



# PDF/SOLUTIONS™

*2023 PDF Solutions  
Analyst Day*

**Santa Clara Marriott** - 2700 Mission College  
Boulevard Santa Clara, California 95054 USA

## Financial Outlook

24<sup>th</sup> October 2023

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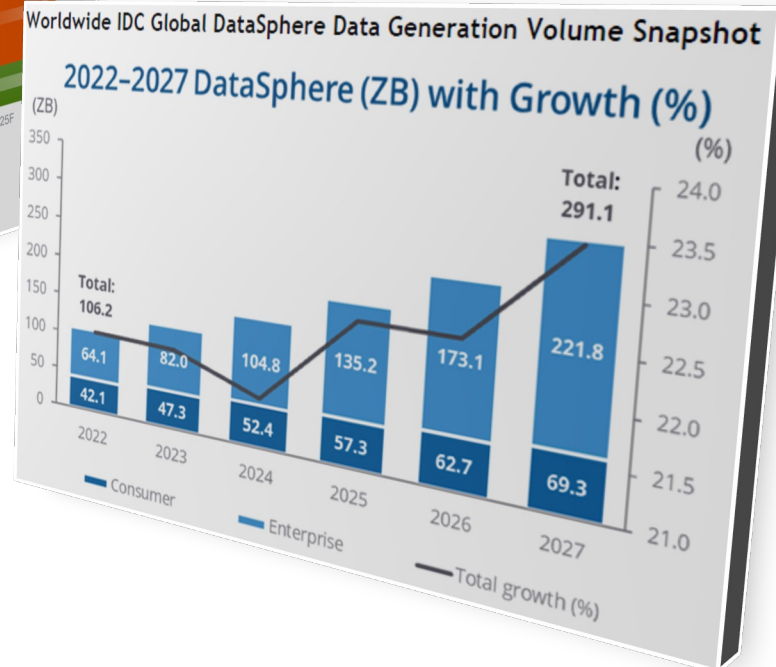
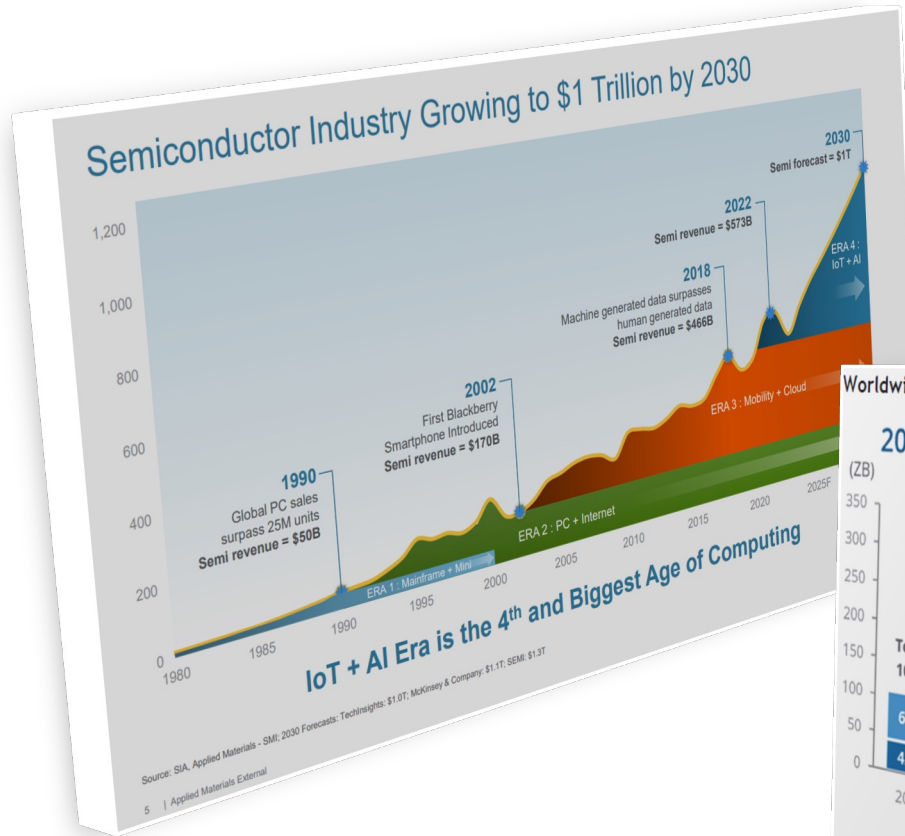
- **Industry Drivers and Overview of PDF Solutions**

- **Market Size and Opportunities**

- **PDF Progress Since Last Analyst Day**

- **Opportunities Ahead**

# Sustained, Long-Term Semi Growth



- AI is driving increasing data generation and data availability, which in turn is driving semiconductor revenue
- Driven by AI, semi revenue expected to reach \$1T+ by 2030

# Inflection Points To Semi Growth



<https://semiwiki.com/semiconductor-services/techinsights/316095-semicon-west-2022-and-the-imec-roadmap/>



<https://www.intel.com/content/dam/www/central-libraries/us/en/documents/2022-intel-investor-meeting-ifs.pdf>



