

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, February 2019.

You will note that the project totals shown at the bottom of the tables rarely equal the 9,178 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 February 2019” 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 (23.5% of all projects), Spain (14.3%), Netherlands (14.2%), Australia (9.3%), Japan (9.2%), Finland (6.6%), France (5.2%), China (4.2%), India (3.6%), Canada (3.5%).
- The projects were performed in more than 30 different countries. Major contributors are Spain (19.5% of all projects where the country of effort is known), United States (13.1%), Netherlands (12.3%), Finland (9.7%), France (7.6%), India (7.1%), Australia (6.7%), China (4.8%), Japan (4.5%) and Canada (3.4%).

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: 67.6% are enhancement projects, 30.6% are new developments, and 1.1% are re-developments.

- Intended market: 91.6% of projects are developed for internal use, (i.e. for the organization that contributed the project to the Repository), and 8.1% for external use. 34.5% are developed in-house and 65.2% are outsourced.
- Team size: 29.8% of projects have up to 4 people in the development team, 27.6% have 5 to 8 people, 22.0% have 9 to 20 people, and 20.6 % have 21 or more people.

Type of product

- Application group: 90.5% are business applications, 4.5% are real-time applications, and 3.9% 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 22.4% personal computers. 34.5% 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: 79.2% of projects that describe methodologies report using a waterfall model. Other methodologies include Agile and/or RUP (11.4%), Joint Application Development (4.4%), Rapid Application Development (3.5%), Multi-functional teams (3.2%) and Timeboxing (0.9%).

Demographics

Project origin

Country of origin

Projects have been contributed from 26 different countries.

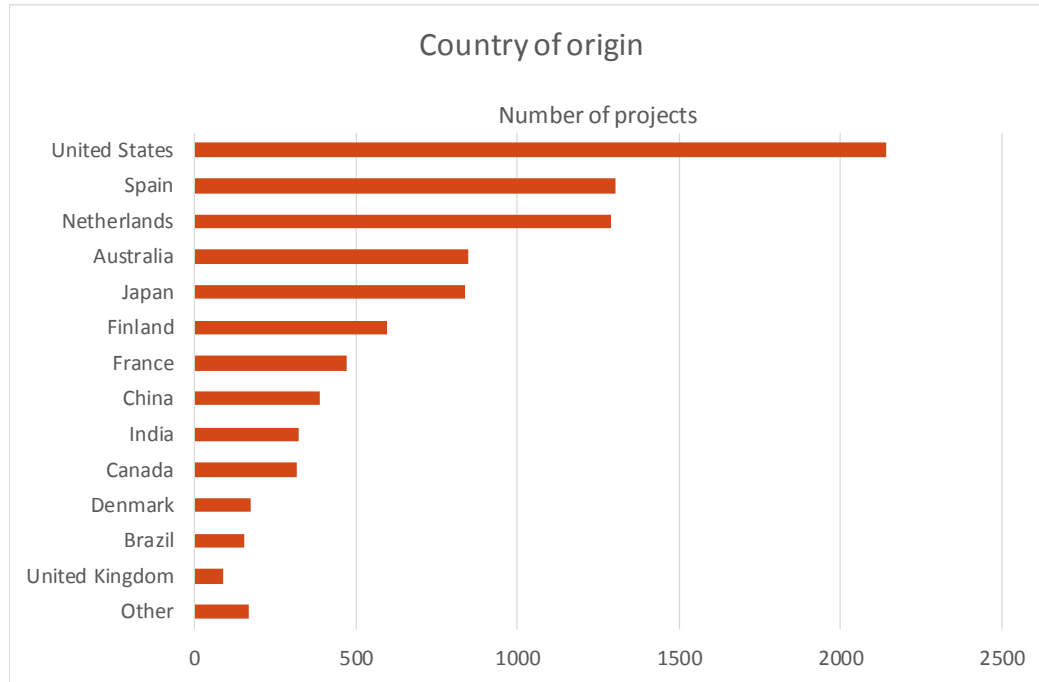


Figure 1 - Demographics country of origin

Demographics		
Country of origin	Projects	Percentage
Countries	N	%
United States	2142	23,5%
Spain	1306	14,3%
Netherlands	1290	14,2%
Australia	847	9,3%
Japan	841	9,2%
Finland	599	6,6%
France	471	5,2%
China	387	4,2%
India	324	3,6%
Canada	316	3,5%
Denmark	172	1,9%
Brazil	154	1,7%
United Kingdom	91	1,0%
Other	169	1,9%
Total	9109	100%

Table 1 - Demographics country of origin

Country of effort

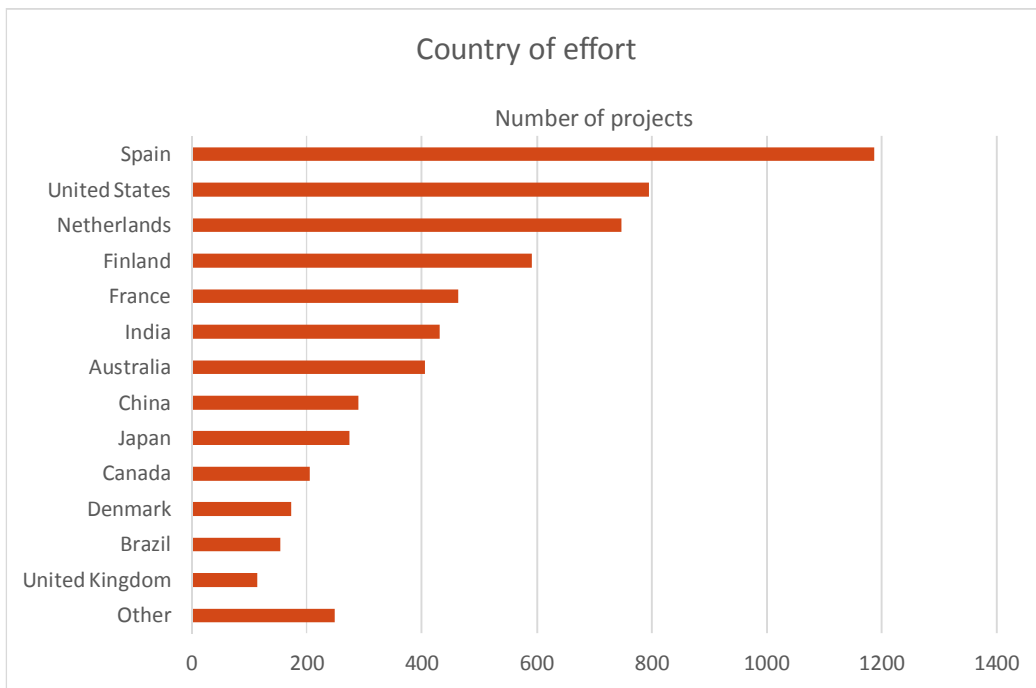


Figure 2 - Demographics country of effort

Demographics		
Country of effort	Projects	Percentage
Countries	N	%
Spain	1187	19,5%
United States	796	13,1%
Netherlands	747	12,3%
Finland	592	9,7%
France	463	7,6%
India	432	7,1%
Australia	405	6,7%
China	290	4,8%
Japan	275	4,5%
Canada	206	3,4%
Denmark	173	2,8%
Brazil	154	2,5%
United Kingdom	114	1,9%
Other	248	4,1%
Total	6082	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.

