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BlueOptima Global Benchmark Report

Key Trends in the Global Software development Industry

July to September 2023

Welcome to the BlueOptima Global Benchmark Report

Welcome to the BlueOptima Global Benchmark (BGB) Report which provides insights into key trends from across the software development industry.

This quarters key insights are:

- In the third quarter of 2023, global productivity increased by ~ 1.18%.
- Regionally productivity increase is predominately driven by India with an impressive rise of ~4.19%.
- Technology shows the greatest Productivity increase of any economic Sector of ~1.79%.
- Code quality has decreased slightly for the period (Q3 2023) globally.

The report provides a global view of the current trends of software development productivity. By consolidating the insights derived from analysis of source code changes delivered by hundreds of thousands of professional software developers working in enterprises located in more than 30 countries, the report provides a quantitative evaluation of their performance. This Report is published quarterly with each Report containing data from the preceding 12 months. The data is analysed using BlueOptima's Developer Analytics platform to calculate Coding Effort (CE), which sets a global standard for measuring software developer productivity. Coding Effort is a metric derived from objectively measuring a software developer's work outputs, specifically changes in static source code metrics, and the context within which that output was delivered then benchmarking that against all other developers.

Coding Effort is used by large global enterprises to compare the productivity of software engineers across technologies and software development methodologies to deliver actionable insights to optimise the software development lifecycle.

Alongside productivity, the maintainability of source code changes delivered by software developers are measured using BlueOptima's Analysis of Relative Thresholds (ART). Analysis of Relative Thresholds is an objective measure of source code maintainability obtained by using static source code metrics to evaluate how easy it is for a developer unfamiliar with the source code to deliver change into that source code. ART is described as 'quality' in this report. It is the proportion of Billable Coding Effort (BCE) hours spent delivering maintainable source code change.

The analysis within this report deliberately excludes part-time and hobbyist software developers.

For example, those contributing to open source projects, as the economic cost and impact of their participation in these projects are indirect and unclear. The data employed in this analysis represents an approximated 2% sampling of the global enterprise software developer population.

About BlueOptima

BlueOptima's analytics platform empowers software developers and their companies to create better software in the most time and cost-efficient way.

The first solution of its kind, BlueOptima provides insight based on the world's only objective software developer productivity metrics: Coding Effort. It's a breakthrough for software development.

BlueOptima's SaaS platform facilitates analysis of productivity, together with quality, in enterprise software development, in terms of individuals, teams, tasks, projects, divisions, and outsourced suppliers. Understanding variations in performance across an enterprise empowers managers to optimise efficiency. BlueOptima is proven to identify savings of up to 20% for software budgets.

BlueOptima's further offerings around benchmarking and recruiting allow organisations to cost-optimise as early as possible in software initiatives.

Find out more

For more information or to access other useful customer success stories, please contact:

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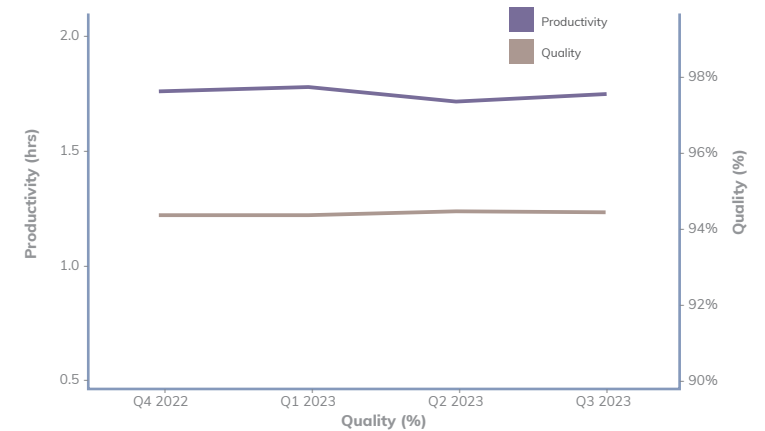
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Global Trends

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Global Breakdown

There is a signs of a return to productivity growth in this quarter in the BlueOptima Global Benchmark data. The increase in Q3 2023 compared to Q2 2023 is ~1.18 %. However, code maintainability has decreased slightly during the period.