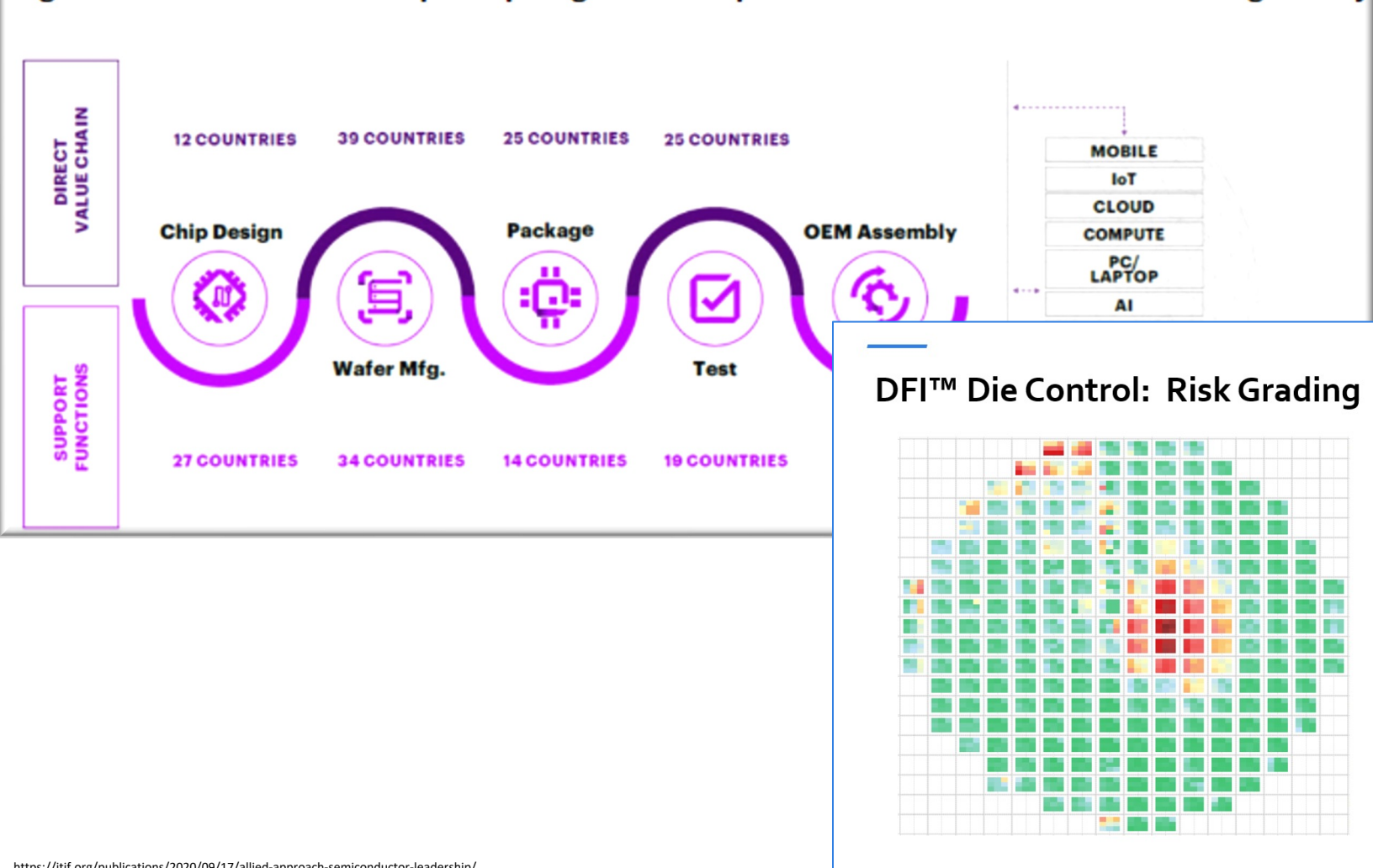
[https://www.semiconductors.org/wp-content/uploads/2022/02/Global-Semiconductor-Incentives\\_2-4-2022.pdf](https://www.semiconductors.org/wp-content/uploads/2022/02/Global-Semiconductor-Incentives_2-4-2022.pdf)

Achieving the necessary semi growth requires overcoming new inflection points

- New architectures & materials
- Chiplets
- Geographic disaggregation

# AI Enables Achieving Rapid Growth

Figure 9: Number of countries participating in various phases of semiconductor manufacturing activity



<https://itif.org/publications/2020/09/17/allied-approach-semiconductor-leadership/>

- AI adoption across the semiconductor supply chain is a key component to efficiently achieving semi growth
- Successful AI application requires:
  - Cross-supply chain data integration
  - The right data, not just more data
  - AI/ML model operations

