

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, August, 2020.

You will note that the project totals shown at the bottom of the tables rarely equal the 9,592 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 August 2020” 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 (22.5% of all projects), Netherlands (16.3%), Spain (15.3%), Australia (8.9%), Japan (8.8%), Finland (6.3%), France (4.9%), China (4.1%), India (3.4%), Canada (3.3%), Denmark (1.8%), Brazil (1.6%) and United Kingdom (1.0%).
- The projects were performed in more than 30 different countries. Major contributors are Spain (20.6% of all projects where the country of effort is known), Netherlands (15.5%), United States (12.3%), Finland (9.1%), France (7.1%), India (6.7%), Australia (6.2%), China (4.6%), Japan (4.3%) and Canada (3.2%).

Project context

- Industry sector: major sectors are Communications (25.6% of all projects where the organization type is known), Insurance (18.6%), Banking (11.5%), Manufacturing (10.7%), Government (10.2%), Medical and health care (6.6%), Financial (5.6%) Electronics/computers (2.5%) and Service industry (2.5%).
- Business area: major areas are Insurance (18.6% of all projects where the business area is known), Telecommunications (13.4%), Communications (11.8%), Banking (11.0%), Manufacturing (9.3%), Government (7.8%), Medical & Health Care (6.6%), Finance (5.3%), Public Sector (3.0%), Computers & Software (2.0%), Aerospace/Automotive (1.0%), Logistics (0.9%), and Utilities (0.9%).

Type of project

- Development type: 69.0% are enhancement projects, 29.3% are new developments, and 1.1% are re-developments.

- Intended market: 91.9% of projects are developed for internal use, (i.e. for the organization that contributed the project to the Repository), and 4.5% for external use. 33.1% are developed in-house and 66.5% are outsourced.
- Team size: 31.6% of projects have up to 4 people in the development team, 29.1% have 5 to 9 people, 20.5% have 10 to 19 people, and 18.8 % have 20 or more people.

Type of product

- Application group: 91.1% are business applications, 4.3% are real-time applications, and 3.6% 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: 32.1% are mainframe projects, 11.0% midrange, and 22.5% personal computers. 34.4% 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: 72.9% of projects that describe methodologies report using a waterfall model. Other methodologies include Agile and/or RUP (14.4%), Joint Application Development (3.1%), Rapid Application Development (3.1%), Multi-functional teams (2.8%) and Timeboxing (0.8%).

Demographics

Project origin

Country of origin

Projects have been contributed from 26 different countries.

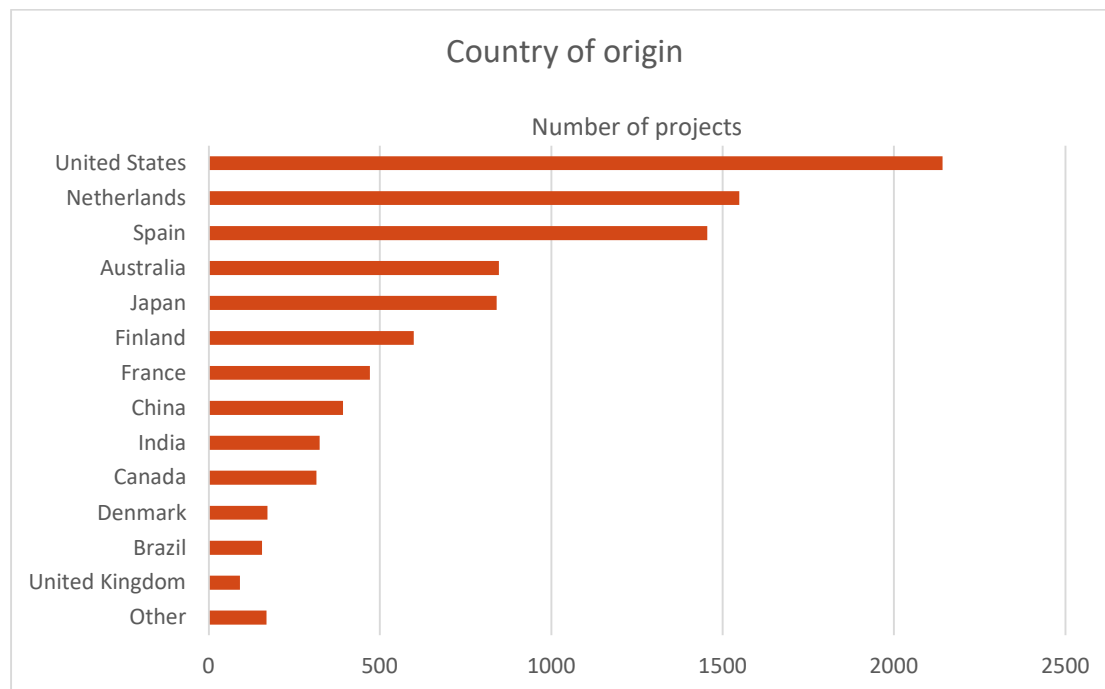


Figure 1 - Demographics country of origin

Demographics		
Country of origin	Projects	Percentage
Countries	N	%
United States	2142	22.5%
Netherlands	1549	16.3%
Spain	1455	15.3%
Australia	847	8.9%
Japan	841	8.8%
Finland	599	6.3%
France	471	4.9%
China	392	4.1%
India	324	3.4%
Canada	315	3.3%
Denmark	172	1.8%
Brazil	156	1.6%
United Kingdom	91	1.0%
Other	169	1.8%
Total	9523	100%