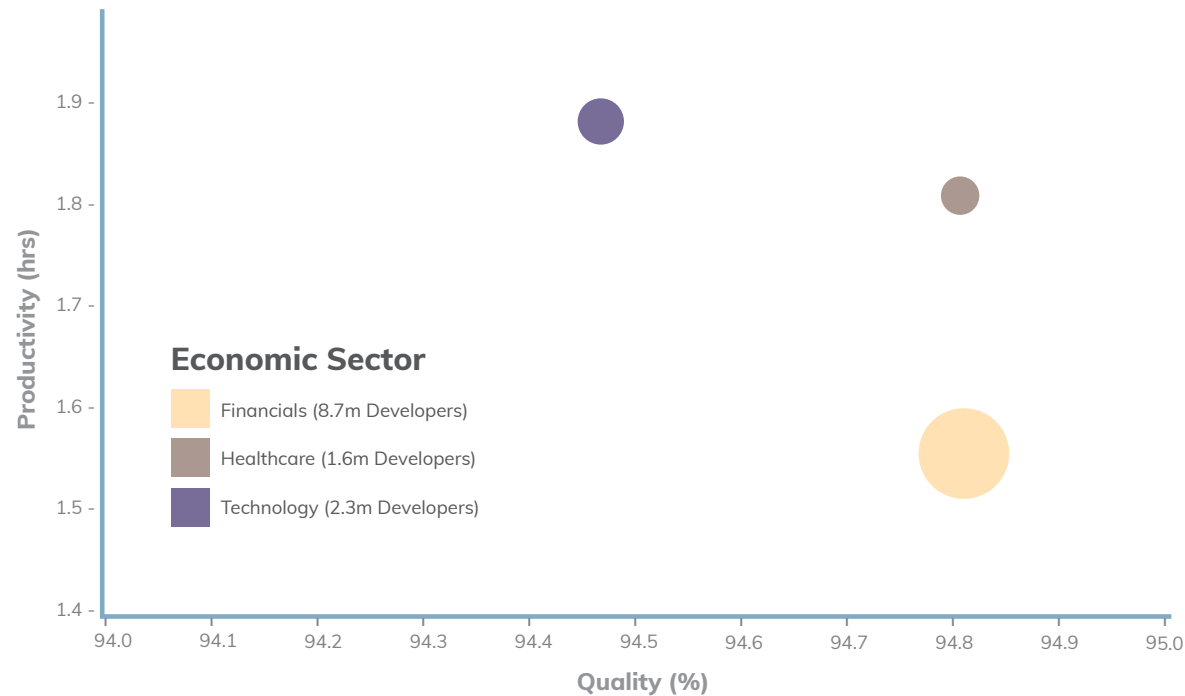|	Q4	Q1	Q2	Q3
	2022	2023	2023	2023
PRODUCTIVITY (BCE/DAY)*				
	1.74	**1.76**	1.70	1.72
QUALITY %				
	94.46	94.47	**94.57**	94.51

Developer Count: *18.6m*

*Billable Coding Effort (BCE)

Economic Sector Performance

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Sector Breakdown

Healthcare:

Q4	Q1	Q2	Q3
2022	2023		
PRODUCTIVITY (BCE/DAY)*			
1.79	1.82	**1.83**	1.81
QUALITY %			
95.14	94.87	94.81	94.95

Technology: *This sector remained the most productive and the only major economic sector that has increased productivity by ~1.79%. However, the Code Quality is the least maintainable and showed a decline.*

Q4	Q1	Q2	Q3
2022	2023		
PRODUCTIVITY (BCE/DAY)*			
1.79	**1.89**	1.85	1.88
QUALITY %			
94.29	94.29	**94.47**	94.34

Financials: *Financial remains the least productive major economic sector. The sector experienced the most significant drop from last quarter, losing ~1.52% in productivity.*

Q4	Q1	Q2	Q3
2022	2023		
PRODUCTIVITY (BCE/DAY)*			
1.71	1.69	1.58	1.56
QUALITY %			
94.75	**94.99**	94.81	94.67

*Billable Coding Effort (BCE)

Regional Performance

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Asia-Pacific Group

India: *With a ~4.19% surge in productivity, this region has displayed the greatest growth and is driving the global productivity increase.*

Q4	Q1	Q2	Q3
2022	2023		
PRODUCTIVITY (BCE/DAY)*			
1.69	1.74	1.70	**1.78**
QUALITY %			
93.86	93.88	93.96	**93.91**

Developer Count: 4.0m

Asia-Pacific Group (excl. India): *While still more productive than India this region has continued to decline in productivity and has a noticeable fall in Code Quality.*

Q4	Q1	Q2	Q3
2022	2023		
PRODUCTIVITY (BCE/DAY)*			
2.33	**2.34**	2.21	2.20
QUALITY %			
94.49	94.22	**95.05**	94.94

Developer Count: 4.3m

North America

North America Group: *This region had the greatest drop, ~2.81%, in Q3 2023 although interestingly Code Quality remaining consistent.*

