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Corporate Release 2021 R2

Demographics

Development & Enhancement Repository

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Introduction

This document provides details of the various project data types that are included in the ISBSG D&E (Development & Enhancement) repository, Sept, 2021.

You will note that the project totals shown at the bottom of the tables rarely equal the 10,600 projects in the Repository. This is because submitters do not necessarily provide project data for all the data fields that ISBSG offers. The "ISBSG Field Descriptions Sept 2021" document explains the contents of the various data fields that the Repository caters for.

By studying the demographics that follow, you will be able to establish the areas that are of specific interest to you. The data in the Repository projects have come from over thirty countries. This is what makes the ISBSG Repository unique. A broad range of project types from many industries and many business areas are available for you to use for estimating, awareness of trends, comparison of platforms and languages or benchmarking.

Executive summary

The projects in the Repository cover a broad cross-section of the software industry. In general, they have a business focus.

Project origin

- The projects have been submitted from more than 26 different countries. Major contributors are the United States (20.3% of all projects), Netherlands (18.2%), Spain (18.1%), Australia (8.0%), Japan (8.0%), Finland (5.7%), France (4.5%), China (3.7%), Canada (3.4%), India (3.1%), Denmark (1.6%), Brazil (1.5%), Mexico (1.4%) and United Kingdom (1.0%).
- The projects were performed in more than 30 different countries. Major contributors are Spain (23.8% of all projects where the country of effort is known), Netherlands (18.3%), United States (10.6), Finland (7.9%), France (6.2%), India (5.8%), Australia (5.4%), China (3.9%), Japan (3.7%) and Canada (3.3%).

Project context

- Industry sector: major sectors are Communications (28.4% of all projects where the organization type is known), Insurance (15.9%), Government (10.7%), Banking (9.8%), Manufacturing (9.8%), Medical and health care (5.7%), Financial (4.8%) Electronics/computers (2.1%) and Service industry (2.1%).
- Business area: major areas are Communications (30.6% of all projects where the business area is known), Insurance (18.0%), Banking (10.6%), Manufacturing (8.7%), Government (8.0%), Medical & Health Care (6.4%), Finance (5.0%), Public Sector (4.5%), Computers & Software (1.9%) and Community Services (1.4%)

Type of project

- Development type: 71.6% are enhancement projects, 28.0% are new developments, and 1.0% are re-developments.

- Intended market: 92.7% of projects are developed for internal use, (i.e. for the organization that contributed the project to the Repository), and 7.0% for external use. 30.9% are developed in-house and 68.8% are outsourced.
- Team size: 34.1% of projects have up to 4 people in the development team, 30.5% have 5 to 9 people, 18.9% have 10 to 19 people, and 16.4% have 20 or more people.

Type of product

- Application group: 91.5% are business applications, 4.4% are real-time applications, and 3.2% are mathematically-intensive applications.
- Architecture: 35.9% of projects for which this information is available have a client-server architecture, and 28.0% have a multi-tier architecture (there is some overlap between these groups of projects). 36.1% are stand-alone systems.

Development environment

- Platform: 32.6% are mainframe projects, 10.9% midrange, and 22.3% personal computers. 34.2% of projects involve multiple platforms.

Development methods

- For ISBSG purposes a methodology applies to the whole project development process. This is distinct from techniques, which apply to individual activities within the development process.
- Methodology: 70.4% of projects that describe methodologies report using a waterfall model. Other methodologies include Agile and/or RUP (18.7%), Joint Application Development (2.7%), Rapid Application Development (2.7%), Multi-functional teams (2.4%) and Timeboxing (0.7%).

Demographics

Project origin

Country of origin

Projects have been contributed from 26 different countries.

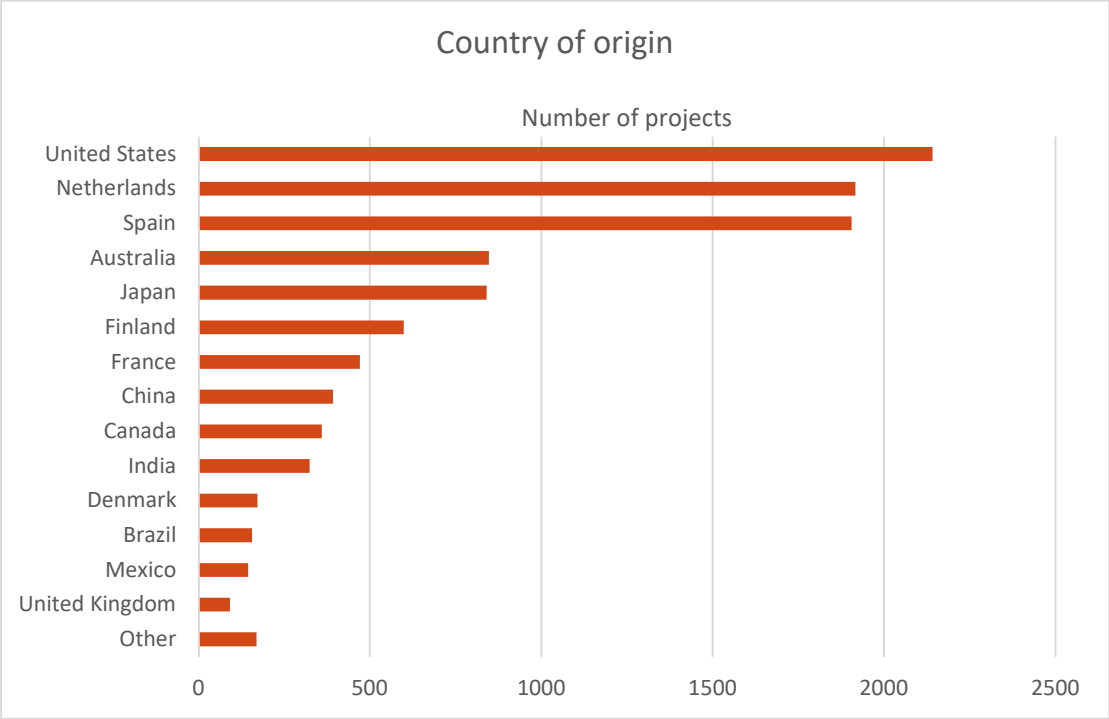

Figure 1 - Demographics country of origin

Demographics		
Country of origin	**Projects**	**Percentage**
Countries	**N**	**%**
United States	2142	20.3%
Netherlands	1917	18.2%
Spain	1905	18.1%
Australia	847	8.0%
Japan	841	8.0%
Finland	599	5.7%
France	471	4.5%
China	392	3.7%
Canada	360	3.4%
India	324	3.1%
Denmark	172	1.6%
Brazil	156	1.5%
Mexico	145	1.4%
United Kingdom	91	0.9%
Other	169	1.6%
Total	**10531**	**100%**