Table 1 - Demographics country of origin

Country of effort

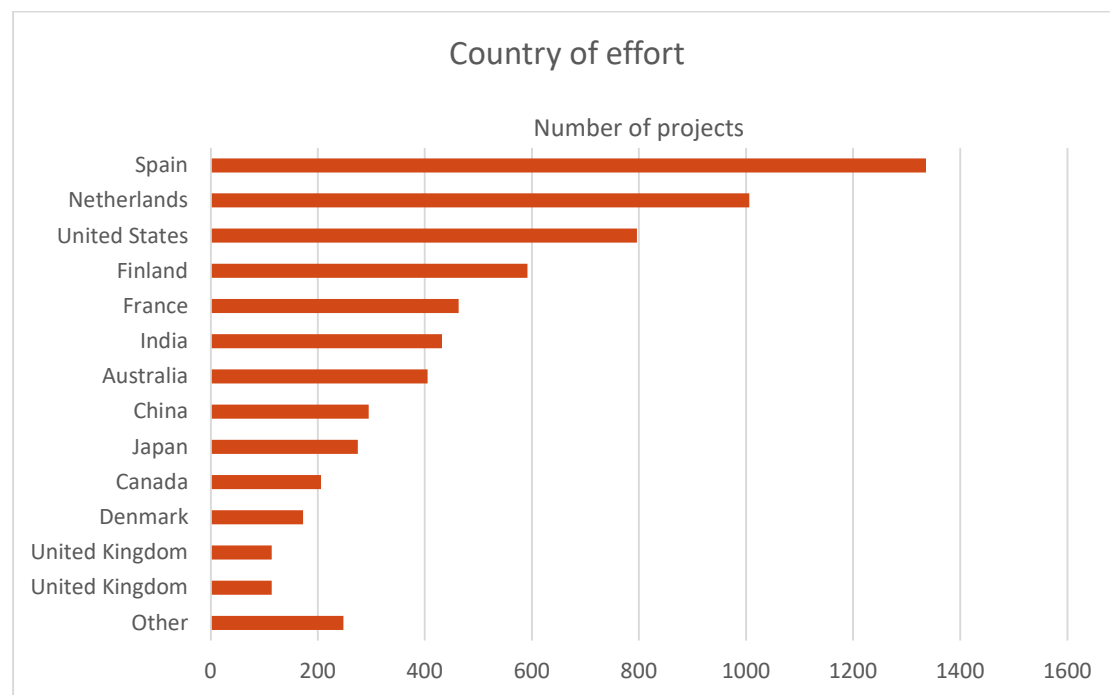


Figure 2 - Demographics country of effort

Demographics		
Country of effort	Projects	Percentage
Countries	N	%
Spain	1336	20.6%
Netherlands	1006	15.5%
United States	796	12.3%
Finland	592	9.1%
France	463	7.1%
India	432	6.7%
Australia	405	6.2%
China	295	4.6%
Japan	275	4.3%
Canada	206	3.2%
Denmark	173	2.7%
United Kingdom	114	1.8%
United Kingdom	114	1.8%
Other	248	3.8%
Total	6496	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.

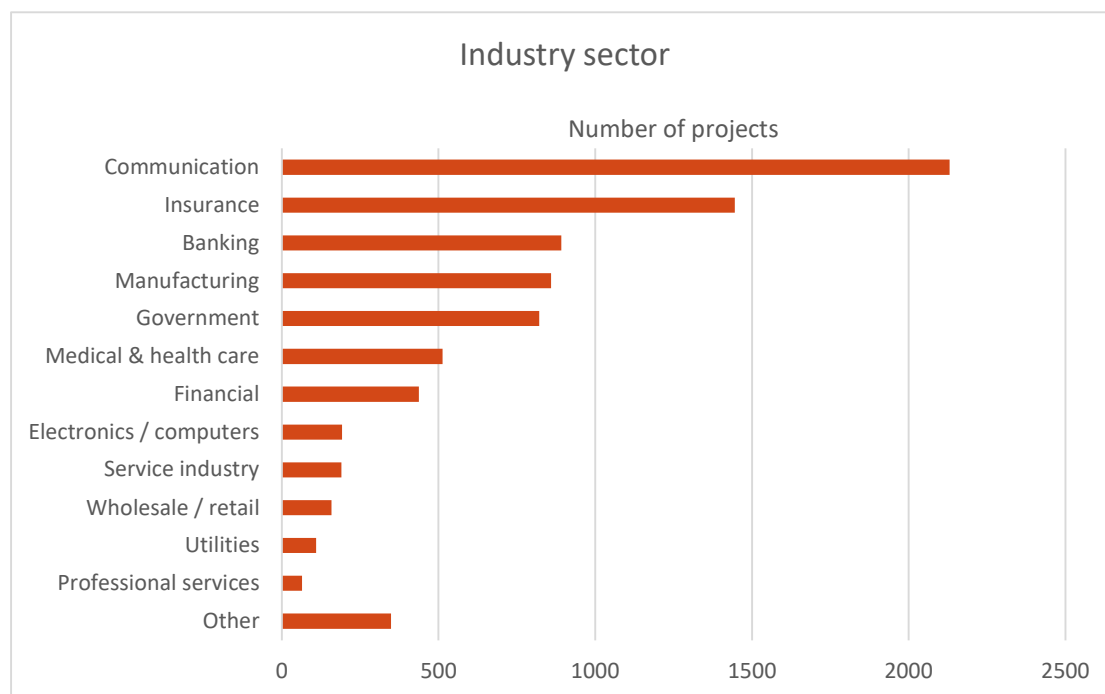


Figure 3 - Demographics industry sector

Demographics		
Industry sector	Projects	Percentage
Industries	N	%
Communication	2131	26.1%
Insurance	1445	17.7%
Banking	892	10.9%
Manufacturing	859	10.5%
Government	821	10.1%
Medical & health care	513	6.3%
Financial	437	5.4%
Electronics / computers	192	2.4%
Service industry	190	2.3%
Wholesale / retail	158	1.9%
Utilities	109	1.3%
Professional services	64	0.8%
Other	348	4.3%
Total	8159	100%

