CROFT: CADIC Relational Online Framework and Toolset for Intellectual Capital Management in SME Clusters

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**Abstract.** This paper introduces a flexible methodology and toolset for efficient online management of intellectual capital (IC) in groups or clusters of SMEs called CROFT: CADIC Relational Online Framework and Toolset. Driven from the ‘bottom-up’ by the requirements of the cluster participants themselves, CROFT provides a flexible framework to assist in managing the flow or transfer of IC. Based on observations of real-world SME clustering activities, CROFT has been developed to provide Group Decision and Communication Support (GDACS) to assist clusters in collective management of the group’s intellectual capital through hierarchical gated access of online resources and networking coupled with a cluster-relevant IC management toolset. The pilot implementation of the system is ongoing, and while there remain issues around technical platform integration and early adoption, CROFT is designed to be flexible enough to benefit a broad spectrum of SME clusters with a wide variety of needs.

**Keywords** SMEs, Cluster-building, Bottom-up approach, Intellectual Capital Management, Group Decision and Communication Support, Infusing DSS

# Introduction

The EU MAP project on Enterprise Clusters and networks posed the question: “How can clusters and networks really offer a favourable framework for enhancing the productivity, the innovation and the competitiveness of SMEs across the European Union, as one way to achieve the Lisbon Summit’s Goals?” (Mertins K, 2009). In March 2000 the European Council assembled in Lisbon for a summit to set out goals to make Europe “the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion” by 2010 (Microsoft, 2004). The strategy was relaunched in Spring 2005 becoming more focused on growth and jobs (European Commission), and in 2008, the Commission relaunched it again as a major Recovery Plan for the ongoing economic crisis. Information and Communication Technologies (ICT) was at the heart of this recovery plan to modernise Europe’s Economy and resulted in i2010, a package of policies aimed at harnessing the potential of ICT to drive innovation in Europe. (European Commission, 2007). The core objectives of the i2010 policies were to drive productivity growth, create an open and competitive digital economy and stimulate innovation.

In a global knowledge-based economy, “high performing clusters” of different organisations have been considered as the core of innovation, regional development and competitiveness for more than 20 years. But there have been considerable changes over this time in our understanding of how we should conceptualise a cluster, in order to embed in it the infrastructure which could provide effective and sustained decision support, enabling “high performance”. Initially, Porter’s definition of clusters as Geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions in particular fields that compete but also cooperate would suffice for most people (Porter, 1998). This definition led to many top–down initiatives to arrange such concentrations but, two decades later, a better understanding of the key performance-enhancing factors in cluster management led to clusters being defined as Network arrangements that, though embedded in, transcend geographical location, focus on global markets, operate as ad-hoc and/or long term business networks, are ICT enabled, and are based on dynamic aggregations of capabilities of different SMEs (Damaskopoulos, Gatautis, & Vitkauskaite, 2008).

In the interim period, there had been a sharp decline in the initial enthusiasm for top-down cluster building involving region-oriented approaches which promoted structures constructed to benefit from governmental funding that was rapidly becoming more elusive. In practice, these structures proved inoperative and terribly slow to respond to market demands and firms’ innovation needs. Infused in this context had been an overabundance of “standard” decision support systems with a bias towards technical solutions rather than towards addressing organisational and managerial deficits; lack of proper understanding of SMEs’ knowledge flows and communication (Lagendijk, 1999). By the end of the first decade in the new millennium, it was becoming obvious that such top-down-developed clusters were showing a marked inability to evolve from a stage of co-location. As a result there was increasing advocacy of the emergence of the bottom up approach to cluster development. (OECD, 2008), (Huggins, 2008), (EU Cluster Observatory, 2009), (OECD, 2009). No longer were SME clusters to be put together thereby gaining competitive advantage but instead they would come together through provision of a facilitating infrastructure founded on collaborative advantage as the key to high performance (Martins, Alwert, & Humphreys, 2010).