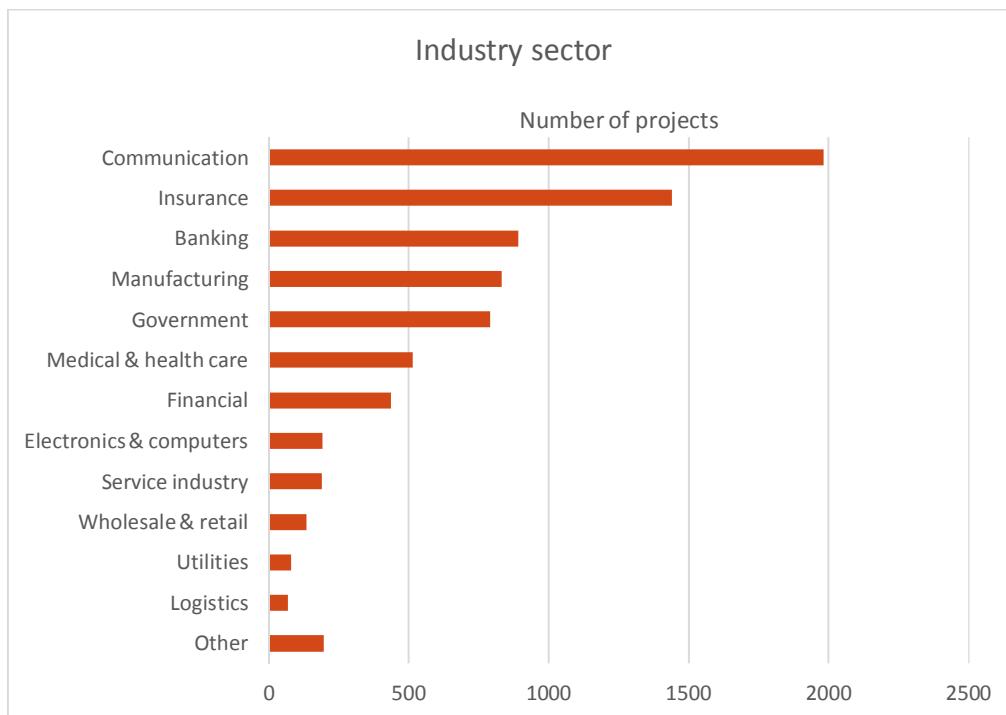


Figure 3 - Demographics industry sector

Demographics		
Industry sector	Projects	Percentage
Industries	N	%
Communication	1982	25.6%
Insurance	1440	18.6%
Banking	892	11.5%
Manufacturing	832	10.7%
Government	790	10.2%
Medical & health care	513	6.6%
Financial	437	5.6%
Electronics & computers	191	2.5%
Service industry	190	2.5%
Wholesale & retail	135	1.7%
Utilities	79	1.0%
Logistics	68	0.9%
Other	196	2.5%
Total	7745	100%

Table 3 - Demographics industry sector

Business area

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

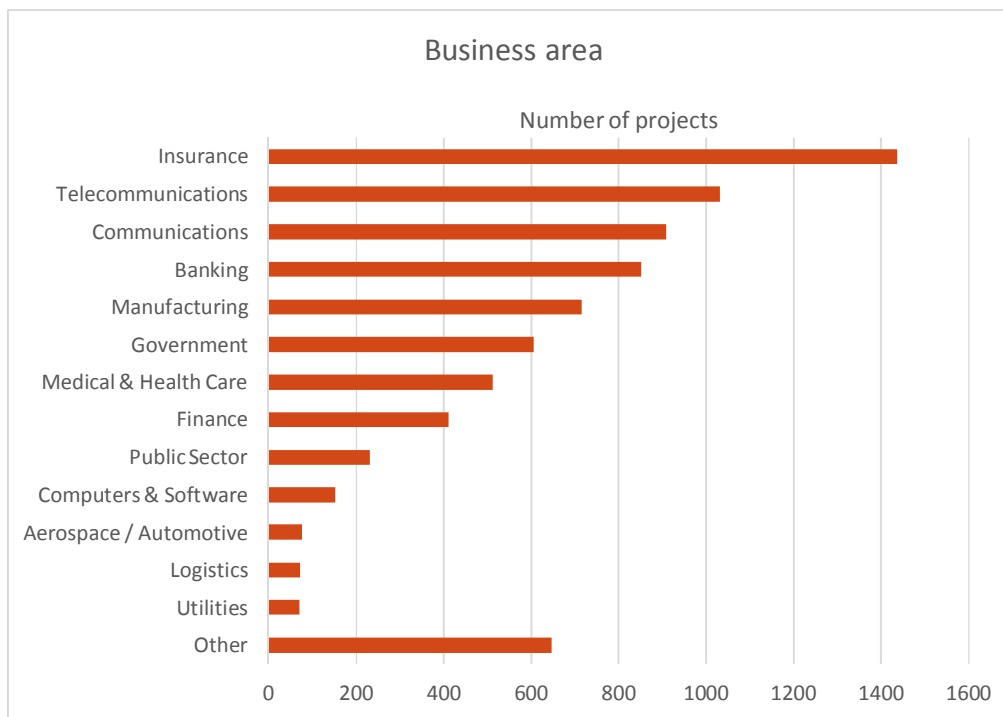


Figure 4 - Demographics business area

Demographics		
Business area	Projects	Percentage
Areas	N	%
Insurance	1436	18.6%
Telecommunications	1032	13.4%
Communications	908	11.8%
Banking	852	11.0%
Manufacturing	716	9.3%
Government	605	7.8%
Medical & Health Care	512	6.6%
Finance	412	5.3%
Public Sector	231	3.0%
Computers & Software	153	2.0%
Aerospace / Automotive	76	1.0%
Logistics	72	0.9%
Utilities	70	0.9%
Other	647	8.4%
Total	7722	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.