Table 1 - Demographics country of origin

Country of effort

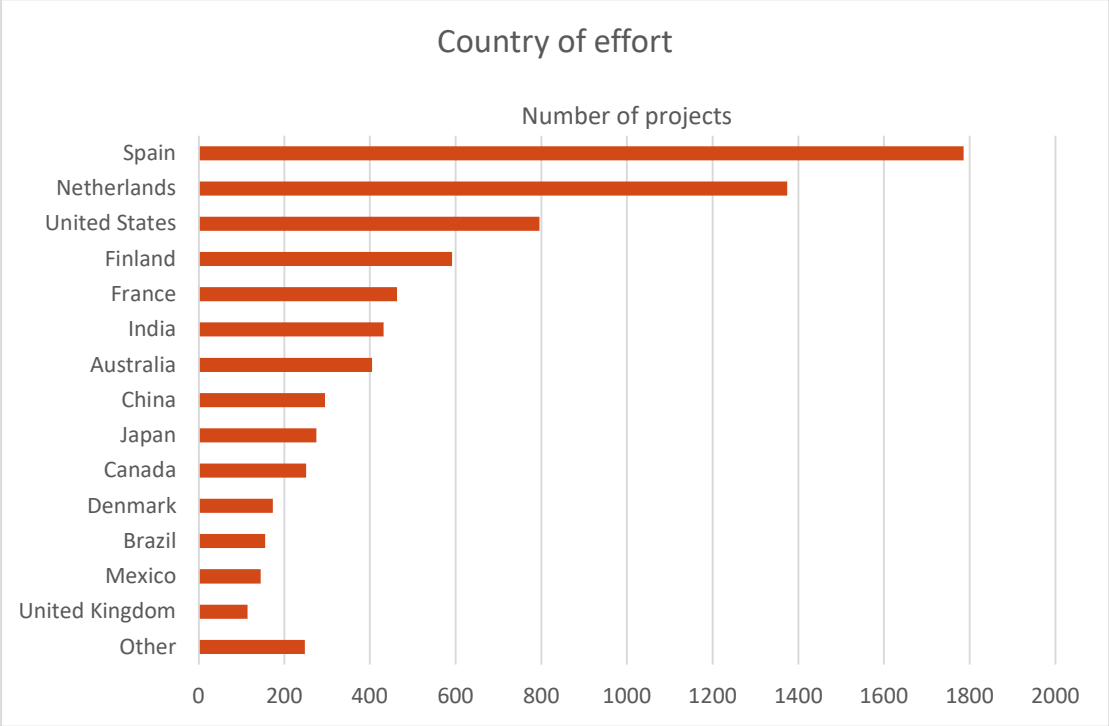

Figure 2 - Demographics country of effort

Demographics		
Country of effort	**Projects**	**Percentage**
Countries	**N**	**%**
Spain	1786	23.8%
Netherlands	1374	18.3%
United States	796	10.6%
Finland	592	7.9%
France	463	6.2%
India	432	5.8%
Australia	405	5.4%
China	295	3.9%
Japan	275	3.7%
Canada	251	3.3%
Denmark	173	2.3%
Brazil	155	2.1%
Mexico	145	1.9%
United Kingdom	114	1.5%
Other	248	3.3%
Total	**7504**	**100%**

Table 2 - Demographics country of effort

Project context

Industry sector

The Industry Sector summarizes the industry, or type of organization, for which each project has been developed.

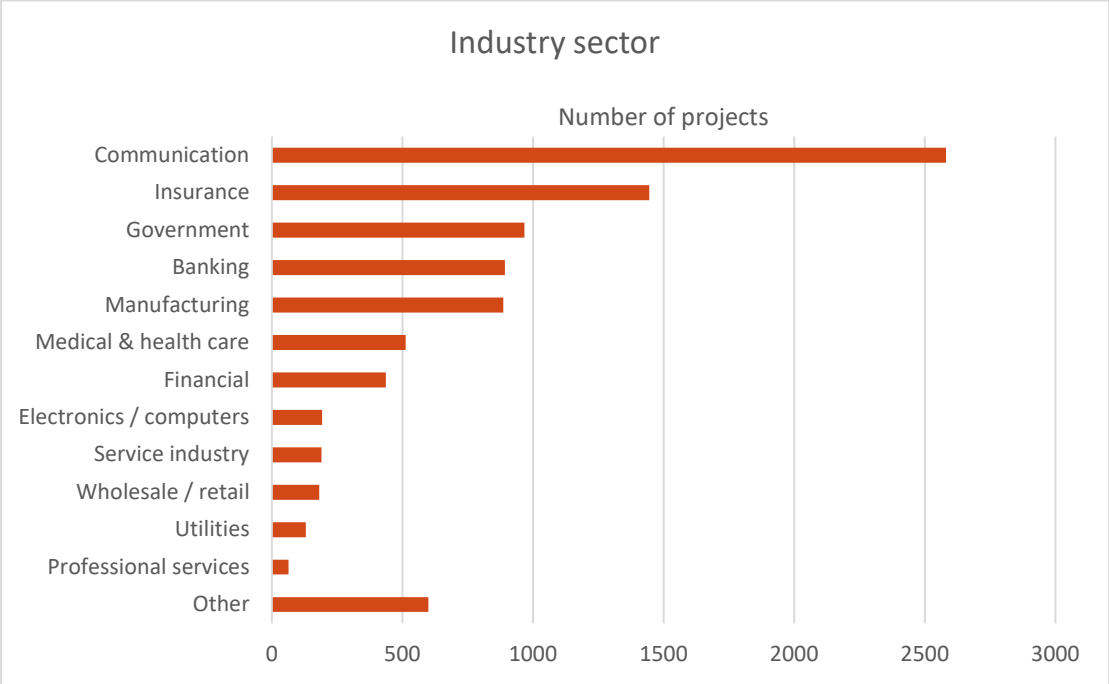

Figure 3 - Demographics industry sector

Demographics		
Industry sector	**Projects**	**Percentage**
Industries	**N**	**%**
Communication	2581	28.4%
Insurance	1445	15.9%
Government	967	10.7%
Banking	892	9.8%
Manufacturing	886	9.8%
Medical & health care	513	5.7%
Financial	437	4.8%
Electronics / computers	192	2.1%
Service industry	190	2.1%
Wholesale / retail	181	2.0%
Utilities	130	1.4%
Professional services	64	0.7%
Other	599	6.6%
Total	**9077**	**100%**

Table 3 - Demographics industry sector

Business area

This is the business area within the organization/industry that the project/application will be supporting.

Figure 4 - Demographics business area

Demographics		
Business area	**Projects**	**Percentage**
Areas	**N**	**%**
Communications	2565	30.6%
Insurance	1505	18.0%
Banking	889	10.6%
Manufacturing	727	8.7%
Government	667	8.0%
Medical and Health Care	540	6.4%
Financial, Property & Business Services	421	5.0%
Public Administration	375	4.5%
Computers & Software	160	1.9%
Community Services	121	1.4%
Transport & Storage	93	1.1%
Wholesale & Retail Trade	89	1.1%
Defence	86	1.0%
Other	144	1.7%
Total	**8382**	**100%**

Table 4 - Demographics business area

Type of project

Development type

A detailed explanation of the development types is given in Appendices, Glossary of Terms.