# PDF's Vision & Mission Statements

## Vision

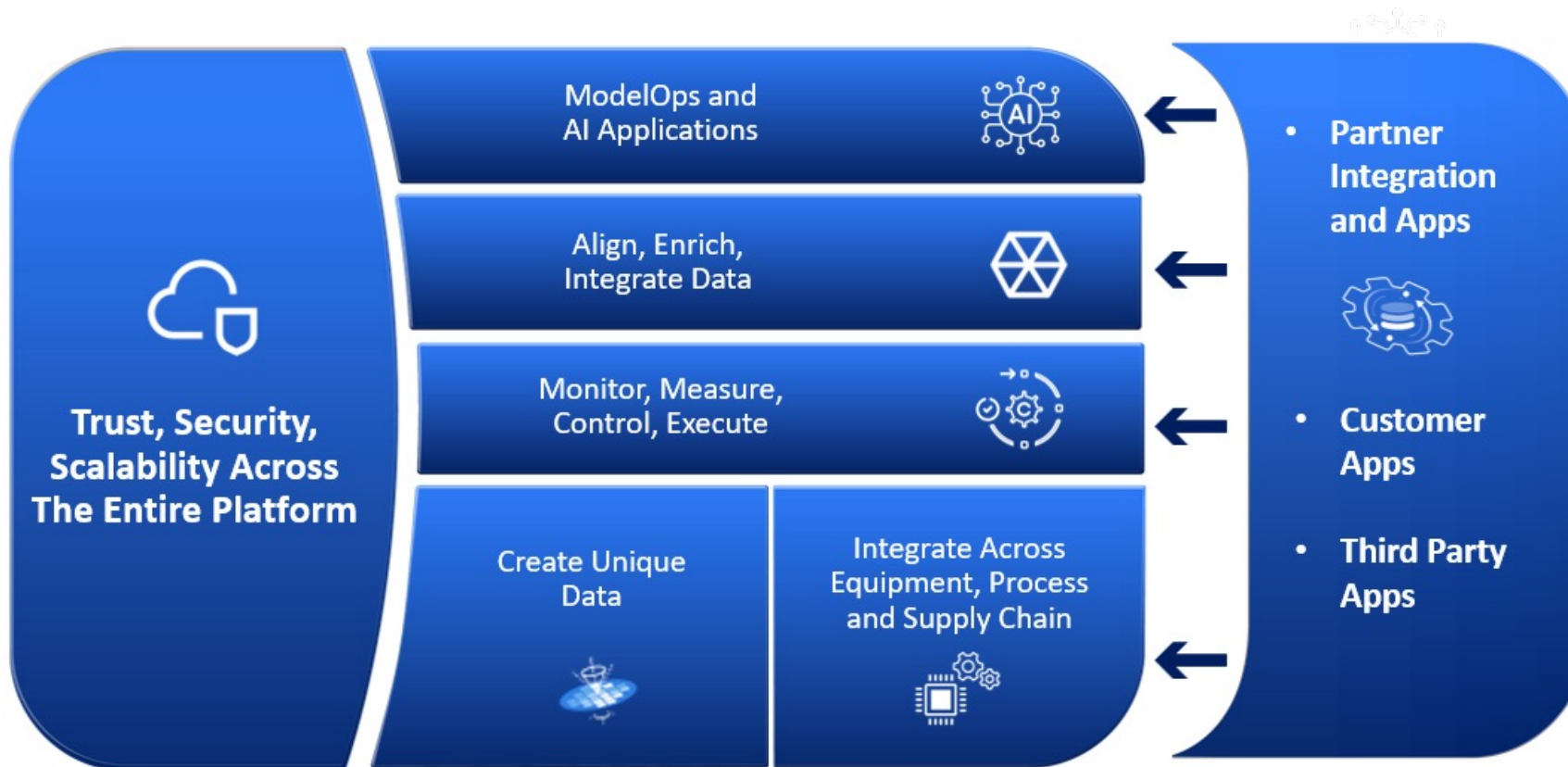
To be the world's leading data and analytics platform spanning the semiconductor and electronics ecosystems.

## Mission

Provide innovative solutions to create, access, and organize data to enable analysis and control for semiconductor and electronics companies to achieve better time-to-market, yields, quality, and operational efficiencies.

# PDF Solutions Integrated Platform For Semiconductor Analytics

Fully integrated solution to accelerate production ramp, improve overall yield and quality

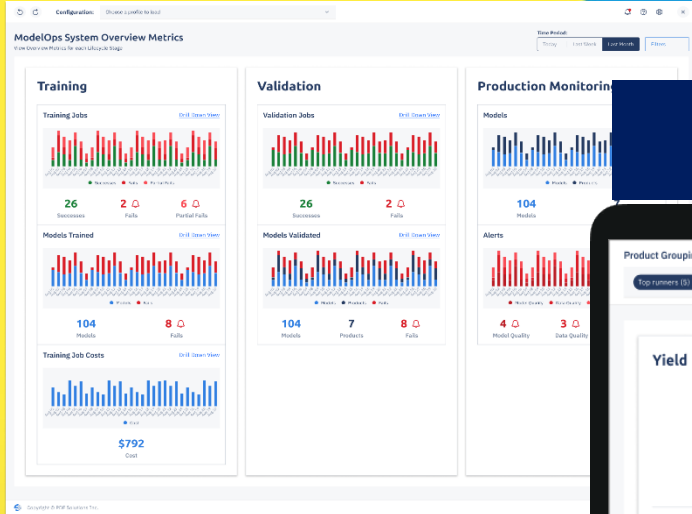


**Growth drivers benefiting from PDF platform include:**

- AI driven actionable insights
- New go-to-market paths via partnerships
- Transition to automotive electrification

# AI Is Transforming The PDF Platform Total Experience

## Model Ops



## Predictive Modeling Burn-in

name	products	target	type	job_id	status	CreateTime	owner	auc	r2	description
Test data 1 model	1	Bin_4	Classification - Bin	306	Idle	7/25/2023 7:12:14 PM	PDF Solu...	0.96		Test data 1