Table 3 - Demographics industry sector

Business area

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

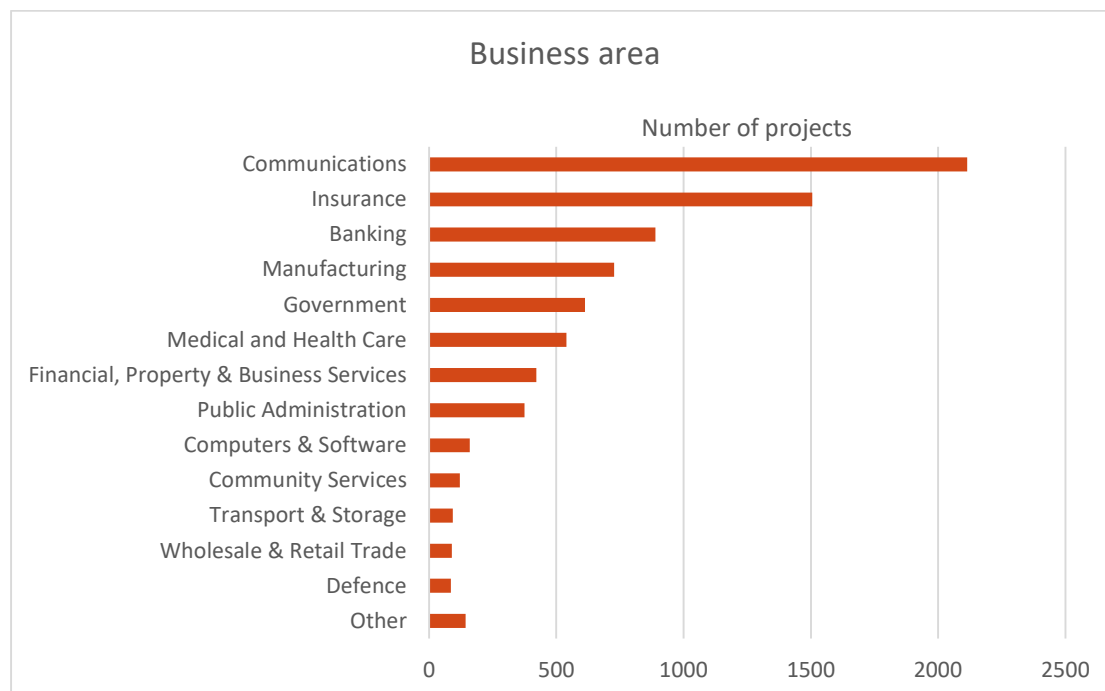


Figure 4 - Demographics business area

Demographics		
Business area	Projects	Percentage
Areas	N	%
Communications	2115	26.9%
Insurance	1505	19.1%
Banking	889	11.3%
Manufacturing	727	9.2%
Government	612	7.8%
Medical and Health Care	540	6.9%
Financial, Property & Business Services	421	5.3%
Public Administration	375	4.8%
Computers & Software	160	2.0%
Community Services	121	1.5%
Transport & Storage	93	1.2%
Wholesale & Retail Trade	89	1.1%
Defence	86	1.1%
Other	144	1.8%
Total	7877	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.

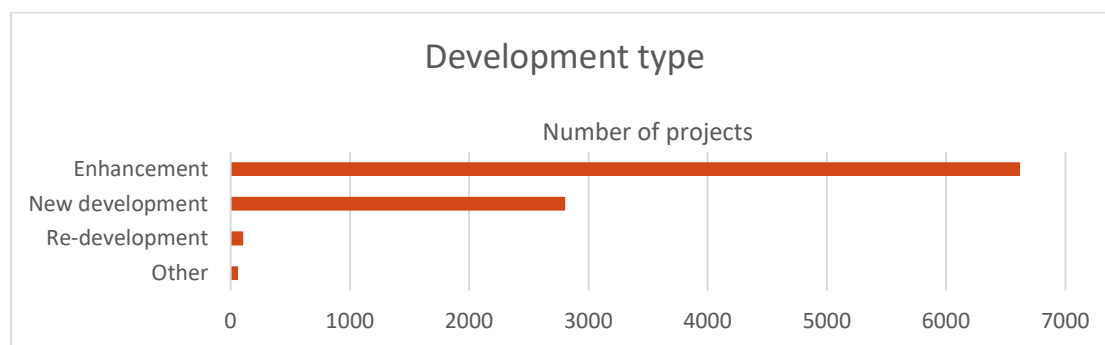


Figure 5 - Demographics development type

Demographics		
Development type	Projects	Percentage
Types	N	%
Enhancement	6620	69.0%
New development	2806	29.3%
Re-development	104	1.1%
Other	61	0.6%
Total	9591	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.

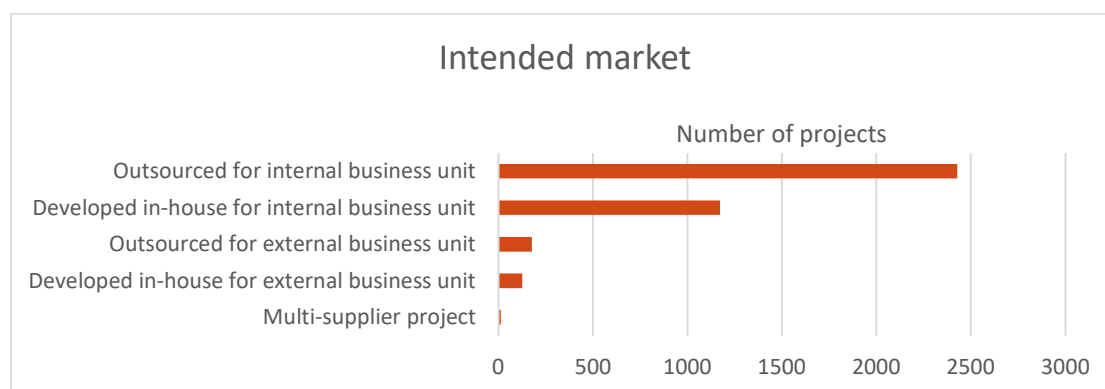


Figure 6 - Demographics intended market

Demographics		
Intended market	Projects	Percentage
Markets	N	%
Outsourced for internal business unit	2428	62.0%
Developed in-house for internal business unit	1173	29.9%
Outsourced for external business unit	178	4.5%
Developed in-house for external business unit	127	3.2%
Multi-supplier project	13	0.3%
Total	3919	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.

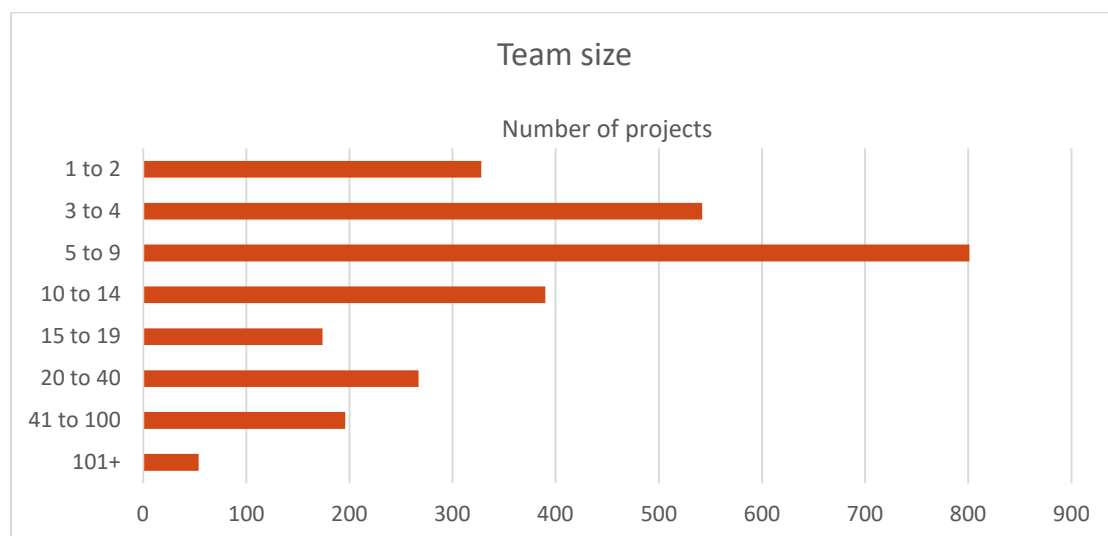


Figure 7 - Demographics team size

Demographics		
Team size	Projects	Percentage
Catergories	N	%
1 to 2	328	11.9%
3 to 4	542	19.7%
5 to 9	801	29.1%
10 to 14	390	14.2%
15 to 19	174	6.3%
20 to 40	267	9.7%
41 to 100	196	7.1%
101+	54	2.0%
Total	2752	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.