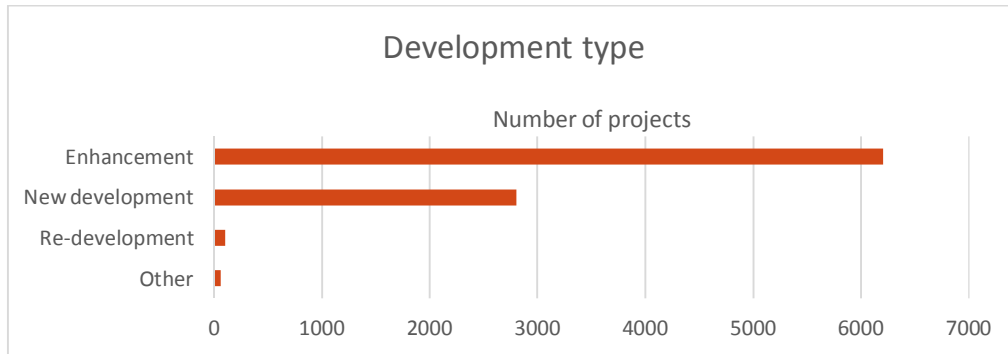


Figure 5 - Demographics development type

Demographics		
Development type	Projects	Percentage
Types	N	%
Enhancement	6207	67.6%
New development	2806	30.6%
Re-development	103	1.1%
Other	61	0.7%
Total	9177	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.

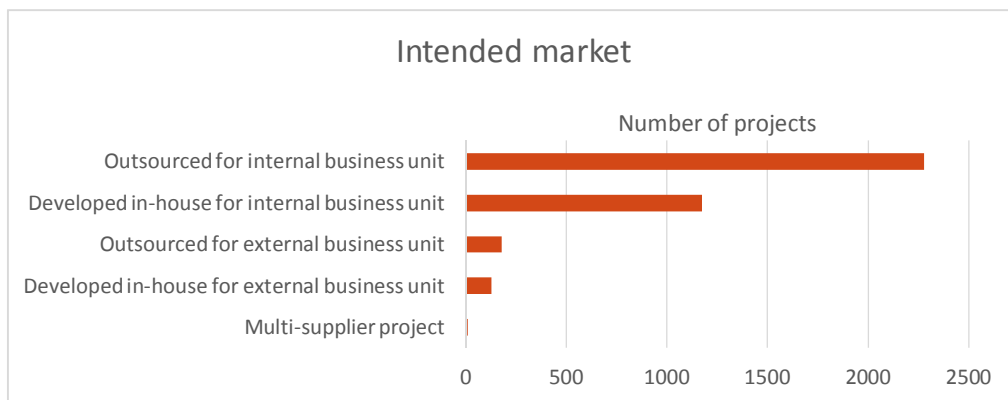


Figure 6 - Demographics intended market

Demographics		
Intended market	Projects	Percentage
Markets	N	%
Outsourced for internal business unit	2279	60.5%
Developed in-house for internal business unit	1173	31.1%
Outsourced for external business unit	178	4.7%
Developed in-house for external business unit	127	3.4%
Multi-supplier project	13	0.3%
Total	3770	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.

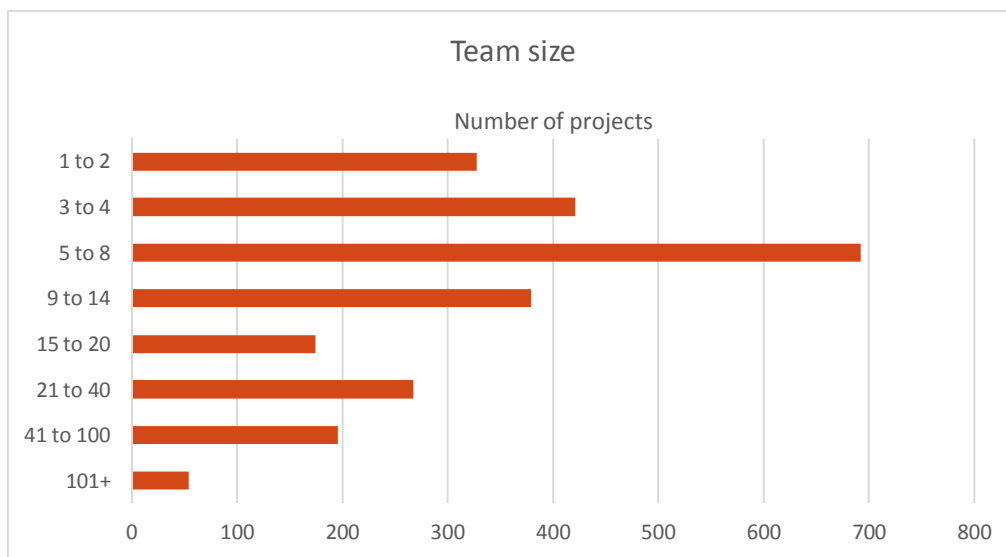


Figure 7 - Demographics team size

Demographics		
Team size	Projects	Percentage
Categories	N	%
1 to 2	328	13.1%
3 to 4	421	16.8%
5 to 8	692	27.6%
9 to 14	379	15.1%
15 to 20	174	6.9%
21 to 40	267	10.6%
41 to 100	196	7.8%
101+	54	2.2%
Total	2511	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.