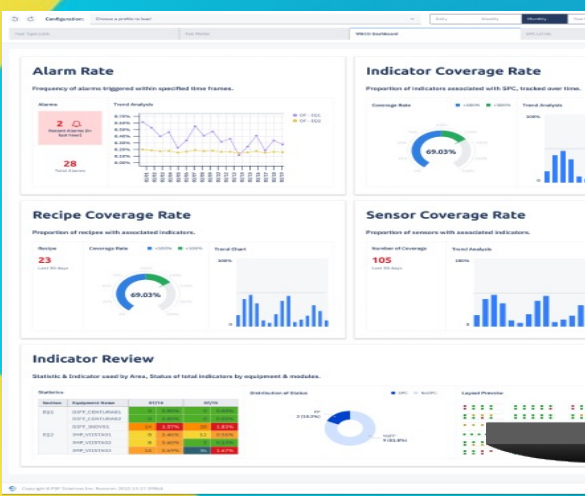
## Guided Analytics AIML

Program	Response	Yield Impact%	Analysis_type	Parameter	Issue	Conf	Stage
WS_PROG_TPISHAN_G_HB	Low	24.90	Univariate	GPN-NSA50/50_avg_pg8	>= 196.7	High	WS
WS_PROG_TPISHAN_G_HB	Low	24.90	Interaction	GPN-NSA50/50_avg_pg8/DVTP118/10...	>= 196.7 >= -0.8988	High	WS
WS_PROG_TPISHAN_G_HB	Low	24.90	Univariate	GPN-NSA50/50_avg_pg8	>= 196.7	High	WS
WS_PROG_TPISHAN_G_HB	Low	24.90	Interaction	GPN-NSA50/50_avg_pg8/DVTP118/10...	>= 196.7 >= -0.8988	High	WS
WS_PROG_TPISHAN_G_HB	Excursion	14.19	Univariate	Equipment4_pg31	Inc LB3.LB5	Med	FT
WS_PROG_TPISHAN_G_HB	Excursion	14.19	Interaction	Equipment4_pg31/Measuring Equipment...	Inc LB3.LB5Inc Tester4.Tester5	Med	FT
WS_PROG_TPISHAN_G_HB	Excursion	14.19	Univariate	Equipment4_pg36	Inc LB3.LB5	Med	FT
WS_PROG_TPISHAN_G_HB	Excursion	14.19	Interaction	Equipment4_pg36/Measuring Equipment...	Inc LB3.LB5Inc Tester4.Tester5	Med	FT
WS_PROG_TPISHAN_G_HB	Excursion	7.31	Univariate	PEQUIP_pg4	Inc Prober1.Prober4	Med	WS
WS_PROG_TPISHAN_G_HB	Excursion	7.31	Interaction	PEQUIP_pg4/LVTP030/10_avg_pg7	Inc Prober1.Prober4 >= -0.6571	Med	WS
WS_PROG_TPISHAN_G_HB	Excursion	7.31	Univariate	PEQUIP_pg15	Inc Prober1.Prober4	Med	WS
WS_PROG_TPISHAN_G_HB	Excursion	7.31	Interaction	PEQUIP_pg15/LVTP030/10_avg_pg7	Inc Prober1.Prober4 >= -0.6571	Med	WS
WS_PROG_TPISHAN_G_HB	Excursion	7.19	Univariate	PEQUIP_pg4	Inc Prober1.Prober4	Med	WS
WS_PROG_TPISHAN_G_HB	Excursion	7.19	Interaction	PEQUIP_pg4/SHORT_WMO20_avg_pg7	Inc Prober1.Prober4 >= -128.4	High	WS
WS_PROG_TPISHAN_G_HB	Excursion	7.19	Univariate	PEQUIP_pg15	Inc Prober1.Prober4	High	WS
WS_PROG_TPISHAN_G_HB	Excursion	7.19	Interaction	PEQUIP_pg15/SHORT_WMO20_avg_pg7	Inc Prober1.Prober4 >= -128.4	High	WS
WS_PROG_TPISHAN_G_HB	Excursion	7.08	Univariate	Equipment4_pg28	Inc LB2.LB4	Med	FT

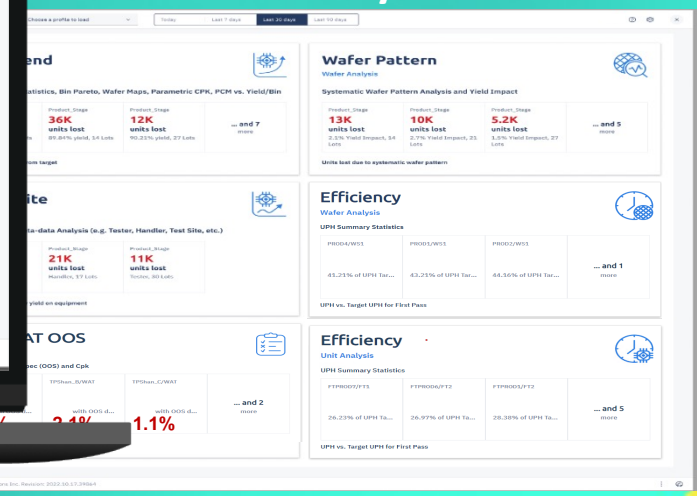
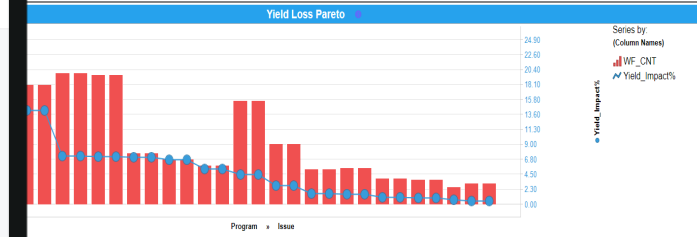
## Total Experience Transformation



## Next Gen FDC

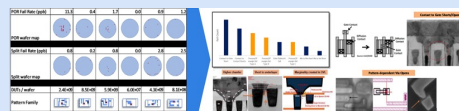


## Guided Analytics



# PDF Partnerships Connect The Industry

## EDA



- Exensio® Fab, Test, Assy, data integration with Test Pattern layout & design for comprehensive E2E analytics

## Cloud Analytics



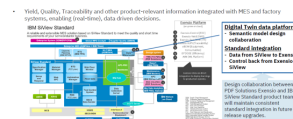
- Cloud platform analytics partner for Semiconductor supply chain solutions – over 78 products cloud ready