There is a growing awareness of the need for SMEs in Europe, and further afield, to engage and collaborate in networks and clusters, particularly through the use of infused Information Systems (El Sawy, 2003) which can facilitate collaboration as “a process through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible” (Gray, 1989). It needs to foster “mutually beneficial relationships between two or more parties who work toward common goals by sharing responsibility, authority, and accountability for achieving results.” (Chrislip & Larson, 1994). In order to fuse decision support into this context, trust-building and setting a secure basis for a collaborative environment is essential. This environment must to be systematically nurtured and managed to maintain trust and promote the knowledge flows requisite in collaboration leading to successful collaborative decision making while, at the same time, obviating co-opetition anxiety in the collaborators (Pince & Humphreys, 2008). But the nature of the bottom-up flow-management process is quite different from conventional top-down command-management process: aiming to foster creativity and innovation, rather than control (Humphreys & Jones, 2006). To research and develop and decision support processes that can be effectively fused into this kind of environment is a fundamental aim of the CADIC project.

# CADIC

CADIC - “Cross-organisational Assessment and Development of Intellectual Capital” (CADIC Consortium, 2011) is an ongoing project within the European Union’s Seventh Framework Programme (Capacities). (European Commission, 2007) CADIC addresses the aim of the European Charter for Small Enterprises to foster the involvement of small and medium enterprises (SMEs) in the inter-firm cooperation at local, national, European and International levels. It aims to help a large number of SMEs set up and strengthen their own clusters and engage in existing and suitable clusters on a much easier and more cost-effective basis. To reach this goal, a major focus of CADIC is not only to understand how effective clusters are formed but also to develop suitable methodologies and technical platforms to assist them in Intellectual Capital (IC) management. Unlike other cluster management structures installed to contribute to regional innovation and/or economic development from the top-down driven by government policy, see for example the RICARDA Methodology, (RICARDA Project, 2007), the development of methodologies and technical platforms in CADIC, including CROFT, have been driven from the bottom-up by the real world needs of pilot clusters.

A focus has been on managing both processes of cooperation and competition that occurs within SME clusters to promote effective networking, an important factor for high performance and cluster sustainability. The tension between these two processes leads to the “co-opetition dilemma” (Bengtsson & Kock, 2000), where the need to exchange and cooperate with potential competitors is being restricted by the fear of the loss of knowledge and therefore the loss of competitive advantages (Park & Russo, 1996).

CADIC clusters and their use of CROFT to be described below are founded in connections based on flows of Intellectual Capital (Yu & Humphreys, 2008), (INCAS Consortium, 2010) through a generative flow- management process designed to obviate co-opetition anxiety in the SME participants in the cluster (Pince & Humphreys, 2008) and avoids putting direct competitors in the same cluster activity. This provides real and/or virtual proximity and promotes strong and trustful relationships, which reduces co-opetition anxiety and fear of loss of IP and IC significantly.

## CADIC Cluster support framework and tools

The CADIC Framework is based on the “flow” model of soft knowledge (Csikszentmihalyi, 2003) and Intellectual Capital (IC) and provides methods and tools to support IC-based collaboration between SMEs, including training and support for key cluster management roles such as “Cluster Facilitator” (CF) at cluster level and “Cluster Relation Manager” (CRM) at company level. *CADIC Framework Support Services* comprise methods and cluster management tools to support the effective and efficient offline IC-Flow between the SMEs collaborating in a CADIC Cluster. They include methods to shape collaboration events, and group decision and communication support in Flexible Learning Environments (Humphreys & Jones, 2008). In use, within the CADIC Framework, ensure the right people are targeted and harnessed to make value added contributions to the success of both their company and the cluster as a whole. In addition, the CADIC SME Cluster Communication Plan,. (Martins & Consortium, 2012), has been developed to facilitate face-to-face cluster development.

Fused into this context, via a specially designed web 2.0 collaborative framework, are CADIC’S Online Support Toolset: The “CADIC Relational Online Framework and Toolset” (CROFT), as described in this paper is a fundamental aspect of this online support toolset, which also includes an “IC QuickCheck” that enables SMEs to compare their own intangible resource base with other organizations in order to find suitable partners to collaborate and manage value-adding IC flows in and between the SMEs involved (Martins & Consortium, 2012).

CROFT is an infusive DSS-centred output of the CADIC project, a framework and toolset designed to provide a system flexible enough to align with the context and personal preference of users across a broad spectrum of clusters to address the Lisbon Goals in all its incarnations.