Q4	Q1	Q2	Q3
2022	2023		
PRODUCTIVITY (BCE/DAY)*			
1.62	**1.69**	1.64	1.59
QUALITY %			
94.62	94.60	**94.66**	94.65

Developer Count: 4.6m

Billable Coding Effort (BCE)

Regional Performance

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Latin American & Caribbean Group

Latin American & Caribbean Group (GRULAC): *Similar to the North American Group, this region showed a drop in productivity of ~2.17%.*

Q4	Q1	Q2	Q3
2022	2023		
PRODUCTIVITY (BCE/DAY)*			
1.79	1.77	1.74	1.70
QUALITY %			
94.76	94.79	94.74	**94.80**

Developer Count: 1.9m

Europe

Western Europe Group: *This region continues the quarter-on-quarter decline in productivity seen for the past 3 quarters with a ~1.80% decline in Q3 2023.*

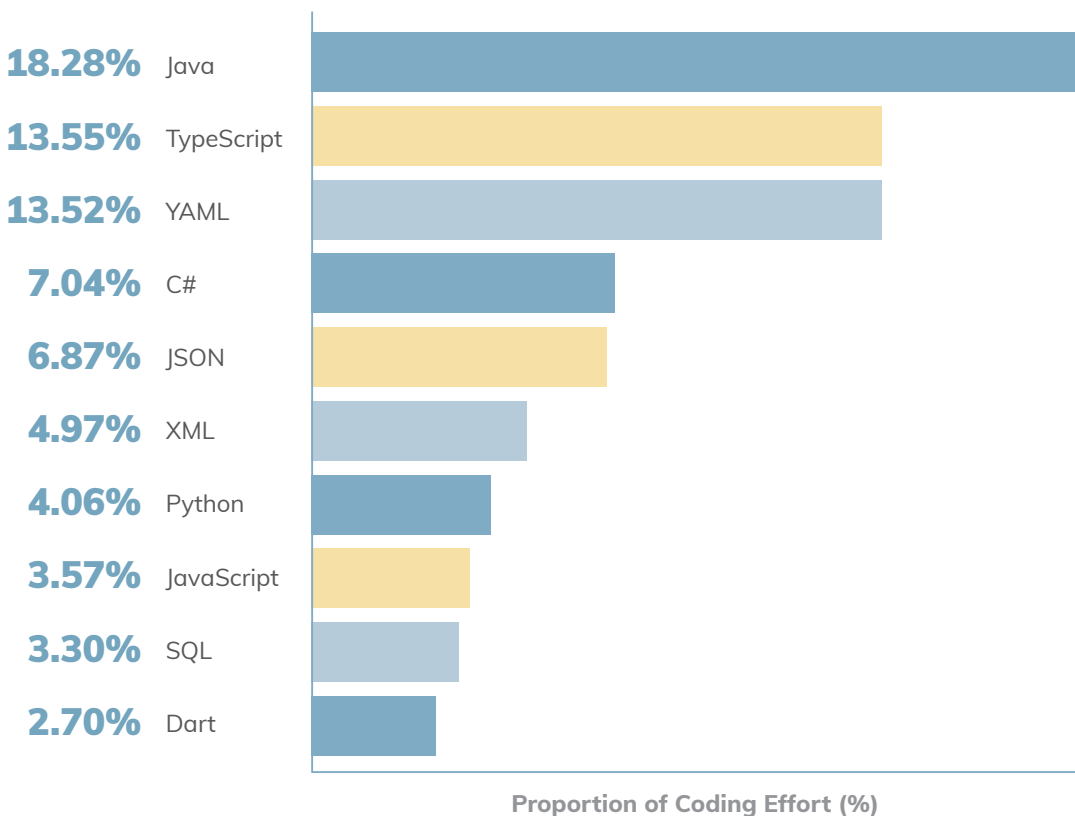| Q4	Q1	Q2	Q3
2022	2023		
PRODUCTIVITY (BCE/DAY)*			
1.85	1.81	1.71	1.68
QUALITY %			
94.63	**94.66**	94.59	**94.66**

Developer Count: 2.0m

Eastern Europe Group: *Following a major drop, the region is showing signs of growth again, maintaining the most sustainable code despite a ~0.12% dip in Code Quality this quarter.*

Q4	Q1	Q2	Q3
2022	2023		
PRODUCTIVITY (BCE/DAY)*			
1.90	**1.92**	1.80	1.81
QUALITY %			
95.25	95.08	95.21	95.09

Developer Count: 1.8m

Billable Coding Effort (BCE)

Top Enterprise Technologies

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18.28% Java

13.55% TypeScript

13.52% YAML

7.04% C#

6.87% JSON

4.97% XML

4.06% Python

3.57% JavaScript

3.30% SQL

2.70% Dart

Proportion of Coding Effort (%)

Breakdown

TypeScript has surpassed YAML to become the second most used language again, while Python cements its position at seventh most used language, overtaking JavaScript. Meanwhile, Java continues to hold its spot as the most used language.

