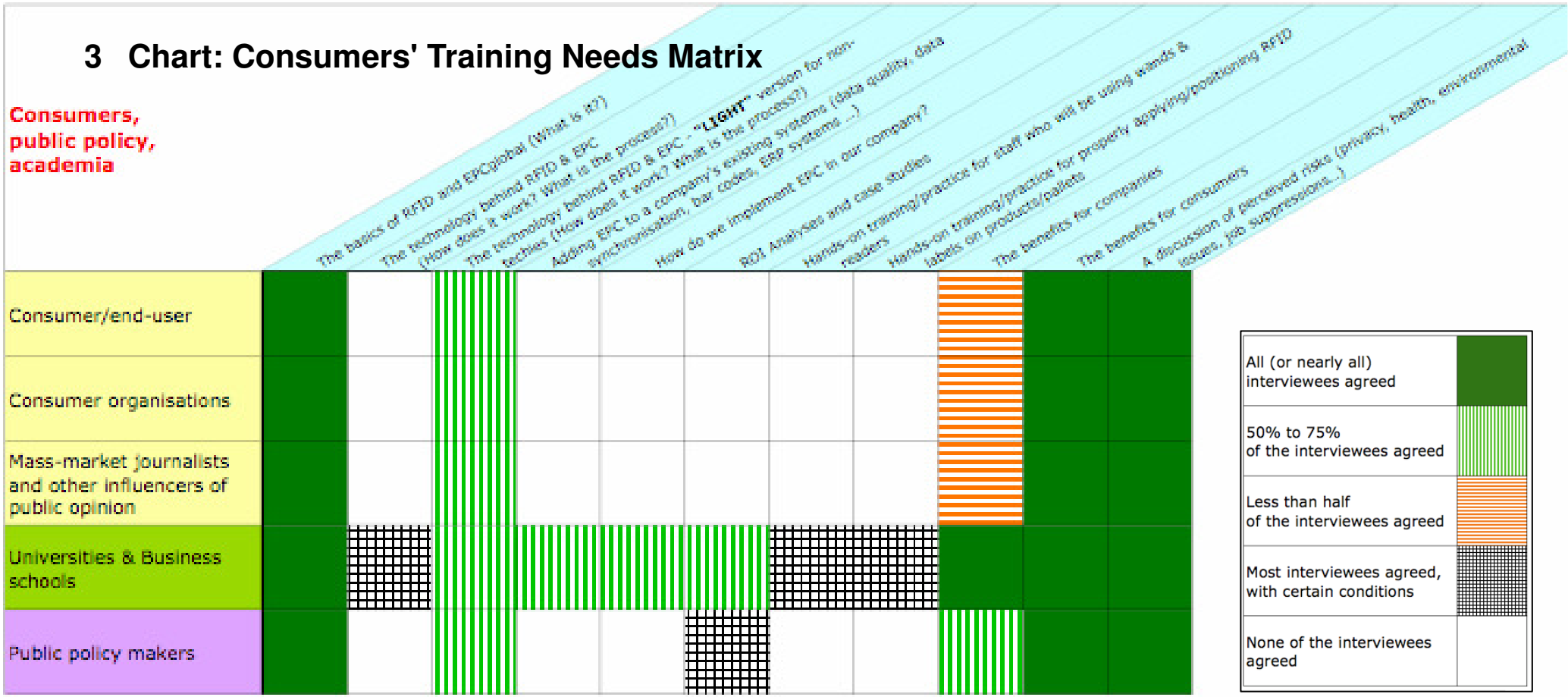
The charts on the next pages enable the visualisation of the feedback we sought and obtained.

Down the left-hand side, the reader will see various categories of people who may need to be trained on (*or made aware of*) EPC technologies/RFID.

Across the top of the charts, the reader will find topics, questions, and/or issues that were deemed potentially worthy of training (*or perhaps better suited for outreach, awareness, communication or public policy actions, as described above*).