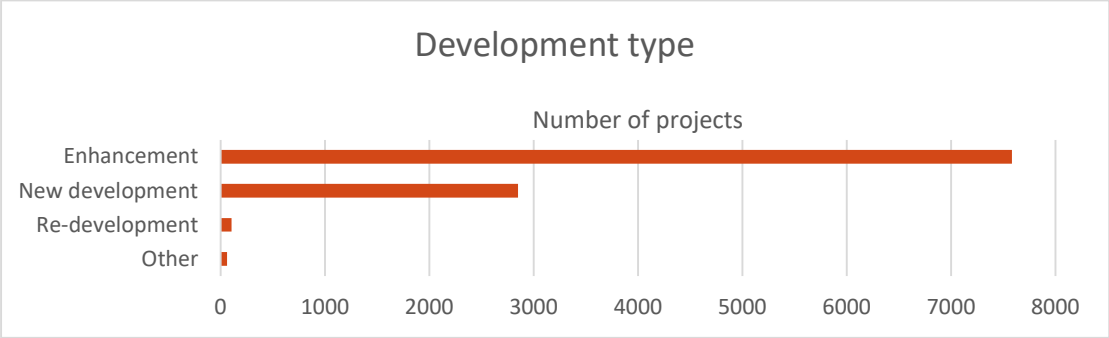

Figure 5 - Demographics development type

Demographics		
Development type	**Projects**	**Percentage**
Types	**N**	**%**
Enhancement	7585	71.6%
New development	2849	26.9%
Re-development	104	1.0%
Other	61	0.6%
Total	**10599**	**100%**

Table 5 - Demographics development type

Intended market

This defines the relationship between the customer, the project/application developer, and application user. If the customer and the developer are in the same organization, the project is assumed to be an in-house development; if the customer and user are in the same organization the project is assumed to be developed for internal use. For some projects, it is possible to determine whether the development was in-house or outsourced, or whether the users are internal or external, but not both.

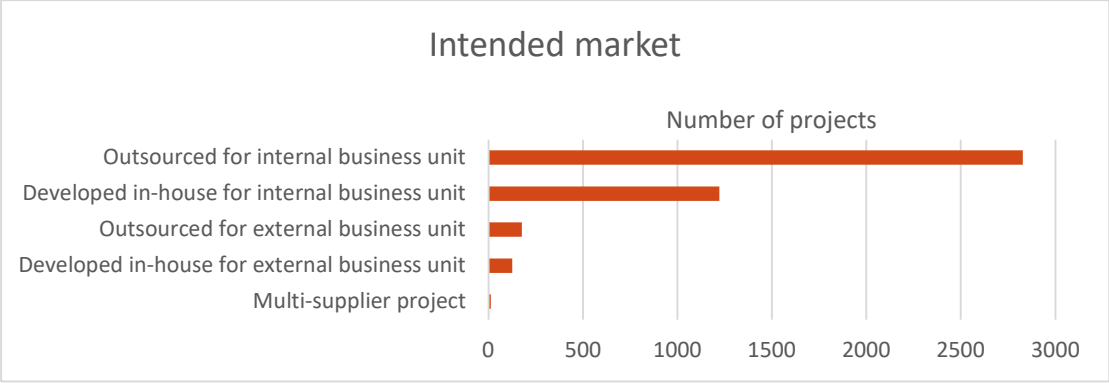

Figure 6 - Demographics intended market

Demographics		
Intended market	**Projects**	**Percentage**
Markets	**N**	**%**
Outsourced for internal business unit	2828	64.7%
Developed in-house for internal business unit	1223	28.0%
Outsourced for external business unit	178	4.1%
Developed in-house for external business unit	127	2.9%
Multi-supplier project	13	0.3%
Total	**4369**	**100%**

Table 6 Demographics intended market

Team size

This is the maximum number of people in the development team at any given time in the project.

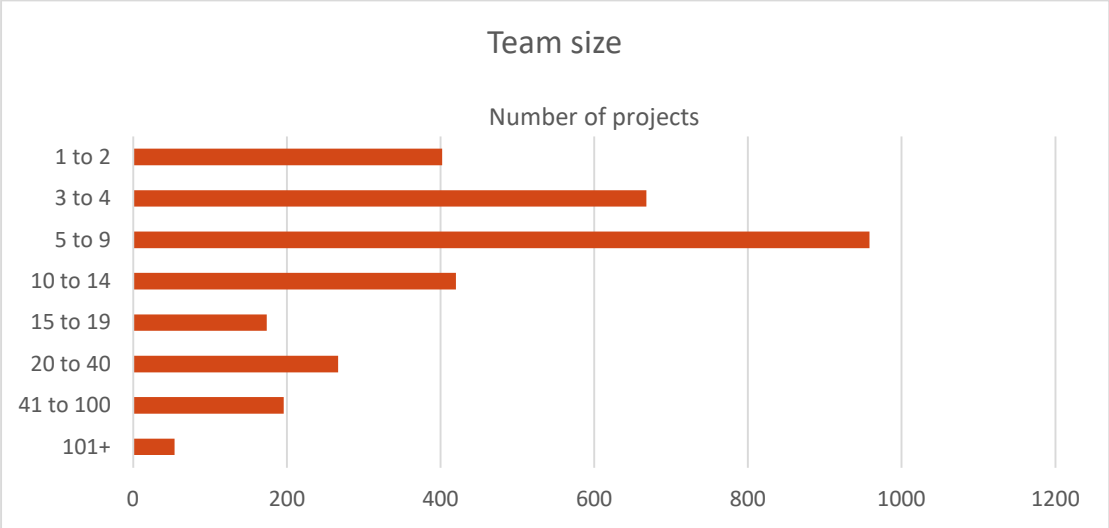

Figure 7 - Demographics team size

Demographics		
Team size	**Projects**	**Percentage**
Catergories	**N**	**%**
1 to 2	402	12.8%
3 to 4	668	21.3%
5 to 9	958	30.5%
10 to 14	420	13.4%
15 to 19	174	5.5%
20 to 40	267	8.5%
41 to 100	196	6.2%
101+	54	1.7%
Total	**3139**	**100%**

Table 7 - Demographics team size

Type of product

Product size

Size is measured in function points. The 4 main function point counting approaches represented in the Repository are IFPUG CPM 4.0 or later, COSMIC, FiSMA and NESMA. Other approaches represented in the Repository include Mark II, Feature Points, and older versions of IFPUG (IFPUG 2, IFPUG 3) but there are few such projects and very few have been contributed to the Repository for many years now.

The following tables and histograms show the range of project sizes, for each of these 4 function point counting approaches.

IFPUG 4

The table shows the sizes (in UFPs) of projects sized with IFPUG function points, that are known or presumed to have been sized using CPM4.0 or later.