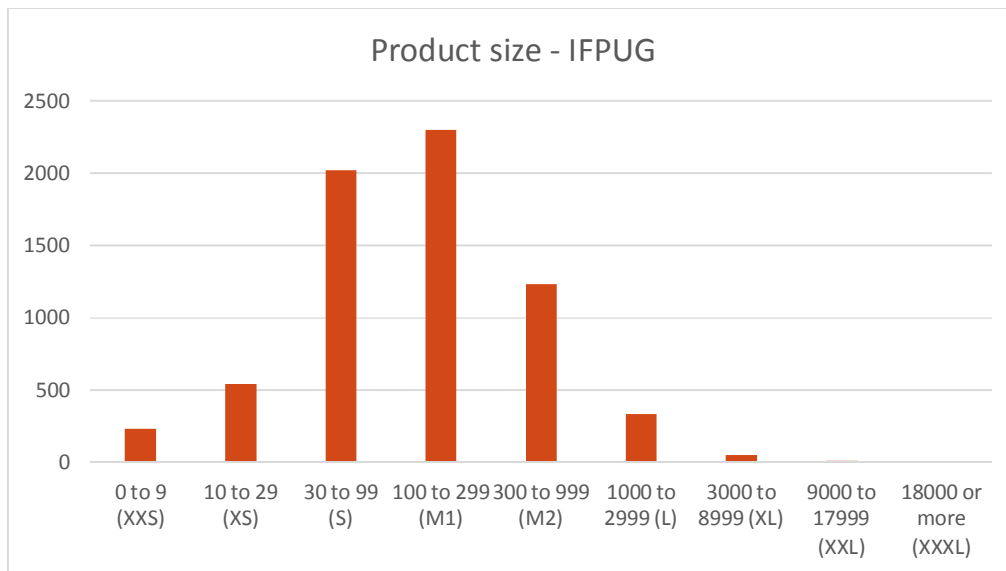


Figure 8 - Demographics product size IFPUG 4+

Demographics		
Product size IFPUG	Projects	Percentage
Categories	N	%
0 to 9 (XXS)	237	3.5%
10 to 29 (XS)	541	8.0%
30 to 99 (S)	2021	30.0%
100 to 299 (M1)	2298	34.1%
300 to 999 (M2)	1235	18.3%
1000 to 2999 (L)	336	5.0%
3000 to 8999 (XL)	52	0.8%
9000 to 17999 (XXL)	10	0.1%
18000 or more (XXXL)	2	0.0%
Total	6732	100%

Table 8 - Demographics product size IFPUG 4+

COSMIC

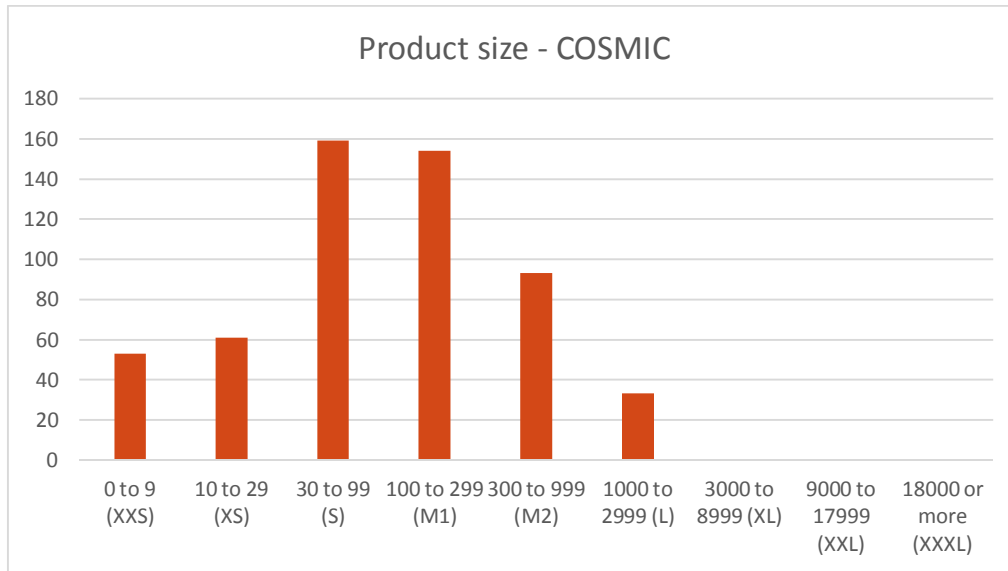


Figure 9 - Demographics product size COSMIC

Demographics		
Product size COSMIC	Projects	Percentage
Categories	N	%
0 to 9 (XXS)	53	9.6%
10 to 29 (XS)	61	11.0%
30 to 99 (S)	159	28.8%
100 to 299 (M1)	154	27.8%
300 to 999 (M2)	93	16.8%
1000 to 2999 (L)	33	6.0%
3000 to 8999 (XL)	0	0.0%
9000 to 17999 (XXL)	0	0.0%
18000 or more (XXXL)	0	0.0%
Total	553	100%

Table 9 - Demographics product size COSMIC

NESMA

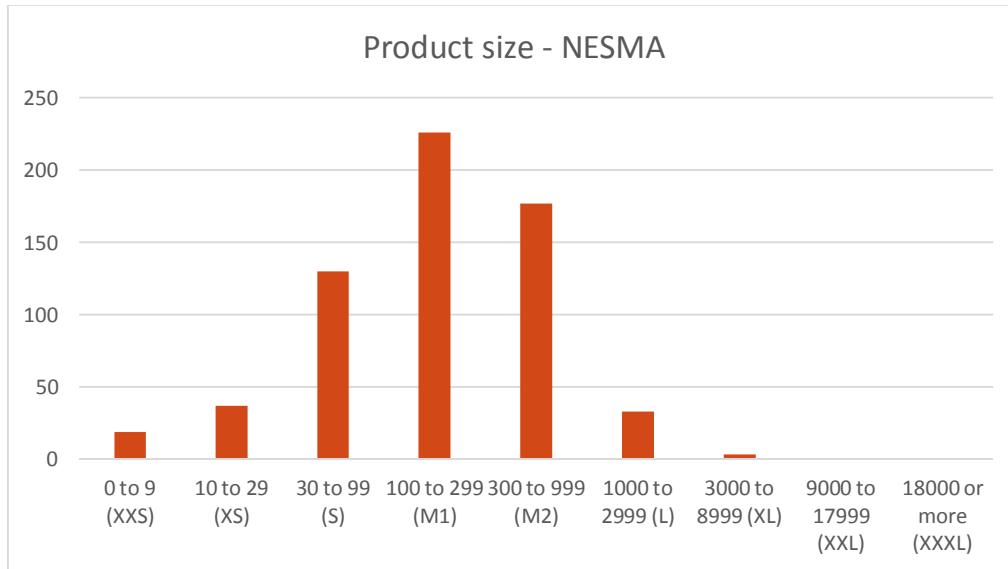


Figure 10 - Demographics product size NESMA

Demographics		
Product size NESMA	Projects	Percentage
Categories	N	%
0 to 9 (XXS)	19	3.0%
10 to 29 (XS)	37	5.9%
30 to 99 (S)	130	20.8%
100 to 299 (M1)	226	36.2%
300 to 999 (M2)	177	28.3%
1000 to 2999 (L)	33	5.3%
3000 to 8999 (XL)	3	0.5%
9000 to 17999 (XXL)	0	0.0%
18000 or more (XXXL)	0	0.0%
Total	625	100%