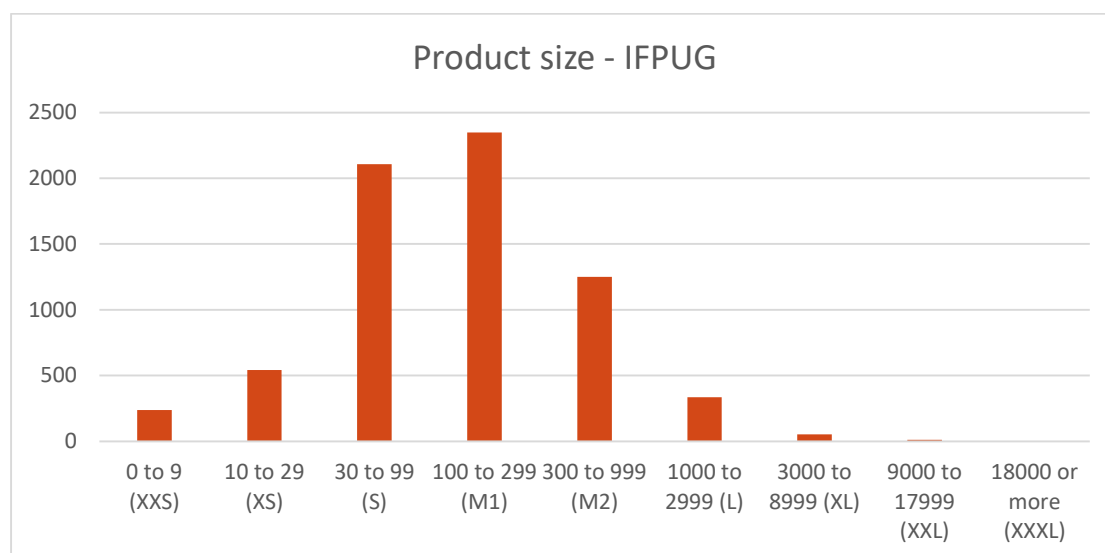


Figure 8 - Demographics product size IFPUG 4+

Demographics		
Product size IFPUG	Projects	Percentage
Catergories	N	%
0 to 9 (XXS)	237	3.4%
10 to 29 (XS)	541	7.9%
30 to 99 (S)	2107	30.6%
100 to 299 (M1)	2348	34.1%
300 to 999 (M2)	1249	18.1%
1000 to 2999 (L)	336	4.9%
3000 to 8999 (XL)	52	0.8%
9000 to 17999 (XXL)	10	0.1%
18000 or more (XXXL)	2	0.0%
Total	6882	100%

Table 8 - Demographics product size IFPUG 4+

COSMIC

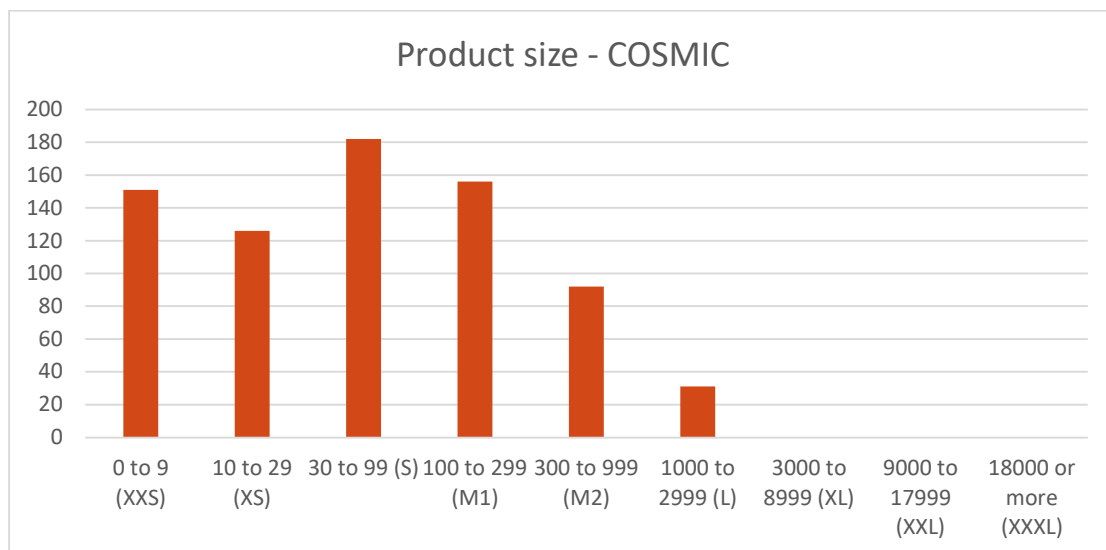


Figure 9 - Demographics product size COSMIC

Demographics		
Product size COSMIC	Projects	Percentage
Categories	N	%
0 to 9 (XXS)	151	20.5%
10 to 29 (XS)	126	17.1%
30 to 99 (S)	182	24.7%
100 to 299 (M1)	156	21.1%
300 to 999 (M2)	92	12.5%
1000 to 2999 (L)	31	4.2%
3000 to 8999 (XL)	0	0.0%
9000 to 17999 (XXL)	0	0.0%
18000 or more (XXXL)	0	0.0%
Total	738	100%