## CADIC Clusters and Consortium Members

The CADIC project involves consortium members that span 7 European countries. It includes RTD Partners located in Germany, Italy, Spain and the UK[[2]](#footnote-3) working together with SME Associations and Grouping (SME-AGs) in Italy, Spain, the UK, Greece and Portugal. CADIC SME clusters have been initiated via “Catalyst SME’s in these countries, and supported and studied, in the areas of Process Engineering, Manufacturing, Creative Media Industries and Ecological Technology. In addition to consortium members, a dissemination plan includes attracting transfer partners for CADIC network development in China, Chile and across Europe.

CROFT was developed based on observations made with all of the CADIC SME catalyst clusters’ studies, particularly those in the Creative Media Industries in the UK. In the following sections will explore how the methodology and toolset fits in to the comprehensive support infrastructure to be managed, ideally through SME-AGs, for enhanced cooperation and communication between organisations such as SMEs and other key stakeholders in their business environment to support existing and emerging clusters of SMEs.

# CROFT

The fundamental aim of CROFT has been to develop a methodology and toolset that is platform independent and flexible based on the ‘bottom-up’ requirements of the SMEs in the clusters themselves. Through the intermingled nature of IT and work processes within CROFT, the system embodies a fundamental aspect of infusive IS. The methodology is designed to demonstrate direct, tangible benefit to the SMEs that use CROFT through, for example, improved networking, enhanced IC flow or increased commercial success through collaboration.

## Aim

CROFT provides a methodology of restricted (gated) access to participants in a virtual collaborative environmented in ProjectPier This qualified gating allows participants to obtain access to other participants and resources on improved IC flow to assist in cluster development and management. The qualified gating is managed through a predicate-transion net (Genrich & Lautenbach, 1981),. Paticipants’ access permissions (ability to open specific gates) a defined as predicates carred on tokens to be used at each gate. On arriving at a gate, if the percate matches the required conditions, defined on the gate, the gate opens, which may give access to the cluster as a whole or a given set of resources and associated discussions, implemented within projectpier’s file management system, accordining to a projectpier project-permission structure implemented at each gate.

The CROFT methodology consists of two strands: a framework and a toolset.

## CROFT Framework

The CROFT framework uses a non-technical metaphor of a shepherd caring for his flock to introduce a gated system of knowledge flow and networking allowing clusters to work positively while managing co-opetition anxiety.

CROFT consists of interconnected gated “pastures” or workspaces (transitions) arranged in a predicate-transition net, i.e., place/transition net on which there is a “predicate gate” on the arc between the place and transition. Each player can only move his token from one pasture to a connected pasture if his or her token currently possesses the attributes that make the predicate = true and the gate can open (see figure 1). Attributes of a participant’s given token(s) determines the level of access afforded to a given system of gating. The attributes are based on the combined requirements and objectives of the group and the participant’s position in the group.

CROFT gated access levels align with four categories of stakeholder/participant who possess a virtual token that (according to the predicate defined on it) allows a specific level of access to pastures within a given CROFT cluster based on the cluster’s system of governance:

* Stranger = No gates are open to the token at the particular point in the PTN at which the token is currently located.
* Novice = Gate is open to transition (for example ‘team membership sign up’) where the Novice can sign up to a set of precondition to gaining membership to a team #n and/or access to knowledge/tools in area #n. This includes restricted download privileges to a subset of the resources available.
* Voyager = A full member of the flock, the gate is open to #n allowing access to team #n and/or access to knowledge/tools in area #n. Access includes comparably free download privileges and restricted upload and edits privileges to specific tools.
* Master/”Shepherd” = e.g. an administrator or moderator, a ‘wild card’ where all gates are open for a particular instantiation of CROFT. Only a small number of members of a CROFT should have this status (ideally one or two individuals). Responsibilities involve being able to set access permissions for each pasture and stakeholder and full upload/download and edit privileges for the toolset content. Shepherds control the Pastures available to the team in terms of the access to the area’s content. In CADIC terminology, the Shepherd would be a Cluster Facilitator (CF).