Table 10 - Demographics product size NESMA

FiSMA

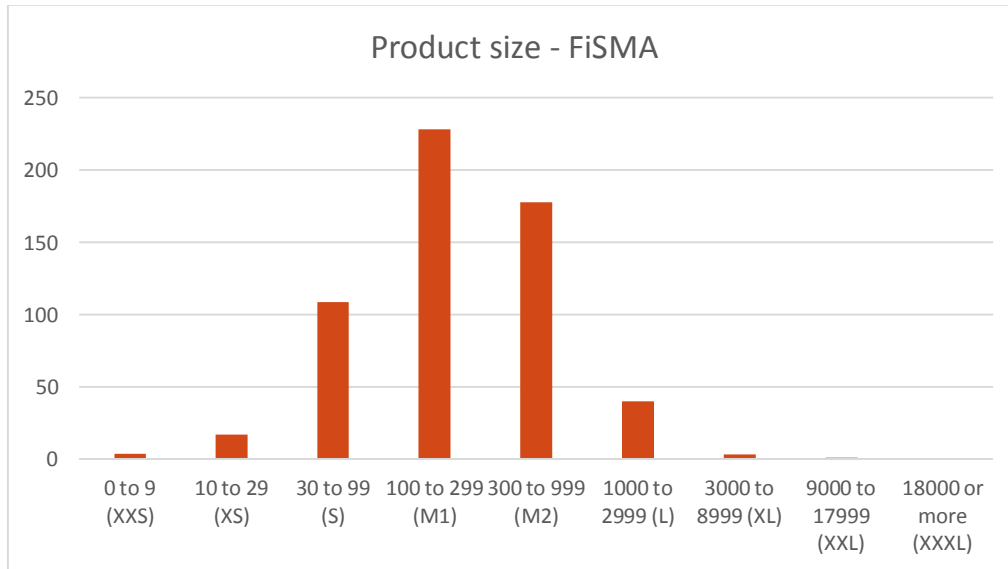


Figure 11 - Demographics product size FiSMA

Demographics		
Product size FiSMA	Projects	Percentage
Categories	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.

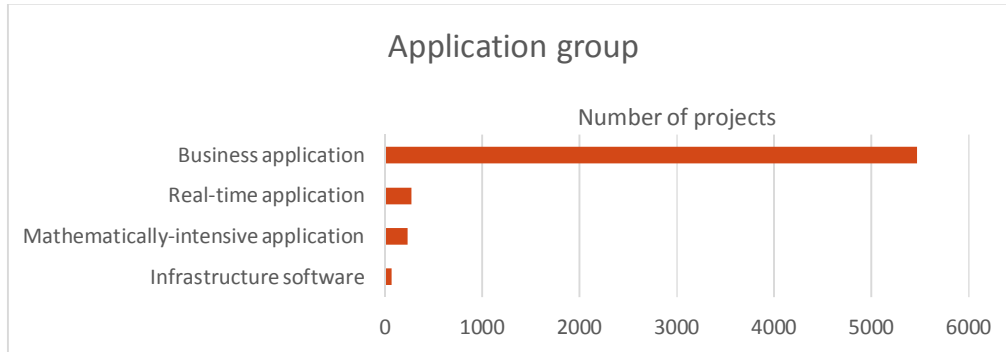


Figure 12 - Demographics application group

Demographics		
Application group	Projects	Percentage
Categories	N	%
Business application	5463	90.5%
Real-time application	274	4.5%
Mathematically-intensive application	235	3.9%
Infrastructure software	65	1.1%
Total	6037	100%

Table 12 - Demographics application group

Application type

A finer-grained breakdown of application types follows.