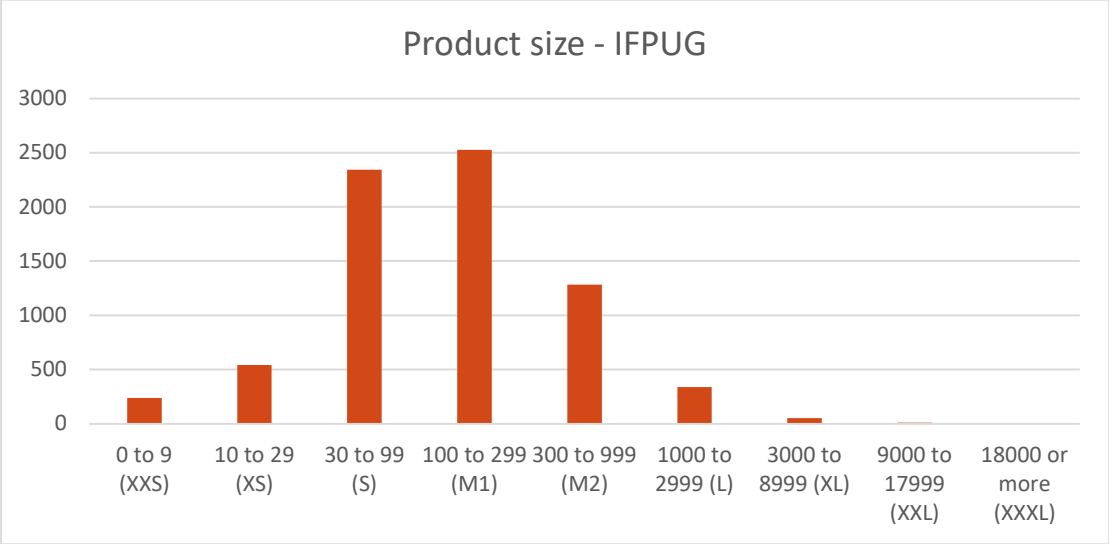

Figure 8 - Demographics product size IFPUG 4+

Demographics		
Product size IFPUG	**Projects**	**Percentage**
Catergories	**N**	**%**
0 to 9 (XXS)	237	3.2%
10 to 29 (XS)	541	7.4%
30 to 99 (S)	2344	32.0%
100 to 299 (M1)	2527	34.5%
300 to 999 (M2)	1282	17.5%
1000 to 2999 (L)	337	4.6%
3000 to 8999 (XL)	52	0.7%
9000 to 17999 (XXL)	10	0.1%
18000 or more (XXXL)	2	0.0%
Total	**7332**	**100%**

Table 8 - Demographics product size IFPUG 4+

COSMIC

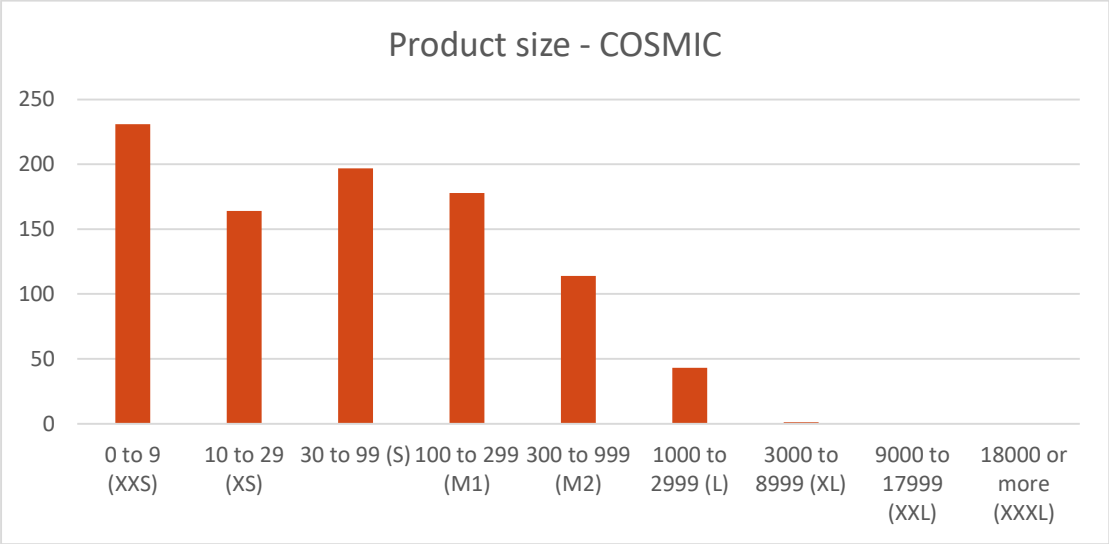

Figure 9 - Demographics product size COSMIC

Demographics		
Product size COSMIC	**Projects**	**Percentage**
Catergories	**N**	**%**
0 to 9 (XXS)	231	24.9%
10 to 29 (XS)	164	17.7%
30 to 99 (S)	197	21.2%
100 to 299 (M1)	179	19.3%
300 to 999 (M2)	113	12.2%
1000 to 2999 (L)	43	4.6%
3000 to 8999 (XL)	1	0.1%
9000 to 17999 (XXL)	0	0.0%
18000 or more (XXXL)	0	0.0%
Total	**928**	**100%**

Table 9 - Demographics product size COSMIC

NESMA

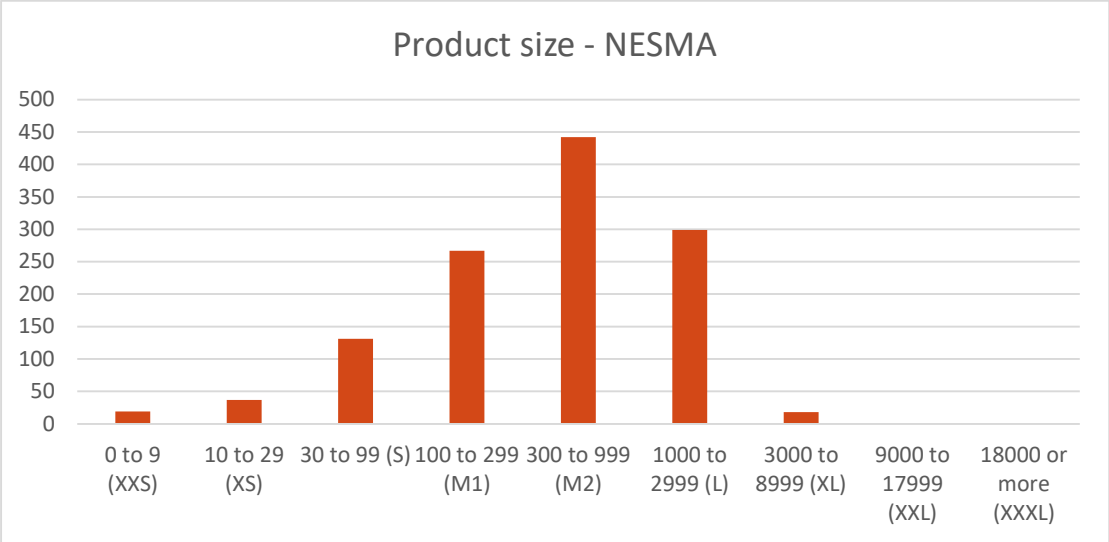

Figure 10 - Demographics product size NESMA

Demographics		
Product size NESMA	**Projects**	**Percentage**
Catergories	**N**	**%**
0 to 9 (XXS)	19	1.6%
10 to 29 (XS)	37	3.1%
30 to 99 (S)	131	10.8%
100 to 299 (M1)	267	22.0%
300 to 999 (M2)	442	36.4%
1000 to 2999 (L)	299	24.6%
3000 to 8999 (XL)	18	1.5%
9000 to 17999 (XXL)	0	0.0%
18000 or more (XXXL)	0	0.0%
Total	**1213**	**100%**