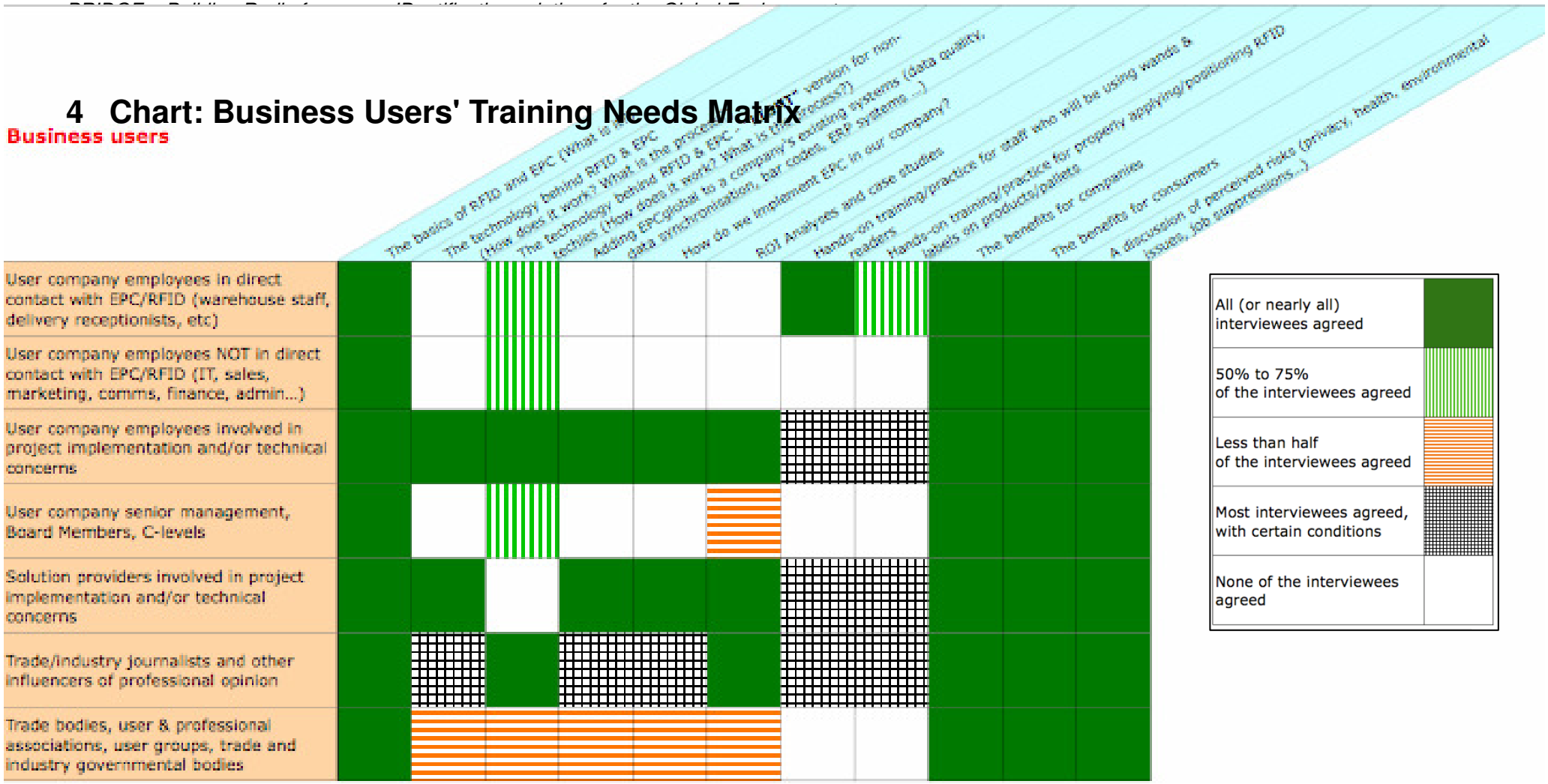
The intersecting squares are colour-coded (*see the key*) to show the degree of agreement or emphasis attributed by the interviewees.

3 Chart: Consumers' Training Needs Matrix



4 Chart: Business Users' Training Needs Matrix

Business users



5 Training Requirements

Targets and topics

This section will add clarity to the training requirement matrix charts, found on the two previous pages.