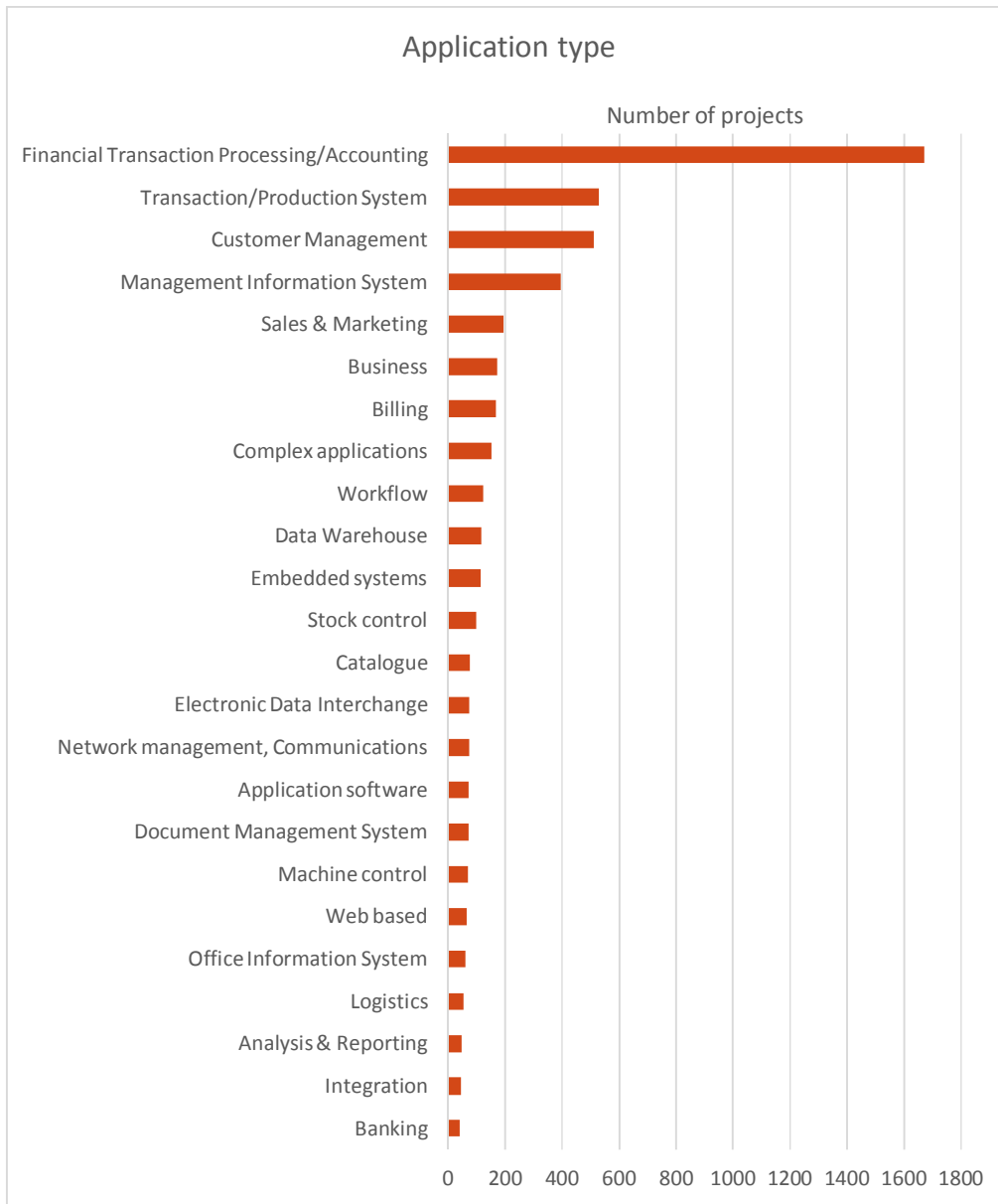


Figure 13 - Demographics application type

Demographics		
Application type	Projects	Percentage
Categories	N	%
Financial Transaction Processing/Accounting	1672	26.5%
Transaction/Production System	528	8.4%
Customer Management	511	8.1%
Management Information System	394	6.2%
Sales & Marketing	195	3.1%
Business	172	2.7%
Billing	167	2.6%
Complex applications	154	2.4%
Workflow	123	2.0%
Data Warehouse	115	1.8%
Embedded systems	113	1.8%
Stock control	99	1.6%
Catalogue	75	1.2%
Electronic Data Interchange	73	1.2%
Network management, Communications	73	1.2%
Application software	71	1.1%
Document Management System	71	1.1%
Machine control	69	1.1%
Web based	65	1.0%
Office Information System	62	1.0%
Logistics	54	0.9%
Analysis & Reporting	47	0.7%
Integration	44	0.7%
Banking	40	0.6%
Other	1319	20.9%
Total	6306	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.

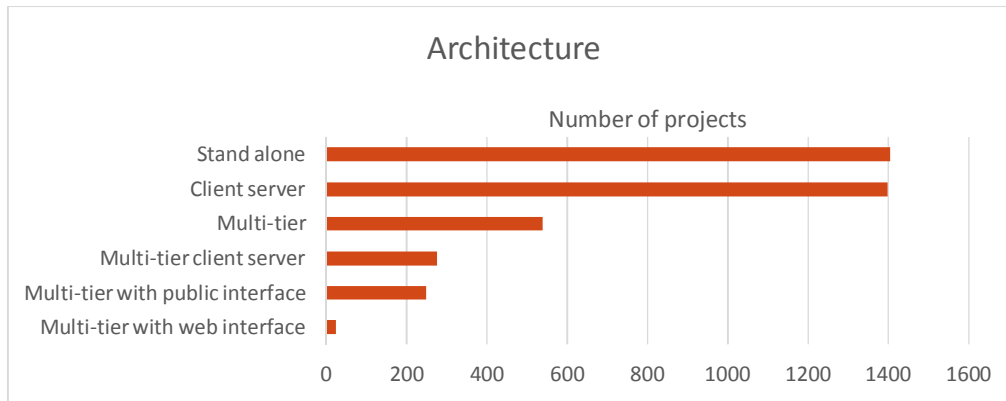


Figure 14 - Demographics architecture

Demographics		
Architecture	Projects	Percentage
Categories	N	%
Stand alone	1404	36.1%
Client server	1397	35.9%
Multi-tier	538	13.8%
Multi-tier client server	276	7.1%
Multi-tier with public interface	250	6.4%
Multi-tier with web interface	25	0.6%
Total	3890	100.0%

Table 14 - Demographics architecture

Development environment

Development platform

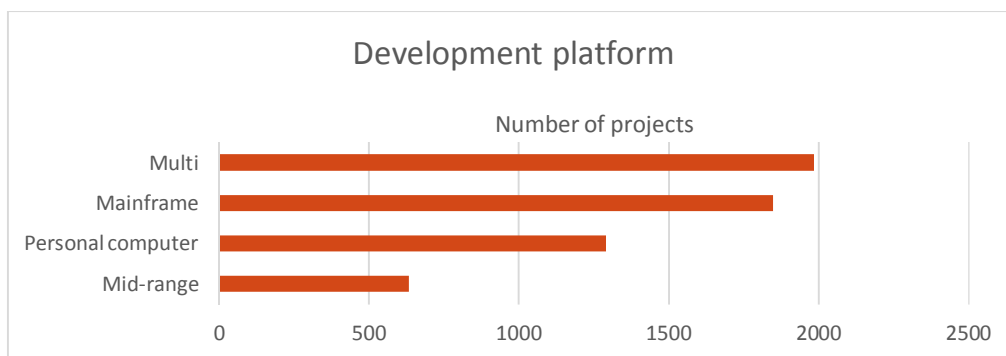


Figure 15 - Demographics development platform

Demographics		
Development platform	Projects	Percentage
Categories	N	%
Multi	1983	34.5%
Mainframe	1848	32.1%
Personal computer	1290	22.4%
Mid-range	634	11.0%
Total	5755	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.

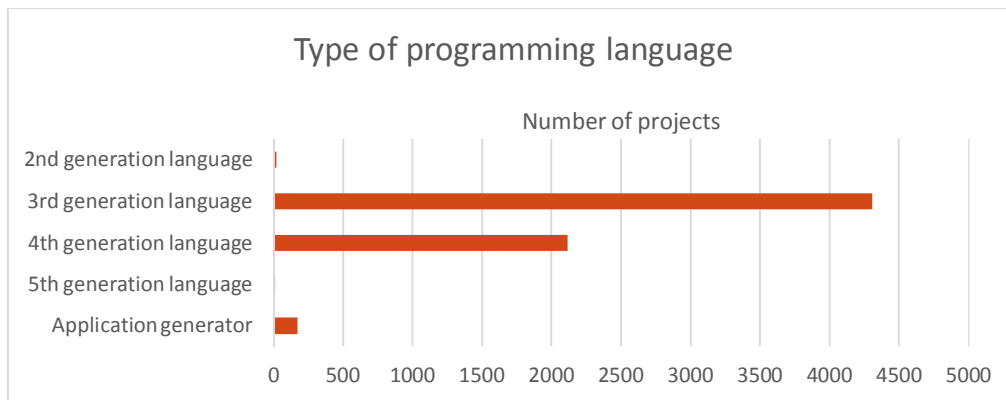


Figure 16 - Demographics type of programming language

Demographics		
Type of programming language	Projects	Percentage
Categories	N	%
2nd generation language	22	0.3%
3rd generation language	4305	64.9%
4th generation language	2116	31.9%
5th generation language	13	0.2%
Application generator	176	2.7%
Total	6632	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.