Table 10 - Demographics product size NESMA

FiSMA

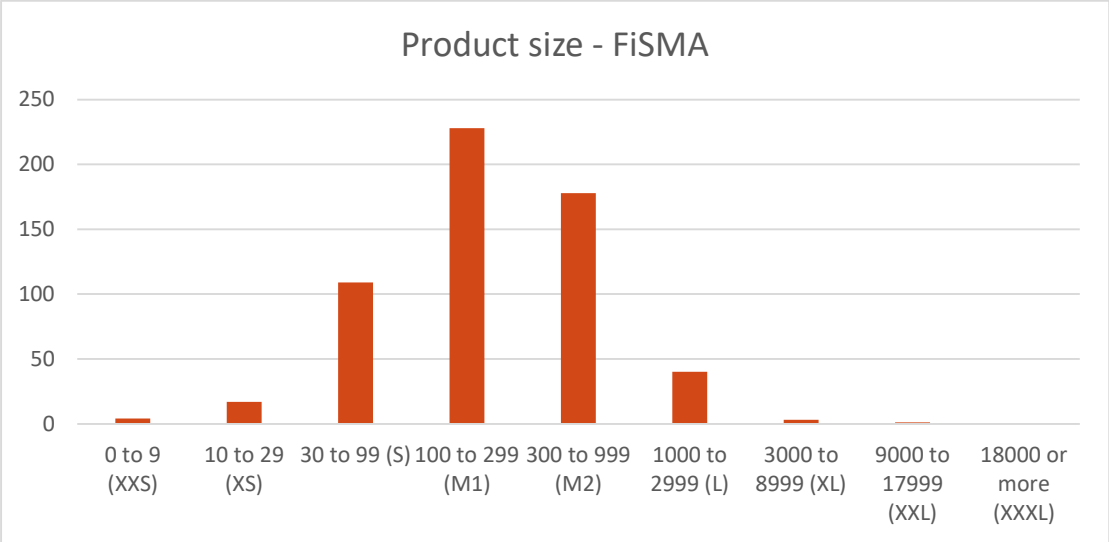

Figure 11 - Demographics product size FiSMA

Demographics		
Product size FiSMA	**Projects**	**Percentage**
Catergories	**N**	**%**
0 to 9 (XXS)	4	0.7%
10 to 29 (XS)	17	2.9%
30 to 99 (S)	109	18.8%
100 to 299 (M1)	228	39.3%
300 to 999 (M2)	178	30.7%
1000 to 2999 (L)	40	6.9%
3000 to 8999 (XL)	3	0.5%
9000 to 17999 (XXL)	1	0.2%
18000 or more (XXXL)	0	0.0%
Total	**580**	**100%**

Table 11 - Demographics product size FiSMA

Application group

The application type identifies the type of application being addressed by the project (e.g. information system, transaction/production system, process control.)

As there are hundreds of different application types recorded, they are grouped here into 4 groups.

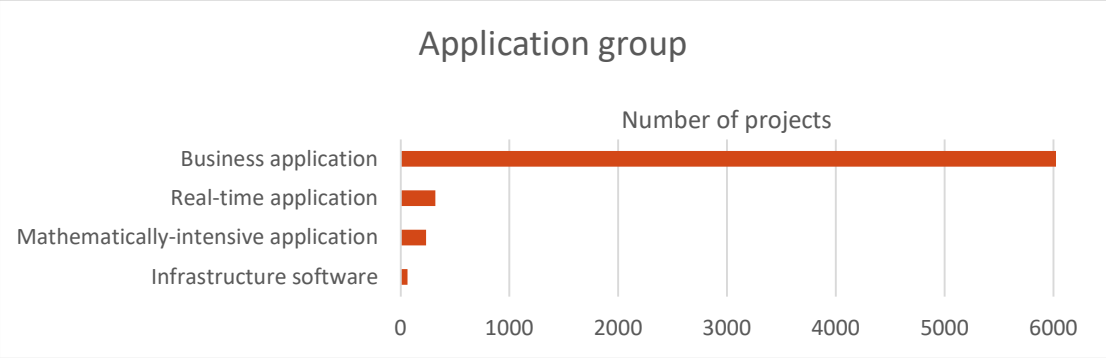

Figure 12 - Demographics application group

Demographics		
Application group	**Projects**	**Percentage**
Categories	**N**	**%**
Business application	6695	91.5%
Real-time application	319	4.4%
Mathematically-intensive application	235	3.2%
Infrastructure software	65	0.9%
Total	**7316**	**100%**

Table 12 - Demographics application group

Application type

A finer-grained breakdown of application types follows.