Table 9 - Demographics product size COSMIC

NESMA

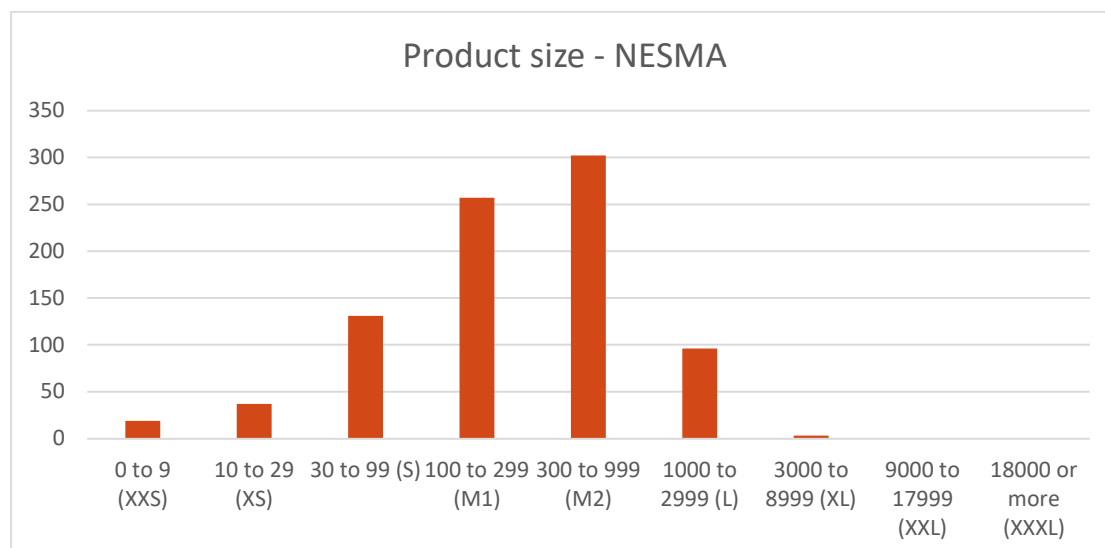


Figure 10 - Demographics product size NESMA

Demographics		
Product size NESMA	Projects	Percentage
Catergories	N	%
0 to 9 (XXS)	19	2.2%
10 to 29 (XS)	37	4.4%
30 to 99 (S)	131	15.5%
100 to 299 (M1)	257	30.4%
300 to 999 (M2)	302	35.7%
1000 to 2999 (L)	96	11.4%
3000 to 8999 (XL)	3	0.4%
9000 to 17999 (XXL)	0	0.0%
18000 or more (XXXL)	0	0.0%
Total	845	100%

Table 10 - Demographics product size NESMA

FiSMA

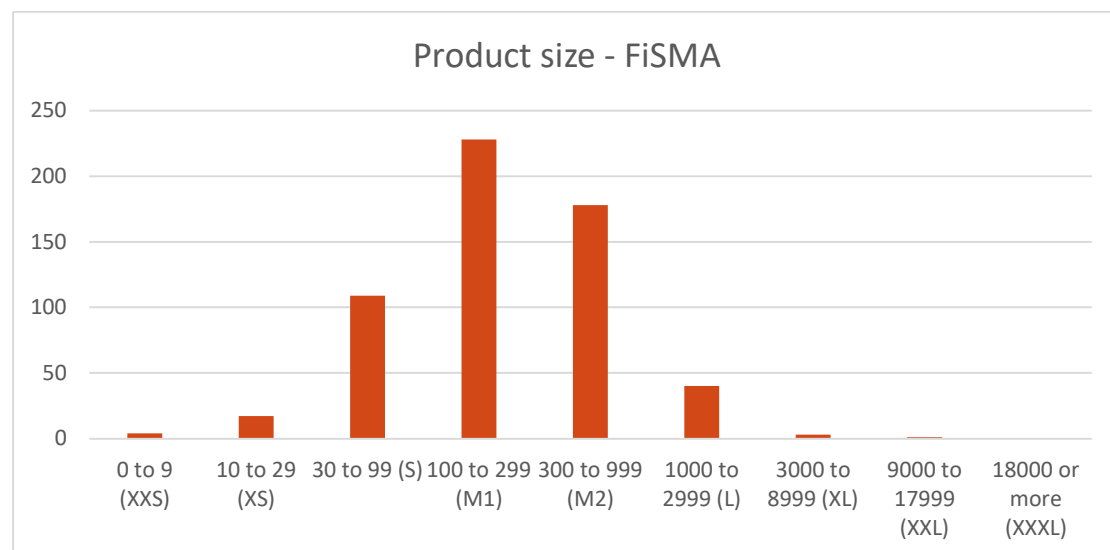


Figure 11 - Demographics product size FiSMA

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.

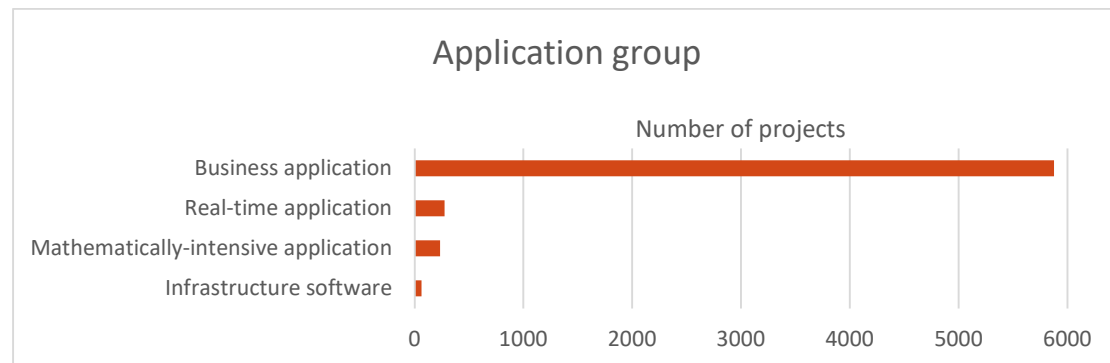


Figure 12 - Demographics application group

Demographics		
Application group	Projects	Percentage
Categories	N	%
Business application	5877	91.1%
Real-time application	276	4.3%
Mathematically-intensive application	235	3.6%
Infrastructure software	65	1.0%
Total	6453	100%

Table 12 - Demographics application group

Application type

A finer-grained breakdown of application types follows.