## Product Health



- Collaboration with pT agents and monitors integrated with Exensio® MA. Empowering Product Engineers for Rapid Diagnosis of Chip Product Health

## MES



- The best combination of MES in the Industry - Integrated offering with Exensio® yield, quality, traceability & SiView

## ERP & Supply Chain



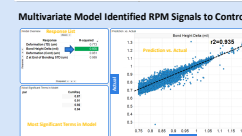
- Enterprise Resource Planning - Links business & supply chain data with E2E data for automation/analysis of quality & cost

## Test (OEM) Strategic Partner



- Joint development & sale of technology solutions based on Advantest test platforms & PDF Solutions' Exensio®

## Assembly (OEM) Collaboration



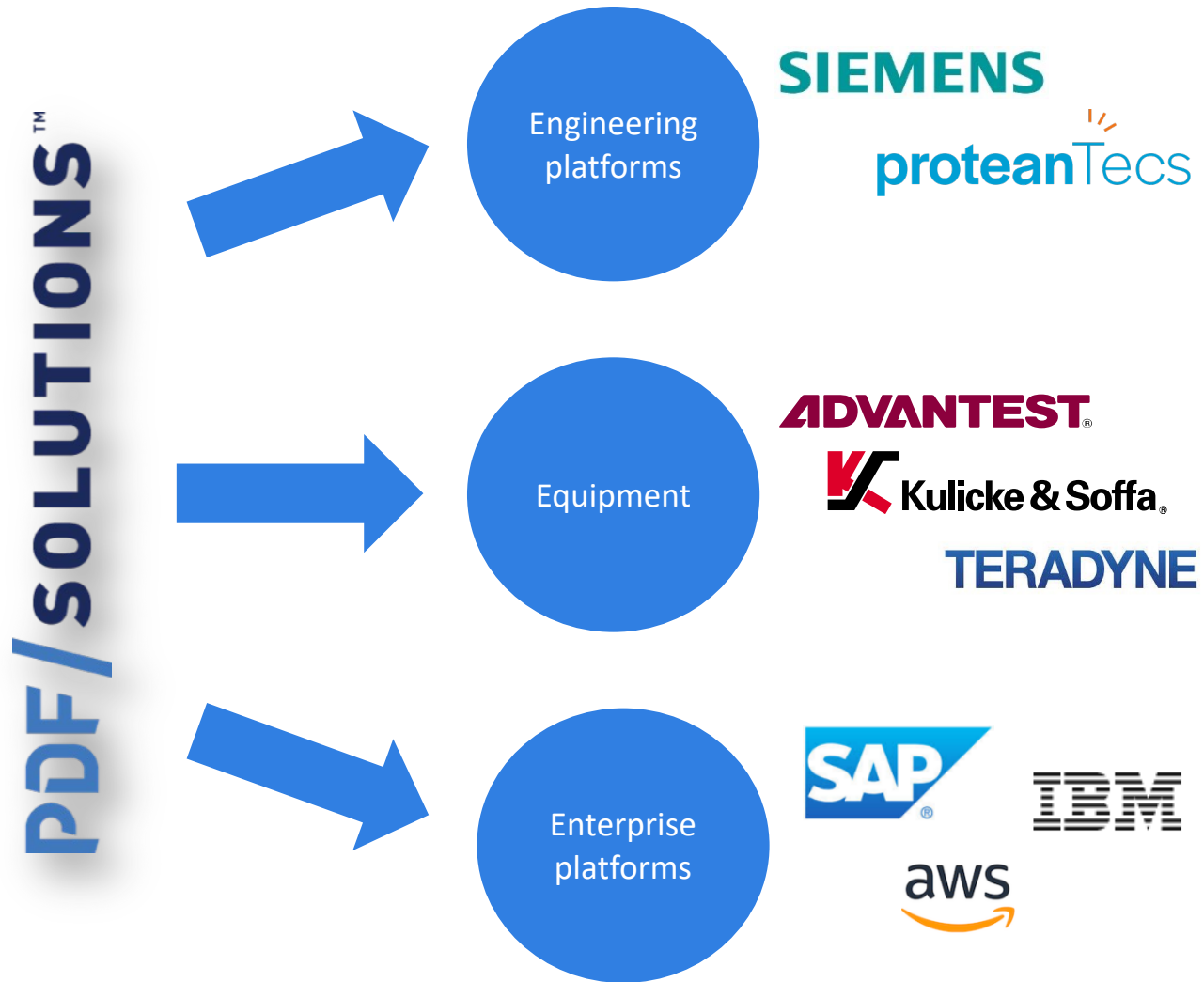
- Collaboration of assembly by K&S' RPM™ with artificial intelligence (AI) and machine learning (ML) capabilities from PDF Solutions' Exensio® platform

## Testing & Analytics



- Collaboration of Teradyne Archimedes analytics solution with secure, scalable, configurable analytics and AI capabilities from PDF Solutions' Exensio® platform

# Strategic Partnership Benefits For PDF



- Enables new PDF products and increases value from PDF platform
- Expands go-to-market via partner sales channels
- Extends PDF to multiple buyer cohorts within customer base