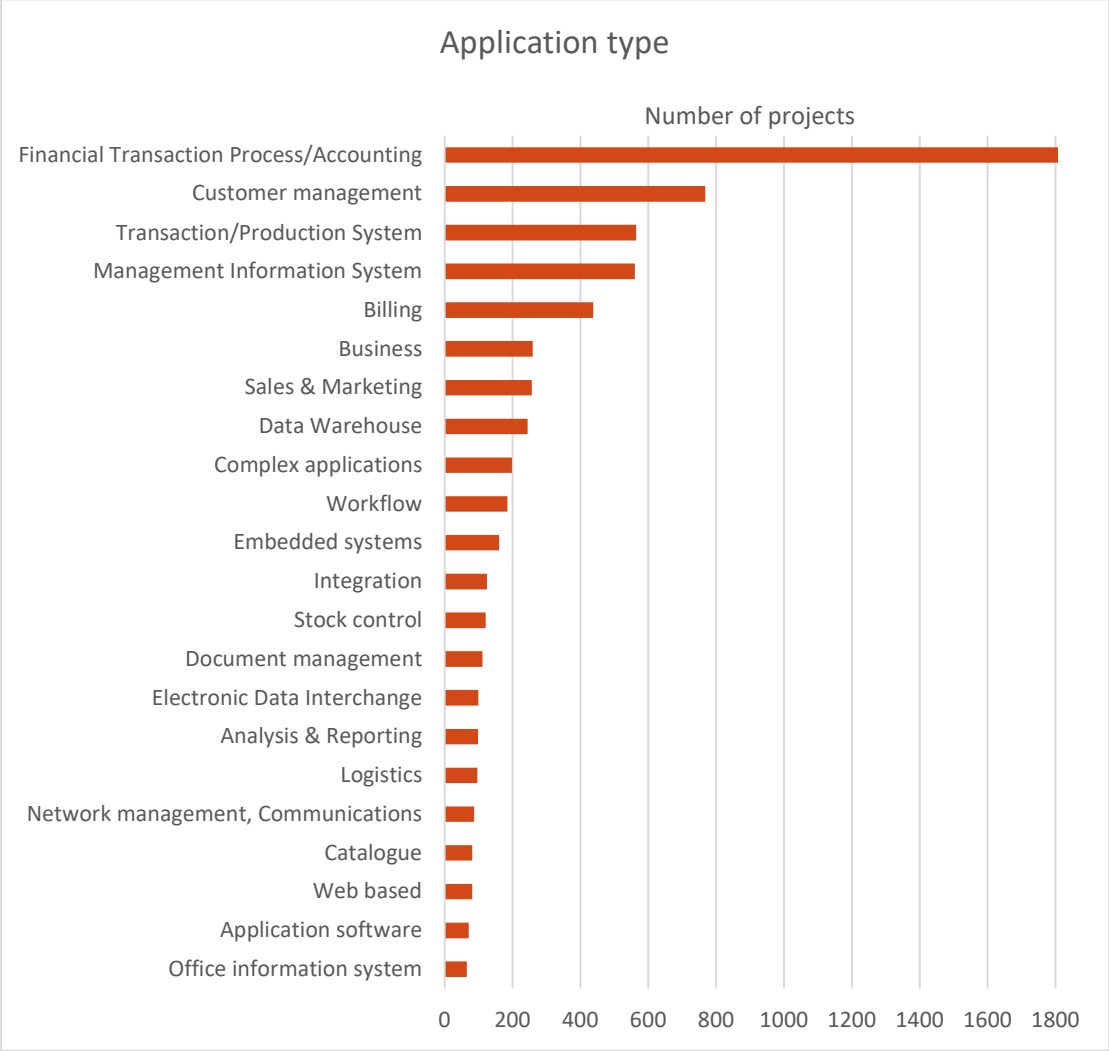

Figure 13 - Demographics application type

Demographics		
Application type	**Projects**	**Percentage**
Categories	**N**	**%**
Financial Transaction Process/Accounting	1855	28.4%
Customer management	768	11.8%
Transaction/Production System	564	8.6%
Management Information System	561	8.6%
Billing	438	6.7%
Business	260	4.0%
Sales & Marketing	257	3.9%
Data Warehouse	245	3.8%
Complex applications	198	3.0%
Workflow	185	2.8%
Embedded systems	161	2.5%
Integration	125	1.9%
Stock control	121	1.9%
Document management	112	1.7%
Electronic Data Interchange	99	1.5%
Analysis & Reporting	98	1.5%
Logistics	96	1.5%
Network management, Communications	87	1.3%
Catalogue	81	1.2%
Web based	81	1.2%
Application software	71	1.1%
Office information system	65	1.0%
Total	**6528**	**100%**

Table 13 - Demographics application type

Architecture

Two broad types of system architecture are represented in the Repository: client-server (of various flavours), and multi-tier (of various flavours). Stand-alone systems are also recorded as a contrast to client-server systems.

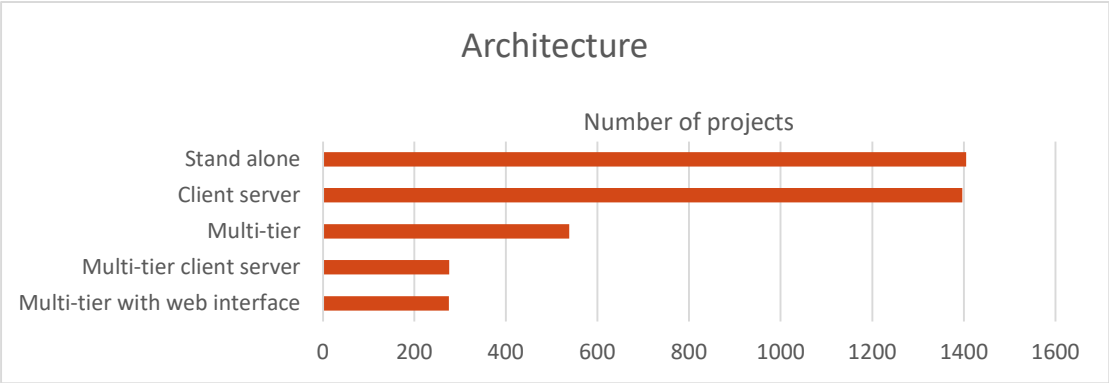

Figure 14 - Demographics architecture

Demographics		
Architecture	**Projects**	**Percentage**
Categories	**N**	**%**
Stand alone	1405	36.1%
Client server	1397	35.9%
Multi-tier	538	13.8%
Multi-tier client server	276	7.1%
Multi-tier with web interface	275	7.1%
Total	**3891**	**100%**

Table 14 - Demographics architecture

Development environment

Development platform

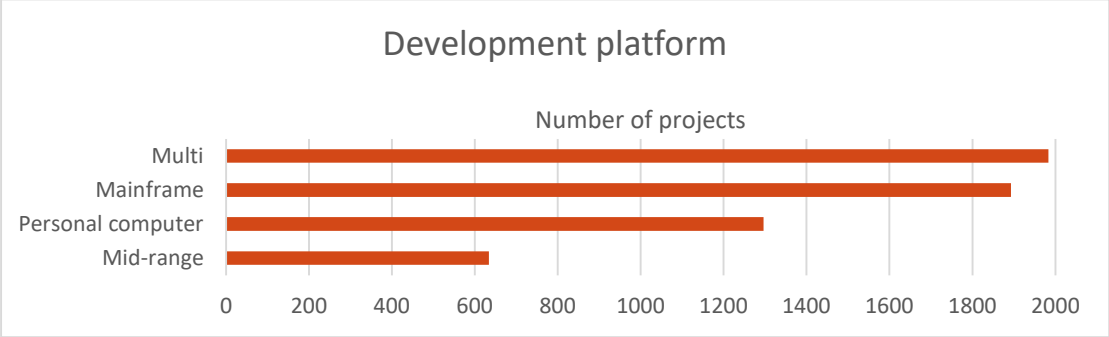

Figure 15 - Demographics development platform

Demographics		
Development platform	**Projects**	**Percentage**
Categories	**N**	**%**
Multi	1983	34.2%
Mainframe	1893	32.6%
Personal computer	1296	22.3%
Mid-range	634	10.9%
Total	**5806**	**100%**

Table 15 - Demographics development platform

Type of programming language

There are many languages recorded in the repository. This can make it difficult to compare some projects. Consequently, languages are classified by type as shown below.

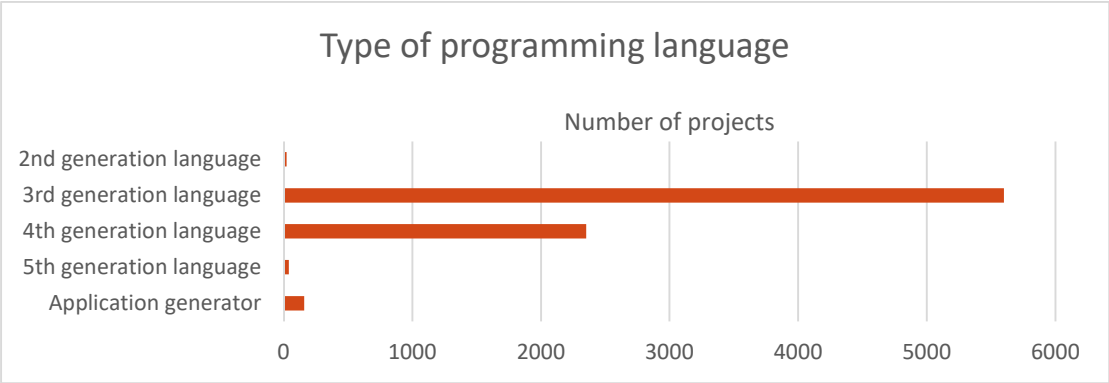

Figure 16 - Demographics type of programming language

Demographics		
Type of programming language	**Projects**	**Percentage**
Categories	**N**	**%**
2nd generation language	22	0.3%
3rd generation language	5593	68.4%
4th generation language	2361	28.9%
5th generation language	39	0.5%
Application generator	159	1.9%
Total	**8173**	**100%**

Table 16 - Demographics type of programming language

Over 160 programming languages are represented in the Repository. 3rd generation languages dominate, but 4th generation languages are also very well represented.

Primary programming languages 3rd generation languages

This is the programming language that has been nominated by the project submitter as the primary programming language.