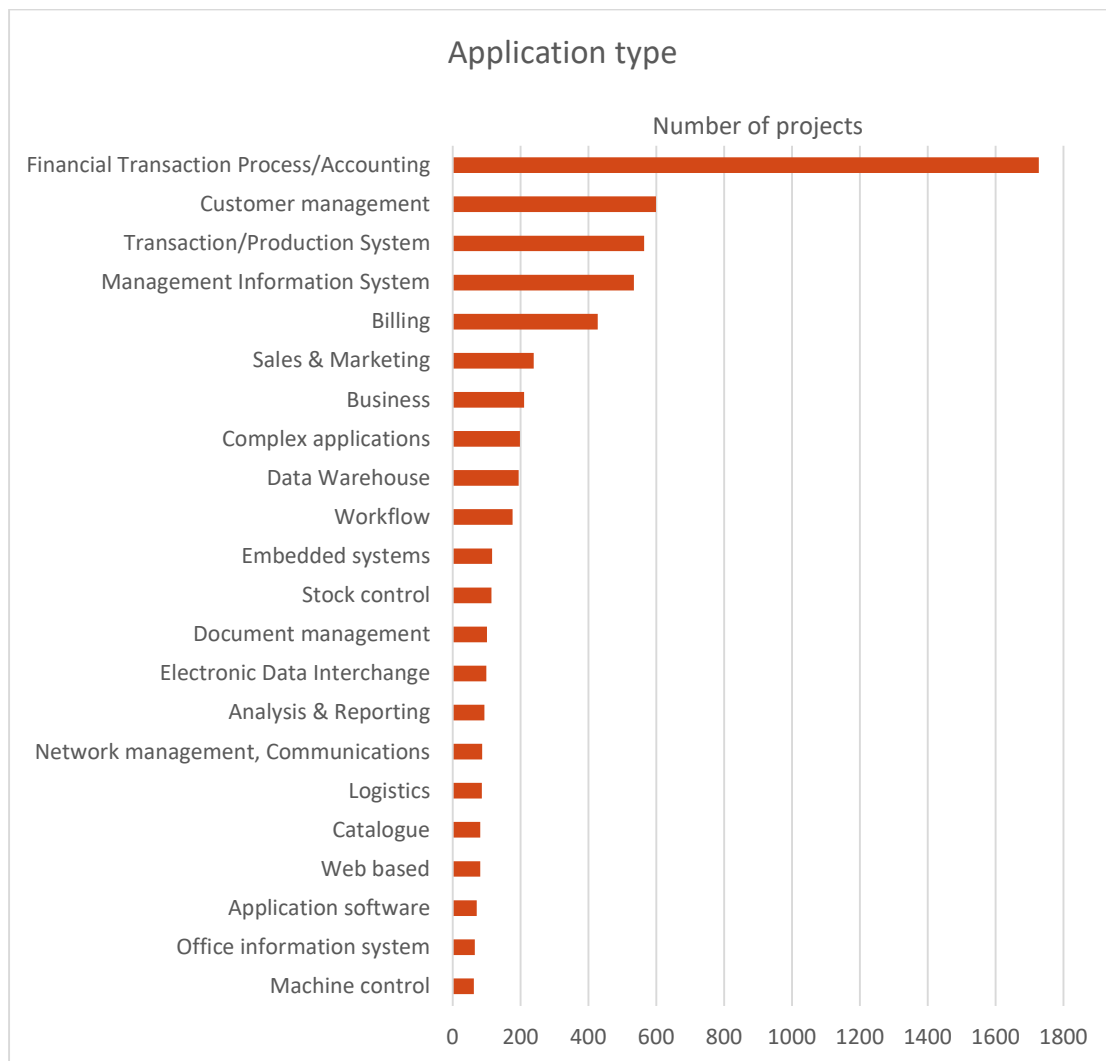


Figure 13 - Demographics application type

Demographics		
Application type	Projects	Percentage
Categories	N	%
Financial Transaction Process/Accounting	1728	29.1%
Customer management	599	10.1%
Transaction/Production System	564	9.5%
Management Information System	534	9.0%
Billing	428	7.2%
Sales & Marketing	239	4.0%
Business	211	3.6%
Complex applications	198	3.3%
Data Warehouse	195	3.3%
Workflow	177	3.0%
Embedded systems	116	2.0%
Stock control	114	1.9%
Document management	101	1.7%
Electronic Data Interchange	99	1.7%
Analysis & Reporting	94	1.6%
Network management, Communications	87	1.5%
Logistics	86	1.5%
Catalogue	81	1.4%
Web based	81	1.4%
Application software	71	1.2%
Office information system	65	1.1%
Machine control	62	1.0%
Total	5930	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.

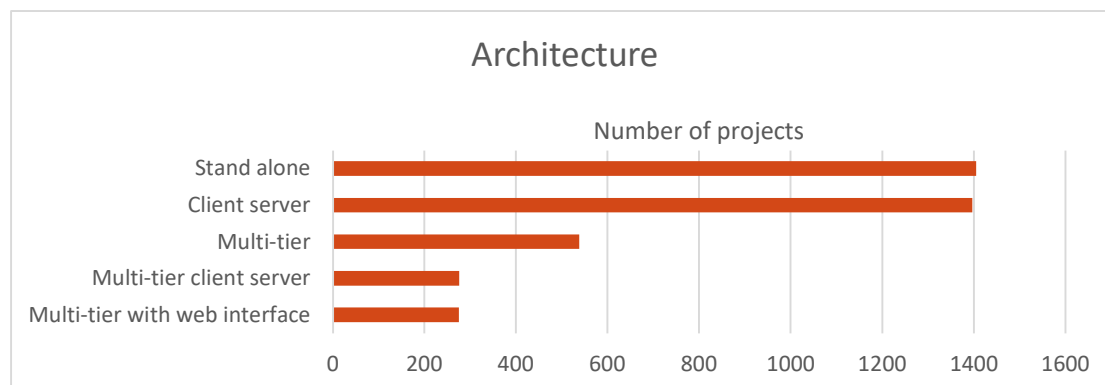


Figure 14 - Demographics architecture

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

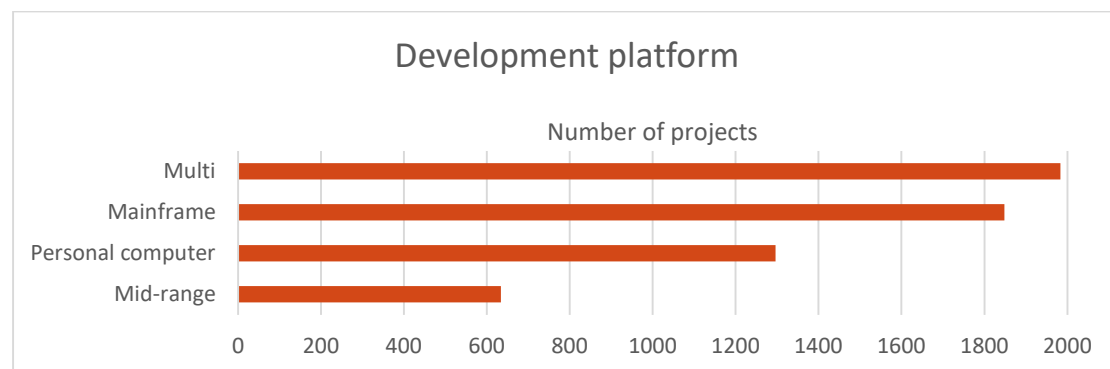


Figure 15 - Demographics development platform

Demographics		
Development platform	Projects	Percentage
Categories	N	%
Multi	1983	34.4%
Mainframe	1848	32.1%
Personal computer	1296	22.5%
Mid-range	634	11.0%
Total	5761	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.