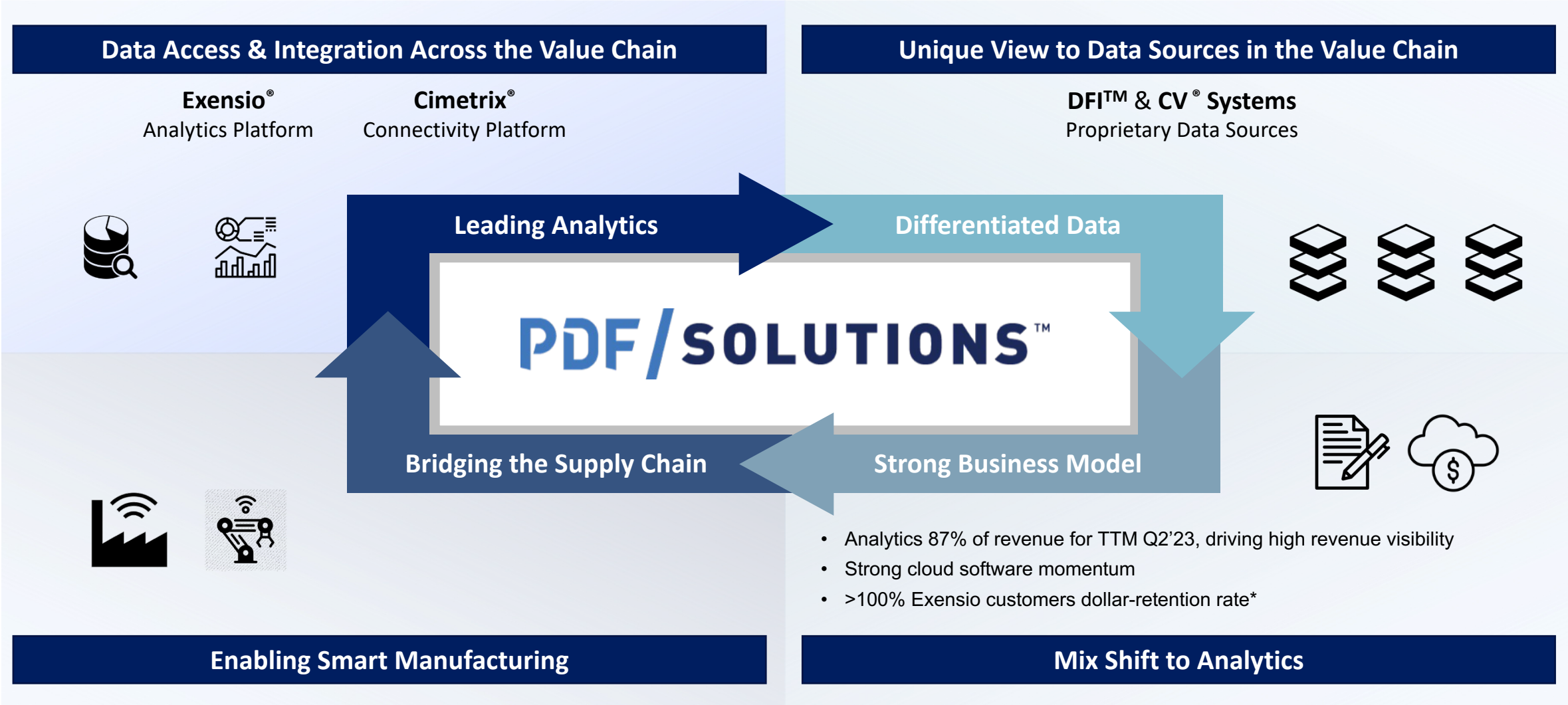
# Automotive Electrification Growth Drivers For PDF



- Unified analytics platform for quality, reliability and traceability
- Silicon carbide (SiC) fabs ramp and production control
- Battery factories production yield and reliability

Image credit "Bing Image Creator"

# PDF Solutions Integrated Data Platform



\*TTM Q2'23 vs TTM Q2'22

# The Opportunity For PDF Is Expanding



Representative industry participants; not indicative of actual customers. Logos are the property of the respective trademark owners.

## Established strong presence:

- >125k equipment factory connections with over >40k process tools
- >350 revenue generating customers in 32 countries through TTM Q2'23

## Strong product suite:

- #1 commercial solution for manufacturing yield and control with large cloud customer base
- Fastest growing commercial provider in manufacturing test operations leveraging DEX network
- Leading solution for die traceability through the supply chain

## Expansion opportunities increasing:

- Strong position within equipment, IP, Factory and Product companies, while expanding to additional Product and System companies



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- **Industry Drivers and Overview of PDF Solutions**