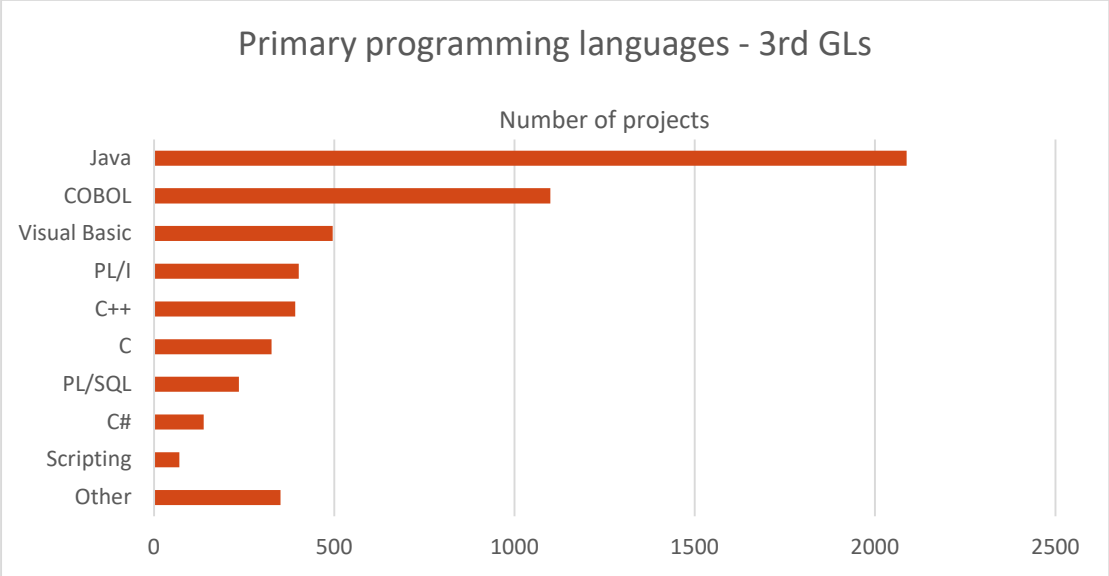

Figure 17 - Demographics primary programming languages 3rd generation languages

Demographics		
Primary programming languages	**Projects**	**Percentage**
3rd generation languages	**N**	**%**
Java	2087	37.3%
COBOL	1101	19.7%
Visual Basic	498	8.9%
PL/I	402	7.2%
C++	392	7.0%
C	326	5.8%
PL/SQL	238	4.3%
C#	139	2.5%
Scripting	71	1.3%
Other	339	6.1%
Total	**5593**	**100%**

Table 17 - Demographics primary programming languages 3rd generation languages

Other 3rd generation languages in the Repository include PHP, TIBCO, Periphonics, HTML, Pro*C, C#.NET, RPG, JavaScript and Smalltalk.

Primary programming languages 4th generation languages

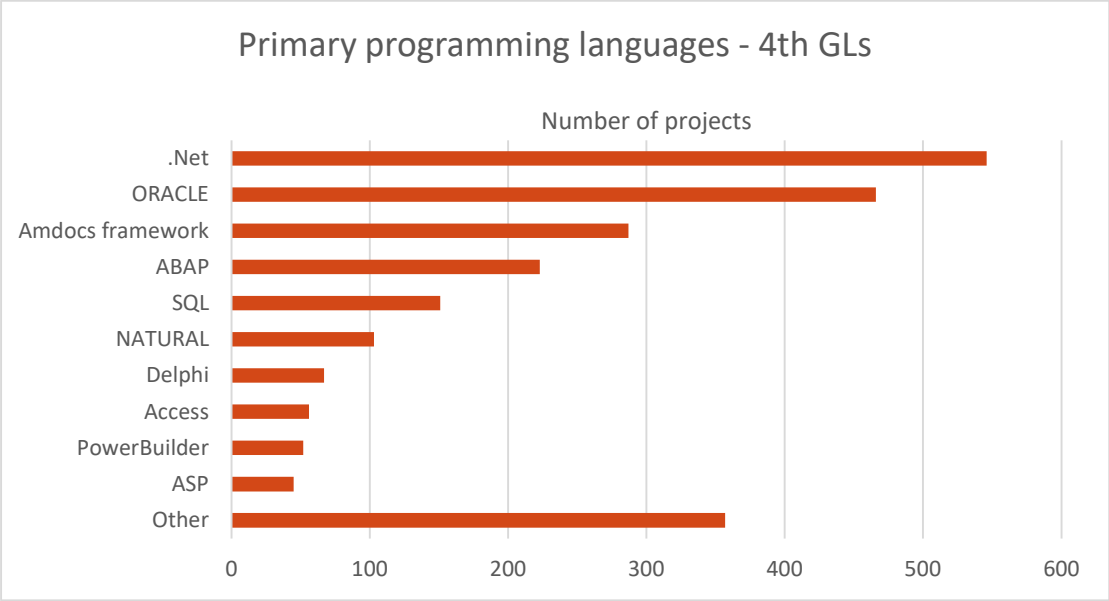

Figure 18 - Demographics primary programming languages 4th generation languages

Demographics		
Primary programming languages	**Projects**	**Percentage**
4th generation languages	**N**	**%**
.Net	545	23.1%
ORACLE	466	19.7%
Amdocs framework	287	12.2%
ABAP	223	9.4%
SQL	159	6.7%
NATURAL	103	4.4%
Delphi	67	2.8%
Access	56	2.4%
PowerBuilder	52	2.2%
ASP	46	1.9%
Other	357	15.1%
Total	**2361**	**100%**

Table 18 - Demographics primary programming languages 4th generation languages

Other 4GLs represented in the Repository include Siebel, Lotus Notes, Mendix, Visual C++, ASP.Net, EASYTRIEVE, FOCUS, CLIPPER and CSP.

Application generators

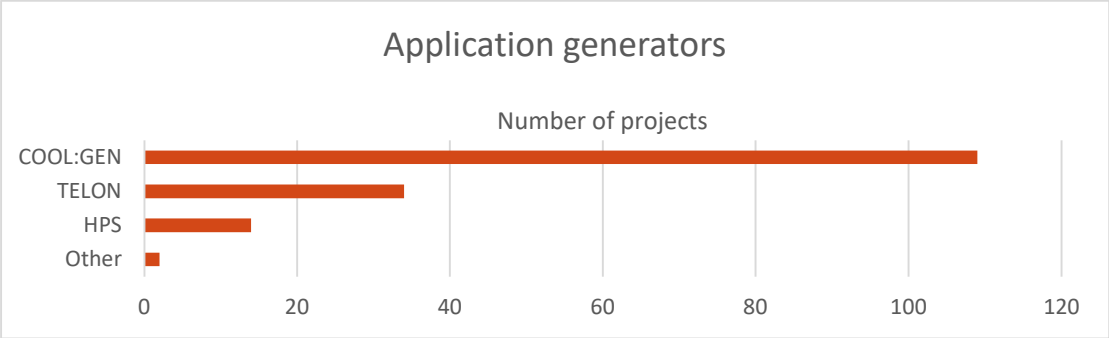

Figure 19 - Demographics application generators

Demographics		
Application generators	**Projects**	**Percentage**
Programming languages	**N**	**%**
COOL:GEN	109	68.6%
TELON	34	21.4%
HPS	14	8.8%
Other	2	1.3%
Total	**159**	**100%**

Table 19 - Demographics application generators

Few projects that used application generators have been contributed to the Repository in recent years. The most recent projects that used application generators were implemented in 2008.