Figure 1: Key generative element of Croft Predicate-transition net

As a methodology driven from the bottom-up, a Shepherd would be “responsible” and “accountable” for managing the attributes for access to each gate while the cluster as a whole would be “consulted” for the appropriateness of the attributes as in a RACI or Responsibility Assignment Matrix (Six Sigma, 2011). Because of the importance of impartiality of the Shepherd due to the accountability assigned to him or her, it is vital that the cluster sees the Shepherd as acting in the best interests of the whole cluster and not one particular SME cluster member. The impact of an impartial individual at the centre of cluster management, both online and offline has been demonstrated in the cluster dynamics during the first half of the CADIC project. Placing a non-partisan participant in the role of CF improved knowledge flow and reduced the impression of competition by individual cluster members in the clusters observed. This was achieved in part through the establishment of trust by the CF to act as moderator for cluster activities, giving participants a “second opinion” for situations, particularly those causing tension between cluster members.

Through observations of the catalyst clusters in the CADIC project, a need for providing motivation to the Shepherd to “keep flock in order” was also identified as key to the successful management of a given cluster and, by association, a given CROFT. This can be based on financial or other rewards to the Shepherd, keeping in mind that the success of the cluster as a whole may be motivation enough. However, the cluster’s success must be demonstrated to be more important to the Shepherd than the success of any individual member to reduce the introduction of bias to their activities.

## CROFT Toolset

The composition of the online IC management and clustering toolset that would be beneficial to the common goals of cluster members varies significantly from cluster to cluster. This has been demonstrated in clusters studied by the CADIC project across all five countries and industry sectors where cluster interests range from basic knowledge transfer to group marketing to establishing formal business relationships between partners in an efficient and proactive manner. Therefore the toolset offered by the CROFT methodology must be flexible enough to accommodate the needs and interests of a broad spectrum of clusters.

The fundamental building block of the CROFT toolset is a CROFT “Quick Start”, a one page précis or summary of a specific tool accessible through a given CROFT with the following structure:

* Uploaded in .pdf file format to provide a high level of accessibility across operating systems while retaining reasonable control of copyright;
* Localised to the most appropriate language, writing style and jargon for a given cluster;
* Containing the following content:
	+ A brief definition of the tool, ideally no more than two lines;
	+ Enough detail regarding the tool to allow the reader to assess the relevance of the tool to a given problem/interest; highlight of the key points of the tool, typically 3-5 points;
	+ A diagram or illustration that would assist in the assessment of utility of the tool, enhancing the impact of the key points;
	+ A “top tip”, for example regarding how to use the tool effectively, to driving buy-in and improve tool use;
	+ Sign-posting or link to the tool and further, more detailed reference material associated with the tool.

During our observation of the CADIC catalyst clusters, participating SMEs demonstrated a focus to protect their businesses, particularly during the current difficult economic period, only allowing minimal time for any non-essential work to be performed. This means that resources, particularly from the management team, remain severely limited when it comes to activities such as assessing untested business tools and methodologies. The requirement for all tools to be uploaded with a Quick Start limited to one page in a common structure provides a mechanism for individuals in a resource-strapped SME to rapidly assess the potential benefit of a given tool while providing further information and links to the tools if they are determined to be beneficial.

The Quick Starts would be centrally located on the CROFT’s file management system. The summaries and associated tools will be categorised for ease of reference, for example:

* CROFT-Specific Guidance, for example:
	+ Instructions describing the general CROFT methodology as defined briefly in this paper;
	+ Cluster Governance including:
		- Mechanism for attribute assignment for tokens to each category of participant;
		- Mechanism for gaining access to the cluster and graduating from one participant category to another;
		- Responsibilities and reward structure of the Shepherd.
* Cluster Management-specific tools and guidance including:
	+ CADIC-developed IC Quick Check and other IC Benchmarking tools;
	+ CADIC-developed SME Cluster Communication Plan.
	+ Localised Template Collaborative Agreements, for example the Lambert Toolkit available from the UK Intellectual Property Office (UK IPO, 2010);
	+ RICARDA Methodology (RICARDA Project, 2007).
* IC and IP-specific tools and guidance, for example:
	+ IP/IA registers;
	+ IP log templates;
	+ Risk management registers;
	+ Template license agreements and other legal documents, including those relevant to a specific sector.

While there will be a foundation of standard CROFT tools, each cluster will be encouraged to develop their own specific toolset, localised to their country and sector as well as their cluster’s interests. In addition, in the spirit of broader knowledge transfer, individual CROFTs will be encouraged to share tools they find useful with other clusters. The benefit would be reciprocal benefit from tools uploaded to the broader CROFT community.