Targets

We first identified four main categories of people who might conceivably need information on EPC/RFID technologies.

These four categories are:

- **Consumers and end-users**, including consumer organisations, mass-market journalists and other influencers of the public's opinions.

- **Universities and business schools**

- **Business users**, including:
  - ✓ User company employees in direct contact with EPC/RFID (warehouse staff, delivery receptionists, etc);
  - ✓ User company employees NOT in direct contact with EPC/RFID (sales, marketing, communication, finance, support staff…);
  - ✓ User company employees involved in project implementation and/or technical concerns;
  - ✓ User company senior management, Board Members, C-levels;
  - ✓ Solution providers involved in project implementation and/or technical concerns;
  - ✓ Trade bodies, user and professional associations, user groups, trade and industry governmental bodies;
  - ✓ Trade/industry journalists and other influencers of businesspersons' opinions.

- **Public policy makers**

This list of categories of people needing information was confirmed and approved by all interviewees, with one proviso: that the training needs of **Small and Medium Enterprises** (**SMEs**) be considered separately from business users from large and/or multinational companies.

Indeed, the categories of user company professionals listed above (*employees in direct contact with RFID, employees involved in project implementation, senior management...)* are, in many SMEs, all one and the same person! As a result, a section below will elaborate on special needs of Small and Medium Enterprises.

Note: The target audience of **"trade bodies, user & professional associations, user groups, trade and industry governmental bodies"** was added to the chart during one of the last interviews, just days before submitting the final version of this document. There was not time to return to previous interviewees and ask their opinions and feedback. As a result, it has been ranked in many categories as "less than half agree" but perhaps, with more time, it might have garnered a greater consensus. We do feel it is a useful target to consider.

Topics

We then built a list of potential topics and questions that would likely warrant training.

Our initial list was lengthened, refined and enhanced thanks to input and feedback from interviewees; although as indicated earlier, some such topics are likely better treated by "outreach" and "awareness" actions (*such as those that will be part of Work Project 13, for example);* by public policy outreach programs (*such as those that will be a part of Work Project 15, for example*), or by communication, publicity and advertising actions.
The main questions that were deemed to likely require some form of response via training, outreach or awareness were:

- What is RFID? What is EPC? What is EPC/RFID usage?
- What is the technology behind EPC/RFID, how does it work?
- How can companies implement EPC/RFID?
- How can companies add EPC/RFID data analysis to their existing systems and programmes?
- What is the potential return on investment?
- How are the wands and readers used? How do they need to be held and manipulated in order to work accurately and correctly?
- What are the benefits for consumers?
- What are the benefits for companies and businesses?
- Are there any risks or dangers?

We will now examine each of these topics in slightly more detail:

The first and most obvious topic deemed worthy for training on EPC technologies and RFID is, quite simply, an overview of the basics: **What is RFID? What is EPC? What is EPC/RFID usage?** They concern whom, what and in which conditions and markets is EPC/RFID used? All of our interviewees and the analysis team agreed that this was an essential starting point to any training, for any category of trainee.

The next set of potential questions concerned a more in-depth examination of **the technology behind RFID and EPC technologies**: How does it work? What is the process? On which standards is it based? Interviewees agreed wholeheartedly that solution providers involved in project implementation and/or technical concerns, and user company employees involved in project implementation and/or technical concerns, would need to be provided this sort of training. It was also pointed out that certain "technologically-minded" trade industry journalists would require this knowledge set, as well as certain course professors in academia.

Many interviewees felt that a **simplified or "light" technology primer** would be very useful for a large number of non-technical people, including consumers and consumer groups, mass market and trade/industry journalists, academics, user company employees and management, and public policy makers. As a result, we suggest that any training work prepared on the technology itself behind should be "drill-down-able" into several layers of depth and complexity, in order to meet this variety of needs and targets.