Methodologies and Techniques

These describe the various methodologies and techniques that may have been used during the execution of a project. They have not been related to specific project activities, and therefore may apply to any part of the development lifecycle.

For ISBSG purposes a methodology (Agile, JAD, Waterfall etc.) applies to the whole project development process. This is distinct from techniques (Data Modelling, OO Analysis etc.), which apply to individual activities within the development process.

Some projects mention more than one methodology (e.g. some JAD projects also use RAD and/or timeboxing), and some mention more than one technique.

Methodology

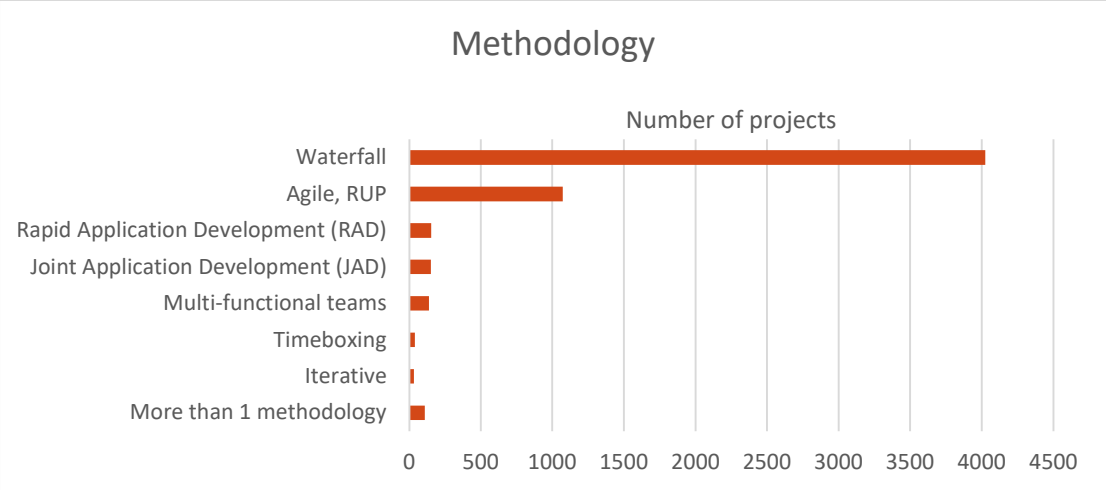

Figure 20 - Demographics methodology

Demographics		
Methodology	**Projects**	**Percentage**
Methodologies	**N**	**%**
Waterfall	4024	70.4%
Agile, RUP	1072	18.7%
Rapid Application Development (RAD)	153	2.7%
Joint Application Development (JAD)	152	2.7%
Multi-functional teams	137	2.4%
Timeboxing	39	0.7%
Iterative	32	0.6%
More than 1 methodology	110	1.9%
Total	**5719**	**100%**

Table 20 - Demographics methodology

Of the 152 JAD projects, 37 also mention RAD, 45 also mention multi-functional teams, and 10 also mention timeboxing.

Specification, design and development techniques

The following graph and table combine information from all three of these fields, as well as considering specification documents, and design documents.

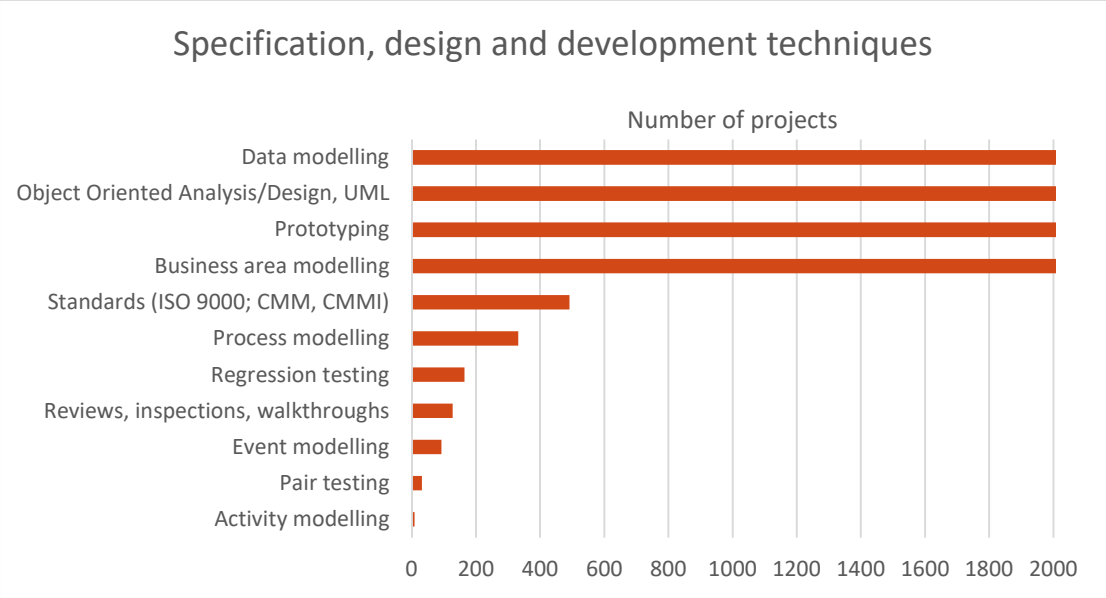

Figure 21 - Demographics specification, design and development

Demographics		
Specification, design and development techniques	**Projects**	**Percentage**
Techniques	**N**	**%**
Data modelling	2367	23.8%
Object Oriented Analysis/Design, UML	2171	21.8%
Prototyping	2147	21.6%
Business area modelling	2008	20.2%
Standards (ISO 9000; CMM, CMMI)	492	4.9%
Process modelling	332	3.3%
Regression testing	164	1.6%
Reviews, inspections, walkthroughs	127	1.3%
Event modelling	92	0.9%
Pair testing	31	0.3%
Activity modelling	9	0.1%
More than 1 development technique used	2566	25.8%

Table 21 - Demographics specification, design and development

Appendix 1 - ISBSG

The ISBSG is a not-for-profit organization founded in 1997 by a group of national software metrics associations. Their aim was to promote the use of IT industry data to improve software processes and products.

ISBSG is an independent international organization that collects and provides industry data of software development projects and maintenance & support activities in order to help all organizations (commercial and government, suppliers and customers) in the software industry to understand and to improve their performance. ISBSG sets the standards of software data collection, software data analysis and software project benchmarking processes and is considered to be the international thought leader in these practices.

The ISBSG mission is to help YOU and your organization improve the estimation, planning, control and management of your IT software projects and/or maintenance and support contracts.

To achieve this:

ISBSG maintains and grows 2 repositories of IT software development/maintenance & support data. This data originates from trusted, international IT organizations and can be obtained for a modest fee from the website www.isbsg.org/project-data/

Help us to collect data

ISBSG is always looking for new data. In return for your data submission, you receive a free benchmark report that shows the performance in your project or contract against relevant industry peers.

Please submit your data through one of the forms listed on http://isbsg.org/submit-data/

Partners

This page will help you to find an ISBSG partner in your country http://isbsg.org/meet-isbsg-partners/