Attributes for gated access to more high-value content, for example, sector-specific cohort data for the IC Quick Check tool or editable (non-pdf) versions of sector specific license agreement templates can include a financial dimension, providing a potential revenue stream for the CROFT as a whole, income for the Shepherd for larger CROFTs and route to accessing more expensive cluster management resources, including off-line resources associated with the online toolset.

While the CROFT methodology is designed to be platform independent, the system is being tested in an implementation on widely available applications to test its viability and performance in improving cluster success.

# The Developmental Process in Collaborative Systems – Huddle/LinkedIn to ProjectPier/LinkedIn

In the development of CROFT, the CADIC web-platform research group sought a range of online services that could satisfy the requirements of the CADIC *Framework 7* proposal:

“A major aim for CADIC is that its clusters must be rapidly self-growing (and/or self-propagating). Effective cluster management is open and generative, shaping, extending and facilitating IC flows through a decentralized not a centralized agency.” (CADIC Consortium, 2011)

This aim has, subsequently, been further defined by the group as the development of a free, scalable, robust, secure and simple to use systems.

The original proposition, as stated in the CADIC EU Project proposal, was to fuse each CROFT localised toolset into the particular SME cluster context through using a combination of LinkedIn (LinkedIn Corporation, 2012) and Huddle (Huddle, 2012). LinkedIn is an online network specifically designed to offer communication and collaboration opportunities within and across businesses. At time of writing it has over 100,000,000 members across all sectors of business including manufacturing, service and education and training. The LinkedIn service is free, with monetising based on selective advertising and additional, paid for services. CADIC’s use of LinkedIn is in terms of the free profiling available to all business sectors and because LinkedIn offers the creation of ‘groups’ enabling communities to be built both internal to a business and external in the form of ‘cluster’ groupings. In this regard, LinkedIn is a hub, and first port of call, for the Cluster members with coordination in the hands of the Cluster Manager.

The CADIC web-platform research team chose the Huddle collaborative system as the initial partner to supply a range of business tools to the clusters. Huddle uses the metaphor of ‘workspaces’ to offer wide range of collaborative tools of use for project management, product/service development and client liaison. The Huddle facilities include Task Manager, Meetings, a Workspace File Repository, Discussion and Whiteboards. At the time of the first phase of research Huddle was free for a single workspace allowing a business to develop a viable platform for no cost. Huddle used the same monetising model as LinkedIn i.e. advertising and payment for additional features including workspaces. The research findings at that time indicated that Cluster Managers and Cluster Facilitators could use Huddle to form cluster-focused workspaces for ICS Framework promotion and business collaborations.

The scalability of both LinkedIn and Huddle accorded with the stated aspiration to sign up 1000 SMEs throughout Europe from the initial seeding of 5 sectors (CADIC Proposal 2009 p.10). Indeed, this form of expansion would only be possible with a Web Platform component allowing for quick, easy and free dissemination of information regarding the CADIC initiative. This ‘virtual’ support system is complemented by actual contact/facilitation with businesses in existing and developing CADIC sectors.

This combination of services was support by the CADIC web platform research team up until October 2011 whereupon Huddle moved to a payment only model. Consequently, Huddle was no longer considered a viable option for SMEs that were looking for an efficient system of support with little or no outlay in the current economic climate. Thus, a replacement collaborative system was required.

A review of the available online collaborative tools, both client-side and server-side, was then undertaken. A decision was made to use ProjectPier (Project Pier Community), the server-based collaborative platform, distributed under a GNU license[[3]](#footnote-4) and a FLOSS[[4]](#footnote-5) rationale. The use of ProjectPier requires the holding of the software on a server under the auspices of the group concerned. In the first instance, it was decided to serve ProjectPier within the LSE as an RTD partner of the CADIC consortium. In this way, a close study could be made of the attributes of ProjectPier from the perspective of those charged with developing the web platform.

ProjectPier uses a “project” and “task” nomenclature that is more pragmatic than Huddle’s “workspace” metaphor, and speaks directly to the creation of specific activities and events. Furthermore, ProjectPier has most of the components offered by Huddle i.e. workspace (as a project space), unlimited members, an invitation system, messaging system, file repository, tasks, calendar and notifications. It does not have a “discussion” component, however, comments can be made attached to specific task and files. Thus, discussions can take place allied to specific activities hopefully reducing the number of unfocused discussion threads. At time of writing, ProjectPier is being assessed in terms of its ability to both satisfy the requirements of the CADIC web platform criteria and in terms of its ability to interface both with the developing CROFT component and the continued use of LinkedIn as a network development system. Initial findings point to the use of LinkedIn for communication and outward-facing cluster development and ProjectPier as a depository for resources and a support tool for joint collaborations between cluster members utilising CROFT and instruments therein.