Another topic requiring training: **how to implement EPC/RFID technologies in a company**, including a look at **adding EPC/RFID data analysis to a company's existing systems and programmes**, such as data quality initiatives, global data synchronisation efforts, bar codes and Enterprise Resource Planning (ERP) systems. This topic would also cover EPC/RFID infrastructure management and EPC/RFID implementation impact on business applications such as Supply Chain Management. This is needed for solutions providers and user company employees involved in integrations projects, as well as for certain industry/trade

journalists, especially if they are working on articles on this topic. Many persons interviewed also felt that it needed to be addressed in certain academic settings as well.

The analyses of **return on investment (ROI)** and **case studies** of already-launched projects were cited by many interviewees as necessary themes for training. This, too, is seen as useful for implementation teams and trade journalists. Several persons interviewed also felt that senior management of user companies needed to understand how "it" worked, how "it" all paid off in the medium and long term. It was also mentioned that certain public policy persons would need at least a thumbnail understanding of ROI to properly carry out their missions.

A training requirement that was identified during the interview process is that of **"hands-on" training and practice for properly using radio frequency wands and readers**, and **"hands-on" training and practice for properly applying or positioning RFID labels on products or pallets**, for people who would be working directly with the technology, for example in warehouses or reception zones.

All interviewees agreed that any training session on EPC/RFID technologies must include an overview of **the benefits for consumers,** no matter what the target segment, because everyone, even "professional" users, are potential consumers, too. For this same reason, interviewees felt that all target segments should receive information and facts to address **the perceived risks and issues** that today tend to cloud understanding of EPC technologies and RFID, such as privacy concerns, health concerns, environmental issues, fear of job suppressions, etcetera.

Of course, public policy initiatives are not within the scope of any training programme; we do not wish to imply this. We simply note that the vast majority of interviewees felt that trainers should remember that business trainees are users, and furthermore that (for the most part) their clients are also consumers, and thus include in the training coursework a section on consumer-focused topics that detail the benefits of EPC/RFID technologies, background information on laws and regulations applicable in Europe around EPC/RFID and provide demystifying facts about any perceived risks.

On the topic of **benefits for companies**: while interviewees agreed that all business users should have this sort of information, opinions were more divided for the consumer categories of potential trainees. Indeed, fewer than half of those contacted felt that consumers, consumer groups and mass-market journalists required training in benefits for companies, while others thought that this was completely unnecessary for consumers. Many but not all interviewees felt that public policy professionals also would need training in the benefits for companies.

6 Small and Medium Enterprises

Special needs

As already mentioned above, SMEs require somewhat special consideration, if only because unlike large corporations, SMEs' staff members generally fulfil several roles (e.g.the CEO of an SME may also be in charge of IT projects, while also being an employee in direct contact with RFID).

SMEs were slow to adopt bar codes. A strong training and education programme adapted to the specific needs of SMEs is important, in order to ensure EPC/RFID is understood, adopted and implemented rapidly by this important and sometimes overlooked group.

A completely distinct and separate training programme is not necessary: the information provided, and recommendations made, to multinationals (concerning IT, processes, etc.) can be applied to SMEs, provided they are simplified and fine-tuned with the specificities of SMEs taken properly into account.

For example, Small and Medium Enterprises often have:

- ✓ A minimal Quality Assurance programme
- ✓ The legal requirement to provide traceability:
  - Track & tracing of goods (e.g. Just in Time mandates, etc.)
  - Track & tracing of problems (e.g. production problems, where does it come from)
- ✓ Limited investment power demanding a simple and inexpensive solutions and equipment (tags, for example, should be inexpensive, even if printed in small batches: 10,000 unit print runs as compared to a multinational's 10,000,000)

It has been estimated that many SMEs don't take advantage of any ICT training, even in the most basic administrative applications, such as Microsoft Office. This extract from an October 2006 Topic Paper from the EU Task-Force on ICT Sector Competitiveness and ICT Uptake (*Working Group 4: SMEs*)[1] details this situation further:

> *"There is a problem in Europe with basic computer skills and digital literacy. More than half the population (aged 16 to 74) have never taken a course (of at least three hours) on any aspect of computer use. Only a minority (of about 11%) have taken a course in the last year, and the course taken by about half the 42% who have taken a course at all was more than 3 years ago. (Eurostat: statistics in focus 17/2006 [sic]). With the current ageing population in Europe, most "old" entrepreneurs are not aware of the benefits of ICT and how it can be used to create a competitive difference.*
>
> *Most entrepreneurs only have a basic knowledge of ICT and don't consider it as a strategic tool but rather as an unavoidable cost. They prefer investing in their core business rather than in ICT. Education, training, and workforce development are key factors to improve the ICT uptake and to make effective use of it in general and for SMEs in particular.*
>
> *Increasingly firm level evidence suggest that effective diffusion and the use of ICTs are key factors in broad-based growth when combined with effective human resource strategies involving education and training*

[1] See http://ec.europa.eu/enterprise/ict/taskforce.htm

and organisational change."

This reality means that extra efforts will likely have to be made to ensure training on EPC/RFID actually reaches SMEs. Furthermore, training for SMEs should be provided locally or electronically, to limit travel expenses; and whenever possible, in local languages, as English-only sessions can be a true barrier.

7 Universities and Business Schools

A somewhat separate case

Universities and Business Schools are, of course, a somewhat different target for this study, as training needs for them mean "training the trainer."

Consensus is that many universities and business schools across Europe do include coursework on supply chain management, and although EPC/RFID is not consistently part of these courses today, it is widely becoming a "hot topic," especially in MBA programs and manager-level courses, such as those that may be part of summer programmes or work/study schemes.

Our interviews demonstrated that universities and business schools have the need for basic raw material on EPC and RFID, potential coursework, and perhaps most importantly, concrete case studies. Their interests (see chart page 5) cover all the topics and themes we identified, in varying degrees, often depending on the theme of the course or the demographics of the students.

8 Training Requirement Analysis

Overview

In order to maximize the potential uses and re-uses of the work done developing training, we are recommending a "building block" system where a set of training modules can be mixed and matched together to suit the different needs of different audiences.

Recommended training building blocks

We recommend developing **five training building blocks, or modules**.

The five training modules are:

1. **The basics of EPC/RFID and its usage** in the supply and demand chain

2. **The technology involved**: Radio Frequency Identification, the Electronic Product Code, and the EPCglobal Network; and how, specifically and in detail, they work

3. **Implementing EPC/RFID standards**, including project pre-launch, launch and post-launch management, typical timelines, interactions with existing systems, profiles of the stakeholders who must be involved, etcetera

4. **Impact and benefits of EPC/RFID standards**, including overall benefits for companies, specific case studies, Key Performance Indicators (KPIs) that should be identified, processes that must be changed, potential ROI, etcetera

5. **Benefits for consumers, and concrete facts about perceived concerns,** such as privacy issues, health issues, environmental impact, effects on job creation or suppression, etcetera.

The building block modules should be designed with the possibility to select different levels of knowledge as needed:

- top-level general information
- deeper, more detailed (and when appropriate: more technical) information

We emphasize that these are training modules, not training courses. Courses themselves would be built using these training modules, choosing the relevant levels in all modules depending on the nature and needs of each potential target audience. For example:

- A course targeted at **solution providers and implementation managers** would contain all of the modules, with an emphasis on, and more detailed study of, module 3.
- A course for **user company employees in marketing or communication roles** would contain all modules, but would only address modules 2 and 3 at the higher, more general levels.
- **Training sessions focused for SMEs** could be built using all 5 modules, with emphasis on the benefits and the impacts. In addition, best practices and highly practical information (e.g. where do I buy the infrastructure, what is the documentation I should read, how long will it take me to implement, etc.) must be included.
- And so forth.

Training modules and the resulting courses must, of course, be translated into several languages. This is important for SMEs, but also for other key actors who may not have a

sufficient level of English. One of the strengths of the GS1 network in Europe is that they have Members Organisations in all countries, making these localisation efforts much easier.

9 Beyond training

Ideas for others

As mentioned in the introduction, in the course of our research, while asking questions about what information needed to be known or shared, many interviewees spontaneously expressed thoughts and ideas that do not truly have their place in standard training modules of the kind that will be addressed by BRIDGE Work Project 12.