Some languages (e.g. Visual Basic, Visual C++) were nominated sometimes as 3GLs and sometimes as 4GLs. The table above tallies the language types as originally nominated. In the following tables, each language is consolidated under a single type.

Primary programming languages 3rd generation languages

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

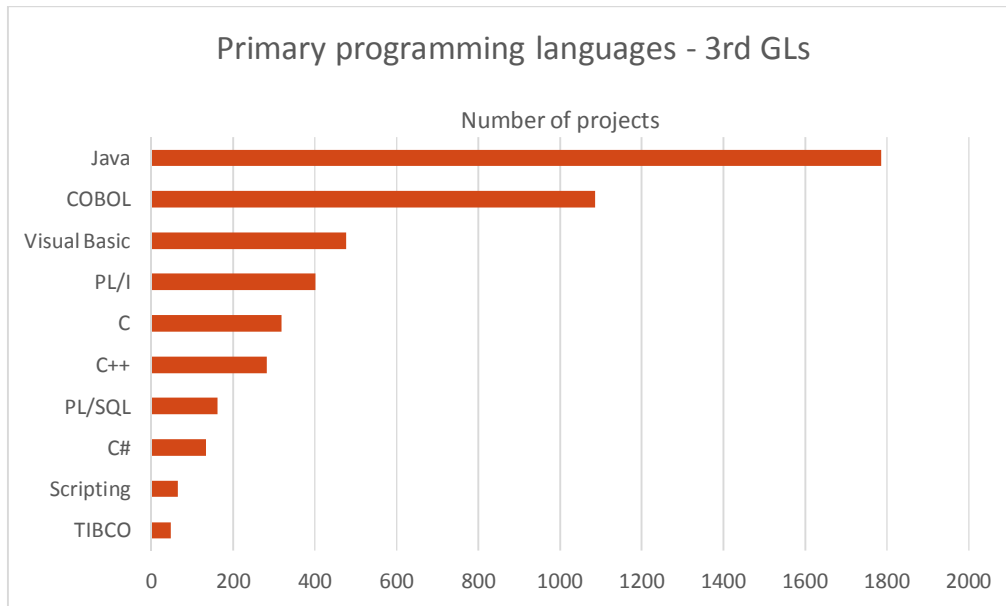


Figure 17 - Demographics primary programming languages 3rd generation languages

Demographics		
Primary programming languages	Projects	Percentage
3rd generation languages		
	N	%
Java	1786	37.5%
COBOL	1085	22.8%
Visual Basic	477	10.0%
PL/I	401	8.4%
C	318	6.7%
C++	283	5.9%
PL/SQL	162	3.4%
C#	135	2.8%
Scripting	65	1.4%
TIBCO	47	1.0%
Total	4759	100%

Table 17 - Demographics primary programming languages 3rd generation languages

Other 3rd generation languages in the Repository include JavaScript, Smalltalk, HTML, Ada, Pascal, Periphonics and FORTRAN.

Primary programming languages 4th generation languages

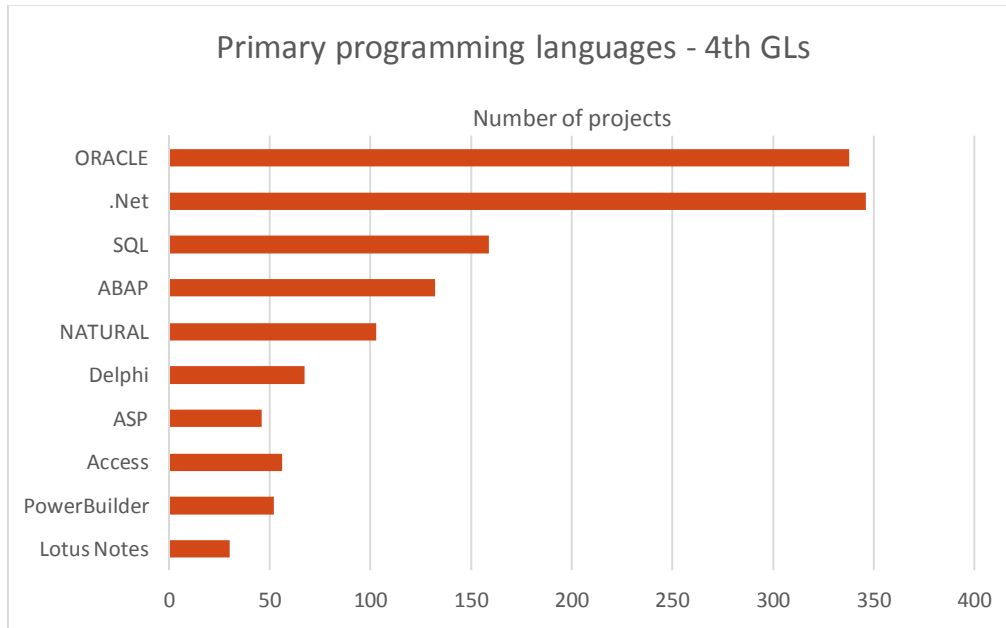


Figure 18 - Demographics primary programming languages 4th generation languages

Demographics		
Primary programming languages	Projects	Percentage
4th generation languages	N	%
ORACLE	338	25.4%
.Net	346	26.0%
SQL	159	12.0%
ABAP	132	9.9%
NATURAL	103	7.8%
Delphi	67	5.0%
ASP	46	3.5%
Access	56	4.2%
PowerBuilder	52	3.9%
Lotus Notes	30	2.3%
Total	1329	100%

Table 18 - Demographics primary programming languages 4th generation languages

Other 4GLs represented in the Repository include Easytrieve, CLIPPER, ColdFusion, Ingres, FOCUS, IDEAL, and RALLY.