# Initial Findings and Further Development

A CADIC Consortium CROFT is currently being populated with toolsets and associated CROFT Quick Starts as detailed in section 3, treating the CADIC Consortium partners as a cluster themselves with the common goal and mutual interest of conducting the CADIC project. The CADIC SME clusters have also been invited to use CADIC to manage their collective IC using each cluster’s cluster facilitator as Shepherd. The Shepherds are members of the CADIC development group, and therefore have professional motivation to effectively manage the CROFT with success of CADIC as a whole a key measure of success for their specific professional aims. Initial results indicate that low adoption rates are an issue even within these founding groups. Two factors have been identified as possible reasons for the limited adoption: clusters already using other online document and relationship management tools and methods; and a perception that the additional resource required to implement CROFT would outweigh the benefit to the cluster. A solution to increasing the attraction of adoption needs to be explored as a priority and is likely to involve a combination of a governance model imposing a requirement to use the system to overcome teething-problems as well as promoting the use of CROFT through a series of case studies demonstrating tangible commercial benefit of using the system. Results from the use of CROFT with the SME clusters will be the basis for the initial case studies.

Initial efforts to use a combination of LinkedIn and ProjectPier has also indicated some short-comings in the system, for example, both systems send the user emails when a discussion is started or a new file is uploaded instead of sharing information directly between the systems requiring addition effort from the Shepherd to keep both systems up-to-date. The CADIC web-development research group is in the process of approaching the ProjectPier community with regard to developing a LinkedIn app similar to that of the cost-restrictive Huddle workspace LinkedIn App (LinkedIn, 2012). As ProjectPier is an open source platform, there is an option for anyone to create a LinkedIn App specifically for ProjectPier. The ProjectPier development community has been approached to develop such an app. The benefits of integrating ProjectPier with LinkedIn must be demonstrated tangibly before the development community will devote resource. This could be conveyed through the use of CROFT case studies as well.

Once the CADIC Consortium’s CROFTs are established, the CROFT methodology will be disseminated to all CADIC catalyst clusters and a number of transfer partners. Non-technical catalyst clusters will act as test cases for demonstrating the level of adaptability to businesses with limited infusive IS in their day-to-day business practices. The level of acceptance by transfer partners outside of CADIC consortium, who have no financial or professional vested interest in the success of the methodology, will be used as a metric for the likelihood of general acceptance of the system by the broader SME community.

# Conclusion

Based on observations of real-world SME clustering activities and driven from the bottom-up, CROFT: CADIC Relational Online Framework and Toolset has been developed as a generative, infusible system providing GDACS (Group Communication and Decision Support – see Humphreys and Jones 2006) to assist clusters in collective management of the group’s intellectual capital through gated networking and knowledge flow coupled with a cluster-relevant IC management toolset. The pilot implementation of the system is ongoing, and while there remain issues around technical platform integration and early adoption, CROFT is designed to be flexible enough to benefit a broad spectrum of SME clusters with a wide variety of needs.

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1. Prof Patrick Humphreys, Institute of Social Psychology, London School of Economics and Political Science, Houghton Street, London WC2 2AE. Email: p.humphreys@lse.ac.uk [↑](#footnote-ref-2)
2. Fraunhofer Institute for Production Systems and Design Technology (Germany), London School of Economics and Political Science (UK), Universitat Politécnica de Catalunya (Spain) and University of Calabria (Italy). [↑](#footnote-ref-3)
3. This is a licence under an AGPL (Gnu Affero General Public License). This license includes statements regarding use over a computer network and makes the complete source code of ProjectPier available to each network owner. Thus, an owner of a ProjectPier system can also create their own plug-ins and developments for their version of ProjectPier. [↑](#footnote-ref-4)
4. FLOSS (Free Libre Open Source Software) goes back to the campaigning by Richard Stallman, from 1983, for software “as a matter of liberty, not price” (Stallman, 1996) [↑](#footnote-ref-5)