For example, some of the "needs" mentioned in the charts on pages 5 and 6 will have to be met by **outreach and awareness actions**, such as those that might be part of Work Project 13, "Dissemination & Adoption Tools," or **communication and advertising**.

It is unlikely, for instance, that actual **consumers or end-users** will ever be a direct target of training on EPC and RFID within the confines of BRIDGE. Nevertheless, it is also absolutely clear that retailers, manufacturers, and consumer organisations must prepare training and education programmes and materials for the public. Consumer education, especially in regards to new technologies, is a right, not a privilege; and it behoves the success of EPC/RFID technologies to make sure that end users are knowledgeable and educated about the technology, its uses and its benefits. Furthermore, consumer education and outreach efforts must be as varied and heterogeneous as consumers are, themselves. The BRIDGE project may wish to have a train-the-trainers role for this. As this project moves forward, we intend to develop additional contacts with Consumer Associations across Europe, get their feedback, and identify if and how BRIDGE and local GS1 Member Organisations could help educate these educators.

We reiterate here that efforts to support public policy initiatives are not at all within the scope of any training programme. However, some of the themes treated here and thus some of the resulting training modules, might be very helpful and useful as part of public policy outreach actions, such as those that might be part of Work Package 15, "Innovation & Policy."

Similarly, **mass-market and trade journalists** may benefit directly from exposure to some of the training modules suggested here. It will obviously be essential to perform proper outreach to the press with informative briefings, newsworthy press releases, "Q&As," and the possibility to interview knowledgeable, quotable spokespersons.

Means & methods

In the course of our work, many interviewees spontaneously shared ideas for the means and methods in which outreach, or communication actions might be transmitted.

Beyond the "traditional" communication and education means and methods such as handouts, flyers and posters at shops and stores, we encourage serious consideration of the use of more "modern" communication tools, such as web sites, flash animations, demo-showcases, road shows, or audio "podcasts".

A chart summarizing these ideas and suggestions gleaned from the interview process is in Annex 1 of this report.

10 Concluding remarks and next steps

An ongoing process

The analysis of training requirements is not a task that can simply cease at a given month in the official BRIDGE timeline.

The need for training will be fluid and indeed will evolve continuously, as time goes by.

As a result, training needs analysis is considered by GS1 to be an ongoing process, to be studied formally once a year in order to ensure that the latest needs are identified and being met.

Consumer associations

We know the important role that European consumer organisations will have in informing the public about EPC and RFID. We intend to develop additional contacts with Consumer Associations across Europe, get their feedback, and identify if and how BRIDGE and local GS1 Member Organisations could help educate these educators.

Awareness & Policy

As mentioned previously, the feedback, ideas and input obtained here will be shared and discussed extensively with the teams working on Work Project 13 (Dissemination & Adoption Tools) and Work Package 15 (Innovation & Policy) as we are certain they will provide useful input to those projects, too.

Next steps

It is obviously advisable to avoid "reinventing the wheel" and to leverage existing training materials, as WP 12 moves into its next steps. Courses and training programmes on RFID and EPC already exist in a number of European countries, both from GS1 Member Organisations, and elsewhere.

Task 12.2 will thus start with the establishment of several teams of experts (business, technical, implementation, public policy), and the identification, gathering and analysis of existing EPC/RFID training and educational material that would suit the needs identified here. Based on this selected material, new material will be developed and the timely creation of the training modules indicated above will be ensured.

Another deliverable of the later portions of Task 12 will be developing a certification system for training in order to identify training courses that stand out and are "approved." BRIDGE-Certified EPC/RFID training programmes would be recognised throughout the supply chain management field, and could help persons looking for work in the industry, or companies seeking the best work/study programmes for their current employees.