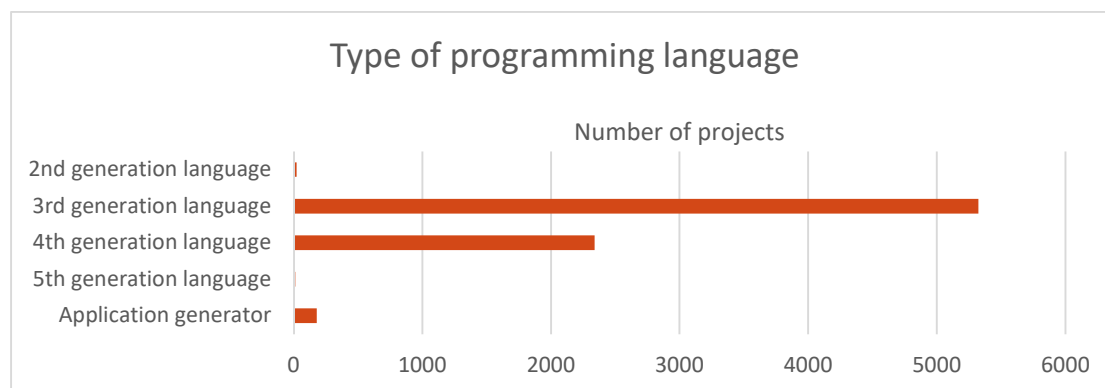


Figure 16 - Demographics type of programming language

Demographics		
Type of programming language	Projects	Percentage
Categories	N	%
2nd generation language	22	0.3%
3rd generation language	5323	67.6%
4th generation language	2340	29.7%
5th generation language	13	0.2%
Application generator	178	2.3%
Total	7876	100%

Table 16 - Demographics type of programming language

Over 120 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.

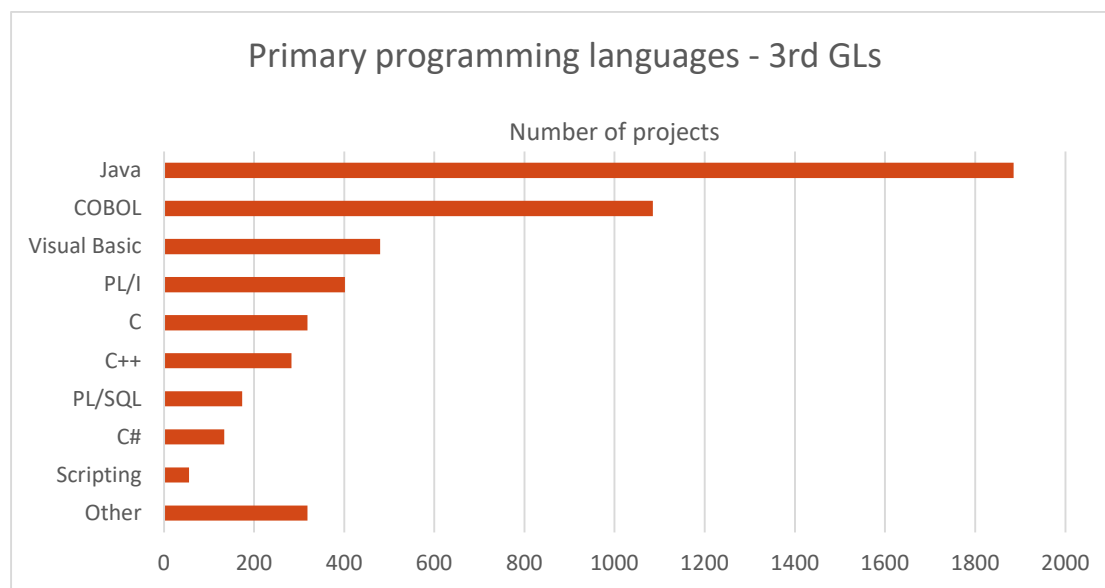


Figure 17 - Demographics primary programming languages 3rd generation languages

Demographics		
Primary programming languages	Projects	Percentage
3rd generation languages	N	%
Java	1885	36.7%
COBOL	1085	21.1%
Visual Basic	480	9.3%
PL/I	402	7.8%
C	319	6.2%
C++	283	5.5%
PL/SQL	174	3.4%
C#	134	2.6%
Scripting	56	1.1%
Other	319	6.2%
Total	5137	100%

Table 17 - Demographics primary programming languages 3rd generation languages

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

Primary programming languages 4th generation languages

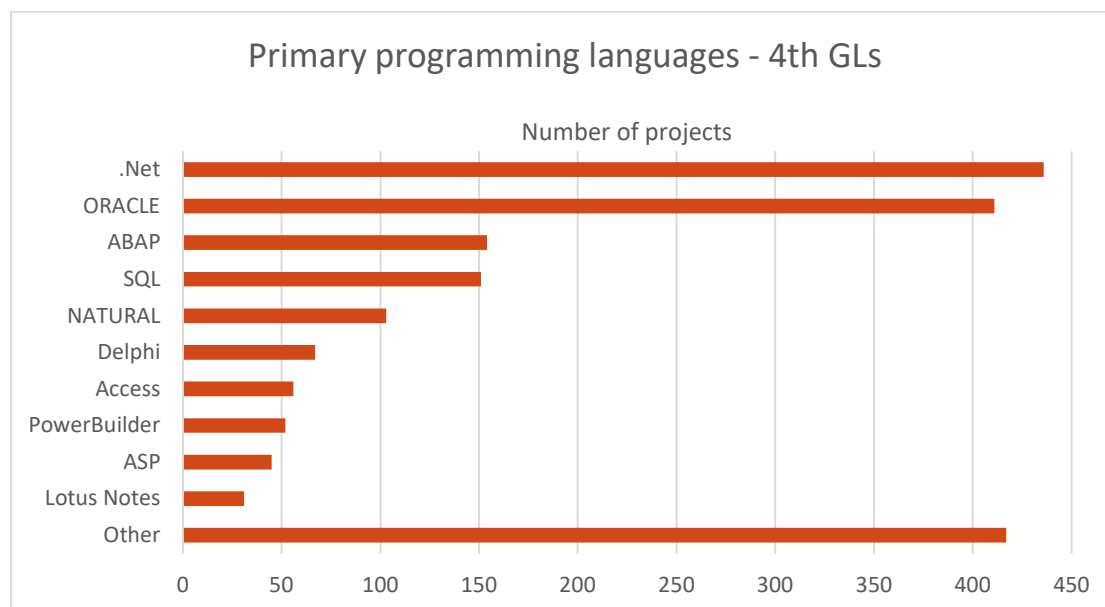


Figure 18 - Demographics primary programming languages 4th generation languages

Demographics		
Primary programming languages	Projects	Percentage
4th generation languages	N	%
.Net	436	22.7%
ORACLE	411	21.4%
ABAP	154	8.0%
SQL	151	7.9%
NATURAL	103	5.4%
Delphi	67	3.5%
Access	56	2.9%
PowerBuilder	52	2.7%
ASP	45	2.3%
Lotus Notes	31	1.6%
Other	417	21.7%
Total	1923	100%

Table 18 - Demographics primary programming languages 4th generation languages

Other 4GLs represented in the Repository include Visual C++, ASP.Net, ABAP, EASYTRIEVE, FOCUS, CLIPPER, CSP, IDEAL, and RALLY.