LANGUAGE	Q4 2022	Q1 2023	Q2 2023	Q3 2023
	PROPORTION OF CODING EFFORT (%)			
Java	18.84	**18.87**	18.38	18.28
TypeScript	12.80	12.66	12.54	**13.55**
YAML	12.31	12.33	**13.90**	13.52
C#	**7.61**	7.47	7.14	7.04
JSON	6.38	7.00	**7.48**	6.87
XML	**6.22**	5.46	5.03	4.97
Python	3.83	4.01	3.95	**4.06**
JavaScript	3.83	**3.96**	3.87	3.57
SQL	**3.42**	**3.42**	**3.42**	3.30
Dart	2.61	**3.17**	2.59	2.70

Note: *Additional extensions mapped to TypeScript since the last report.*

*Billable Coding Effort (BCE)

About the Report's data

Proration Methodology Changes

BlueOptima has made significant improvements to our proration logic, particularly when handling infrequent committers or those with an extended break from the code base, this change considerably reduces the instance of underreported productivity due to extended absences from working with a codebase. In order to ensure the comparison between the two quarters is statistically justifiable the previous quarters data has been recalculated in this report so both quarters are using the same proration methodology and hence a comparison on productivity can be made.

Coding Effort

Coding Effort is calculated by statistically evaluating every source code change made by developers in terms of 36 static source code metrics measuring various aspects of Volume, Complexity, and Inter-relatedness while considering the context worked in e.g. a complex legacy software component or a brand new project.

Analysis of Relative Thresholds (ART)

ART is a measure of the quality (specifically: maintainability) of source code. It is calculated by evaluating the proportion of code which is aberrant, relative to the codebase in which it sits. Code is flagged as aberrant when it violates certain internally benchmarked statistical thresholds, across a number of static source code metrics.

BlueOptima Population Sample

This report leverages models and analysis built on the BlueOptima dataset which contains activities of over 400,000 developers and more than 126 Billion static metrics changes. Detailed location, employment, and organisational data is available for more than 32,000 based in India, 10,000 based in North America, 8,000 based in Western Europe, 4000 based in Eastern Europe, 4,000 based in the APAC region (excl. India & China), 3,000 based in China, and 2,000 based in Latin America and the Caribbean. The regions of Africa and the Middle East, which represent an estimated 6.8% of the global developer population, have been omitted from this analysis due to insufficient sample size. All data used is anonymised and aggregated.

Global Software Developer Population

BlueOptima uses a sampling technique in calculating the performance of software engineers across various geographical regions and industries globally. BlueOptima has estimated the global software developer population using a combination of accredited sources and predictive modelling.

The global population of software engineers across various geographical regions according to the BlueOptima Global Benchmark are 3,966,219 in India, 4,642,058 in North America, 1,834,578 in Eastern Europe, 1,962,108 in Western Europe, 4,317,893 in

the APAC region (excl. India), and 1,898,734 in Latin America and the Caribbean.

Estimates of the total number of developers per region are derived from the following sources using a process of harmonising the data sources and arriving at a best-estimate across all sources: IDC Worldwide Developer Census, Evans Data Global Developer Population and Demographic Study, Stack Overflow State of European Tech, Statista, and World Bank Open Data.

Business Classification

The classification of organisations into Economic Sectors, Industry Groups, and Industries is done using The Refinitiv Business Classification. Estimates of the numbers of enterprise software developers in Economic Sectors, Industry Groups, and Industries is done by measuring various proxies of software developers in a firm (e.g. annual revenue, profit, assets, and headcount of each organisation)

on a per industry basis and optimising estimation of this against the known developer population in a subset of the those organisations that are known to BlueOptima. Once this industry level estimate is arrived at, constituents of the Global 2000 are evaluated and their developer populations estimated. The relative proportions of developers in Economic Sectors are then applied on a pro rata basis to the global software developer population.

This analysis is provided as a source of information in good faith based on sound underlying data. However, BlueOptima accepts no liability for any actions taken in reliance on this analysis.

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Who are BlueOptima?

We provide a SaaS technology that objectively

measures software development efficiency. Our core metrics for productivity and code maintainability allow executives to make data driven decisions related to talent optimization, vendor management, location strategy and much more.

Contact Us

To discover powerful insights and determine areas of improvement specific to your organisation, reach out to our team and book a demo to explore our custom analytics solutions at:

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