11 Annex 1: Methods & means (ideas from the interview process)

Target	Methods & Means to reach this target
Consumer/end-user	Leaflets to take home, website, information hotline, advertising, videos, flash animations, demos/stands/road-shows, "podcasts"…
Consumer organisations	Face-to-face outreach, website, information documents, Q&A, interview possibilities with knowledgeable speakers…
Mass-market journalists and other influencers of public opinion	Information documents, Q&A, press releases, interview possibilities with knowledgeable speakers, website, demo-showcase …
Universities & Business schools	Use cases, proposed curricula, videos/flash animations, website, "podcasts"…
User company employees in direct contact with EPC/RFID (warehouse staff, delivery receptionists, etc)	Videos/flash animations, website, hands-on practice sessions, talking points for HR managers, leaflets to take home to families…
User company employees NOT in direct contact with EPC/RFID (sales, marketing, comms, finance, support staff…)	Website, one-page information document, texts that can be re-used on corporate intranets, talking points for HR managers…
User company employees involved in project implementation and/or technical concerns	Training courses adapted to needs
User company senior management, Board Members, C-levels	Website, one-page information documents, talking points, Videos/flash animations, "podcasts"…
Solution providers involved in project implementation and/or technical concerns	Training courses adapted to needs
Trade/industry journalists and other influencers of professional opinion	Information documents, Q&A, press releases, interview possibilities with knowledgeable speakers, website, demo-showcase…
Trade bodies, user & professional associations, user groups, trade and industry governmental bodies	Face-to-face outreach, information documents, Q&A, website, placing knowledgeable speakers at events & conferences, demo-showcase…
Public policy makers	Face-to-face outreach, information documents, Q&A, interview possibilities with knowledgeable speakers, website, …

12 Annex 2: Persons/Organisations Consulted

Miia Korpela, Business Analyst RFID, UPM Raflatac Finland
Paul Roberts, Nestle, Group Distribution Engineering Manager
Paul Mills, Director, Melior
Janie Banos, Projects Director, Cetecom
Philippe Gautier, CIO, Benedicta
Florian Michahelles, ETH Zurich, Dept of Management, Technology, & Economics
John Jenkins, Director, JJ Associates
Annamaria Colonna, CAEN Italy
Giovanni Riganti, CAEN Italy
Jérôme Bauxis, Direction Veille & Innovation, Carrefour
Pierre Blanc, Direction Veille & Innovation, Carrefour
Cornelia Kutterer, Senior Legal Advisor at BEUC
Freek Posthumus, NORMAPME
Carole Brier, ECSLA
Stephanie Penning, Learning Consultant, ECR Europe
Dr. Mark Harrison, Cambridge University
Professor Olivier Aba, Grenoble (France) Graduate School of Business
INSEAD Fontainebleau, France
David Lyon, GS1 UK, EPCglobal Business Manager
Heinz Graf, GS1 Switzerland
Daniel Müller, Manager EPCglobal Switzerland
Marisa Jimenez, EPCglobal Brussels
Xavier Barras, Director EPCglobal, GS1 France
Audrey Ni Cheallaigh, GS1 Global Office
Chris Adcock, President, GS1 EPCglobal
Manfred Piller, GS1 Austria, Head of Department GS1 Systems
Leen Danhieux, ADC Project Leader, GS1 Belgium & Luxembourg
Sylvia Stein, Senior Advisor/Senior Consultant, GS1 Netherlands
Pierluigi Montanari, R&D Area Manager, GS1 Italy (INDICOD-ECR)
Sally Herbert, President, GS1 GDSN
Michel van der Heijden, CFO & Director of Solutions, GS1 Global Office
Henri Barthel, GS1 Global Office
Roger Till, External Relations, GS1 UK
Bruno Chambost, Training Manager, GS1 France
Jean-Marc D'Hooghe, GS1 Training & Education Group Manager
Antoine Mallia, GS1 Customer Service Director

13 Annex 3: WP 12.1 Core Work Team

Jean-Marc D'Hooghe, GS1 Training & Education Group Manager
Antoine Mallia, GS1 Customer Service Director
Roger Till, External Relations, GS1 UK
Marisa Jimenez, Public Policy, GS1 EPCglobal Brussels
Erik Sundermann, GS1 Global Office, Brussels
Shannon Wolfe, Infinite Flash