Application generators

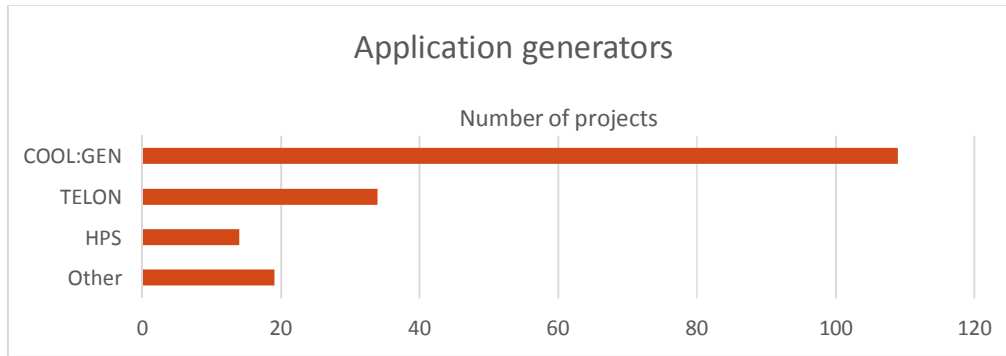


Figure 19 - Demographics application generators

Demographics		
Application generators	Projects	Percentage
Programming languages	N	%
COOL:GEN	109	61.9%
TELON	34	19.3%
HPS	14	8.0%
Other	19	10.8%
Total	176	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

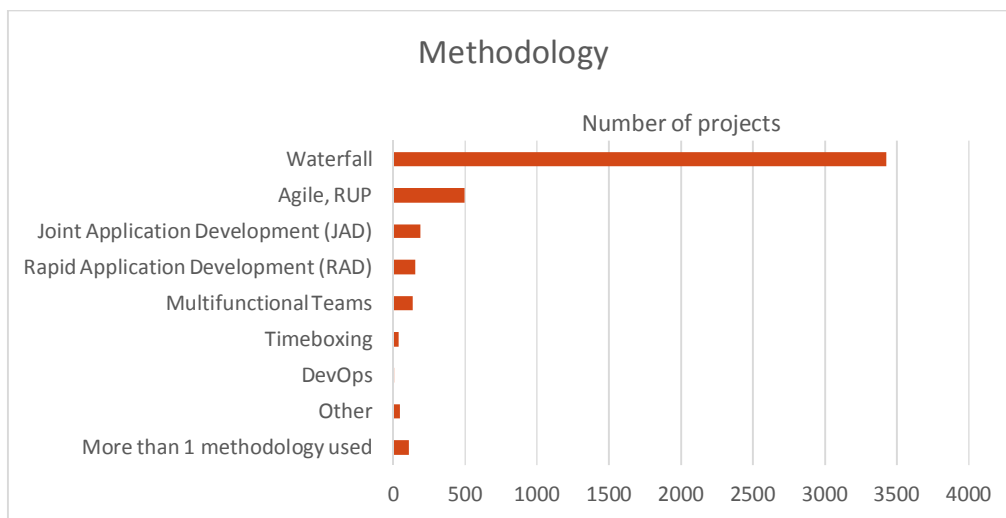


Figure 20 - Demographics methodology

Demographics		
Methodology	Projects	Percentage
Methodologies	N	%
Waterfall	3425	79.2%
Agile, RUP	495	11.4%
Joint Application Development (JAD)	190	4.4%
Rapid Application Development (RAD)	153	3.5%
Multifunctional Teams	137	3.2%
Timeboxing	39	0.9%
DevOps	5	0.1%
Other	49	1.1%
More than 1 methodology used	109	2.5%

Table 20 - Demographics methodology

Of the 190 JAD projects, 37 also mention RAD, 45 also mention multi-functional teams, and 11 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.

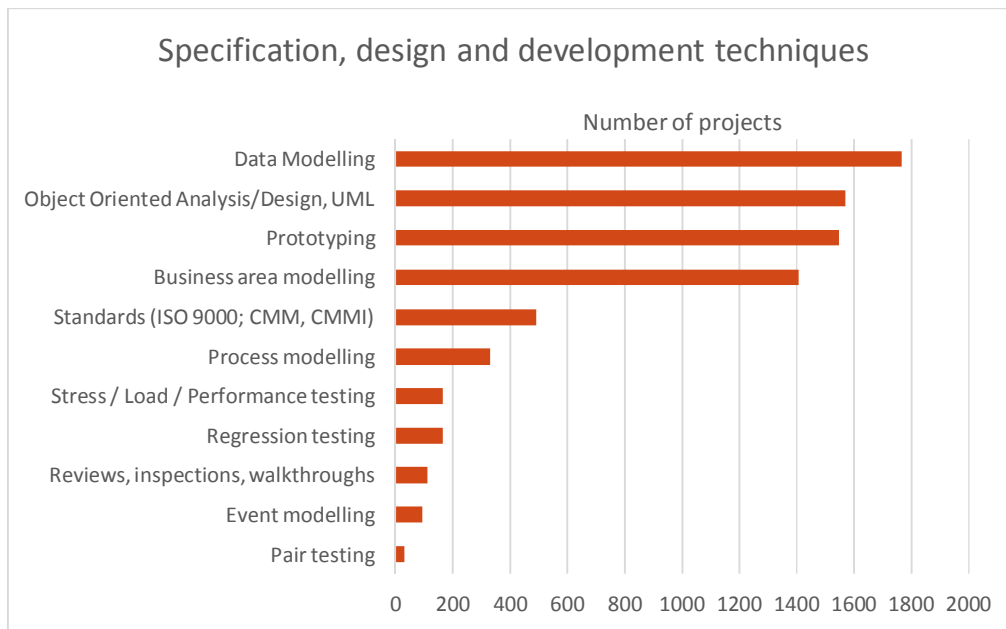


Figure 21 - Demographics specification, design and development

Demographics		
Specification, design and development techniques	Projects	Percentage
Techniques	N	%
Data Modelling	1767	75.1%
Object Oriented Analysis/Design, UML	1568	66.6%
Prototyping	1547	65.7%
Business area modelling	1408	59.8%
Standards (ISO 9000; CMM, CMMI)	492	20.9%
Process modelling	331	14.1%
Stress / Load / Performance testing	165	7.0%
Regression testing	164	7.0%
Reviews, inspections, walkthroughs	111	4.7%
Event modelling	92	3.9%
Pair testing	31	1.3%
More than 1 development technique used	1972	

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/>