Application generators

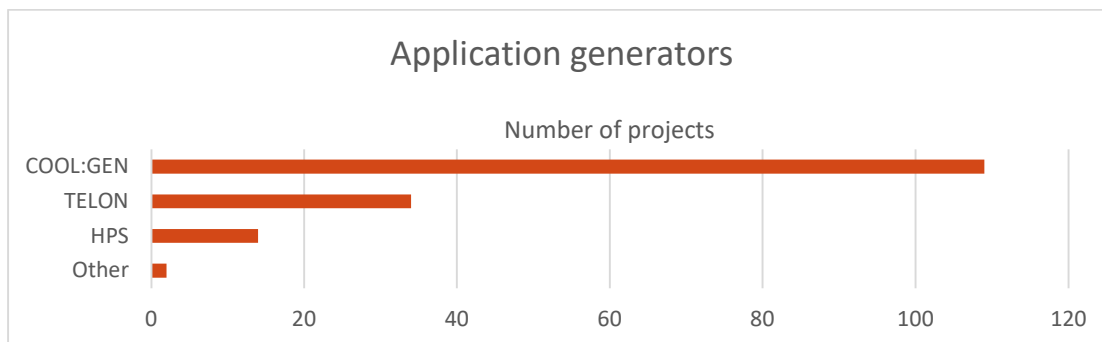


Figure 19 - Demographics application generators

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

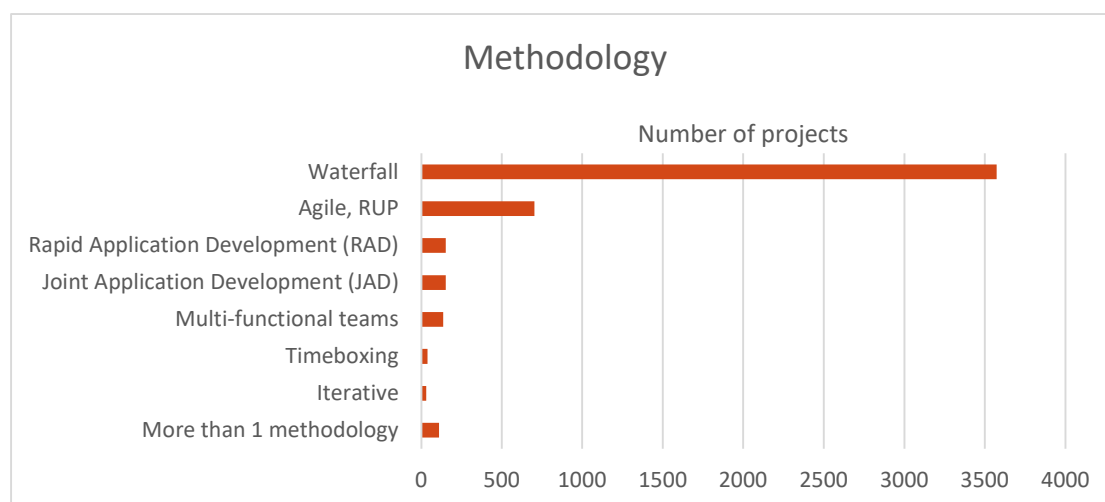


Figure 20 - Demographics methodology

Demographics		
Methodology	Projects	Percentage
Methodologies	N	%
Waterfall	3574	72.9%
Agile, RUP	704	14.4%
Rapid Application Development (RAD)	153	3.1%
Joint Application Development (JAD)	152	3.1%
Multi-functional teams	137	2.8%
Timeboxing	39	0.8%
Iterative	32	0.7%
More than 1 methodology	110	2.2%
Total	4901	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.

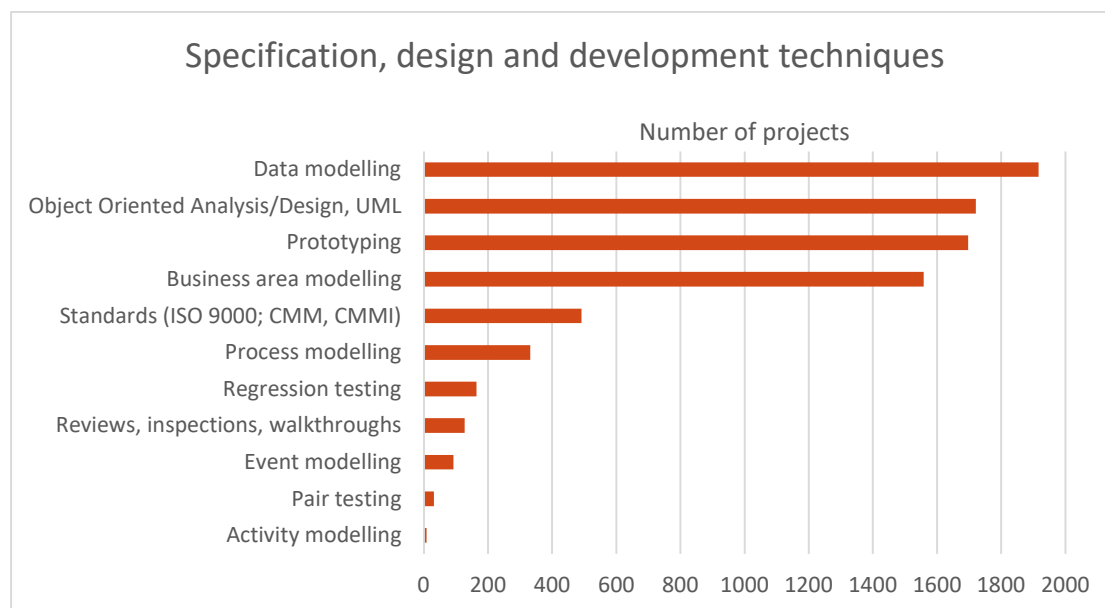


Figure 21 - Demographics specification, design and development

Demographics		
Specification, design and development techniques	Projects	Percentage
Techniques	N	%
Data modelling	1917	23.6%
Object Oriented Analysis/Design, UML	1721	21.1%
Prototyping	1697	20.8%
Business area modelling	1558	19.1%
Standards (ISO 9000; CMM, CMMI)	492	6.0%
Process modelling	332	4.1%
Regression testing	164	2.0%
Reviews, inspections, walkthroughs	127	1.6%
Event modelling	92	1.1%
Pair testing	31	0.4%
Activity modelling	9	0.1%
More than 1 development technique used	2116	26.0%

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/>