- **Market Size and Opportunities**

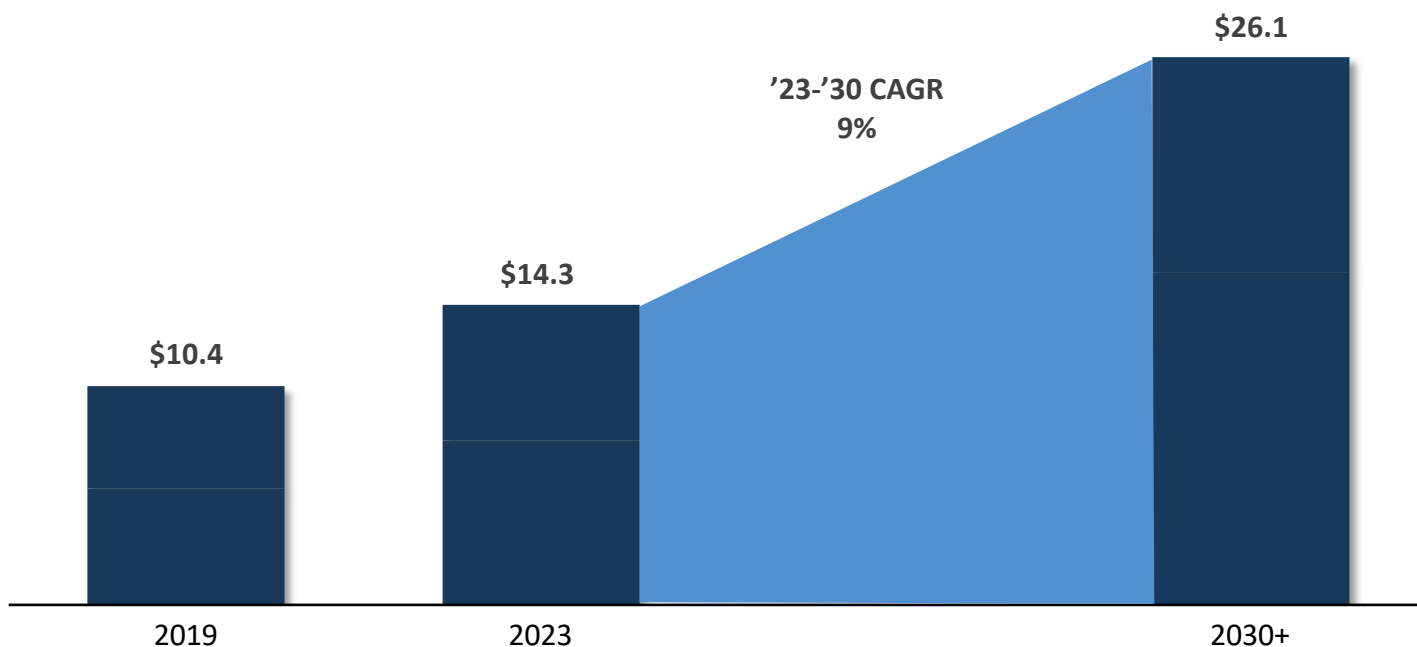
- **PDF Progress Since Last Analyst Day**

- **Opportunities Ahead**

# Total Semiconductor Analytics TAM

## Potential value capture of analytics in Semiconductors

(\$ in billions)

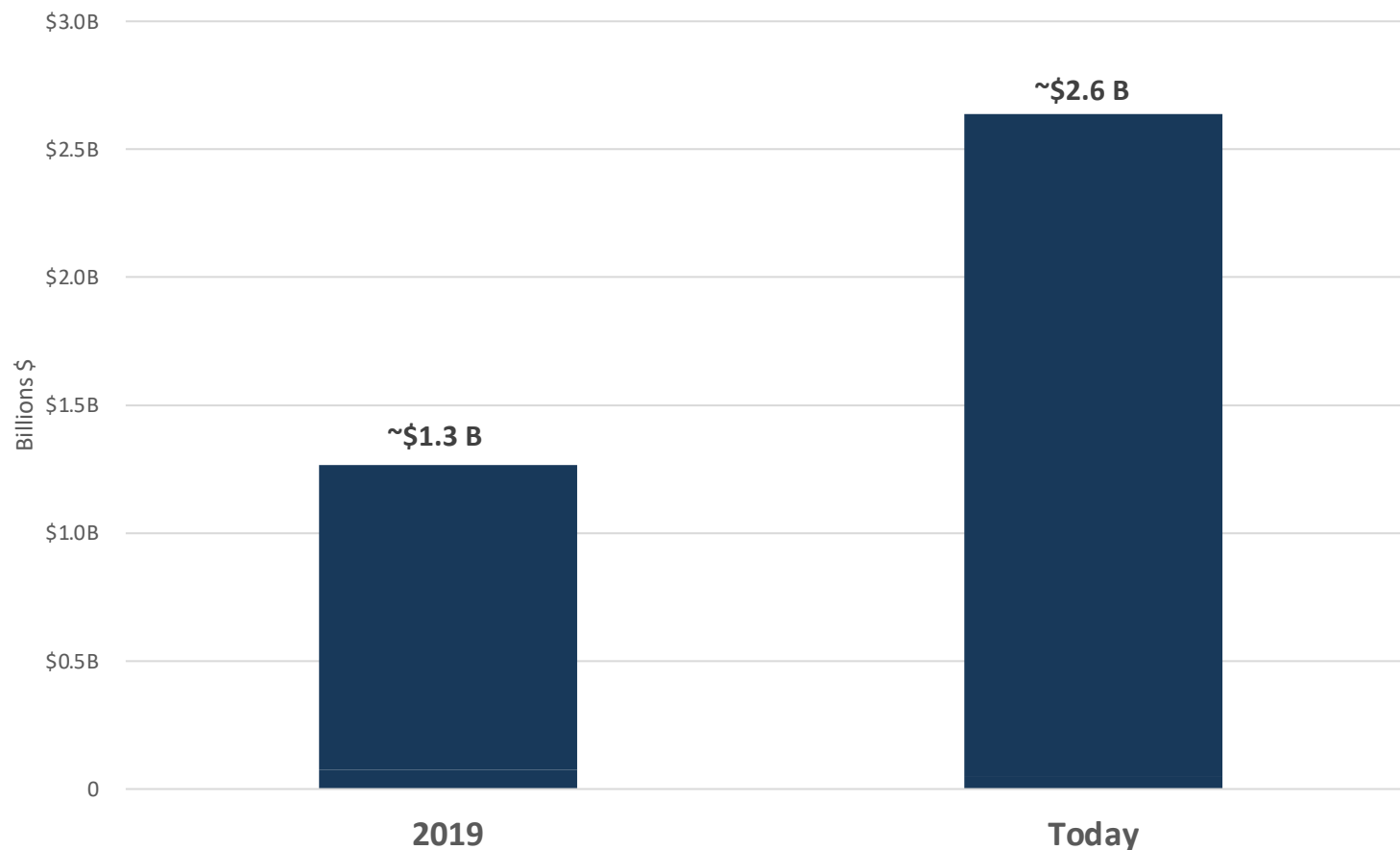


## Methodology

- Analytics as a portion of total R&D and COGS spending by Semiconductor Companies across three categories:
  - Fabless-Logic
  - IDM
  - Memory/Storage
- Estimated % of spending attributable to analytics based on each company type – Fabless-Logic, IDM, Memory/Storage
- Based on FactSet consensus spending estimates for 2023 for individual companies and industry experts projecting a \$1T market for semiconductor revenue by 2030+


Source: FactSet and Wall Street estimates.

# Market Opportunity – PDF SAM



Source: PDF Solutions estimates

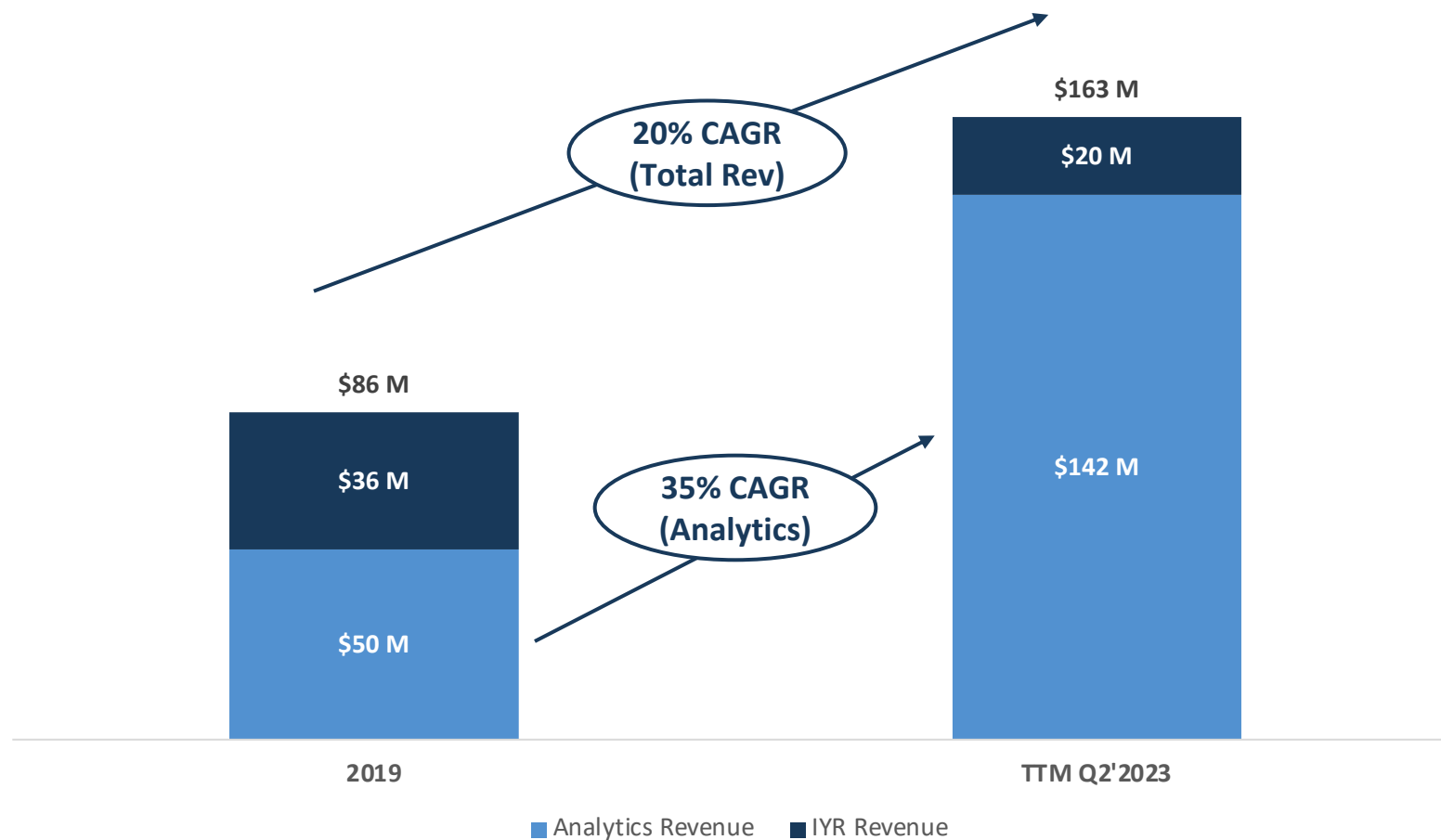
- Today, market size is **2.0x vs. 2019**
- PDF total revenue is up **1.9x TTM Q2'23 vs. 2019**
- Analytics revenue is up **2.8x TTM Q2'23 vs. 2019**
- **Growth drivers:**
  - Adoption across supply chain
  - ML & advanced solutions
  - DFI for quality & reliability
  - Transition to cloud

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# PDF Solutions – Overview Of Revenue Sources

Revenue Categories	Revenue Source	Description	Type
Analytics	Exensio Analytics	Big Data Analytics Platform	Perpetual Software (on premise)
			Term-Based License Software and Hardware (on premise)
			SaaS (cloud)
	Differentiated Data	IP-based inline and end of line yield metrology solutions	Term-Based License
	Cimetrix Connectivity	Equipment Communications & Interface Protocols	Perpetual Software
Integrated Yield Ramp	Fixed Fee	Software, IP and Service	Service and Time-Based Software & Hardware
	Variable Fee / Gainshare		Royalty Payment

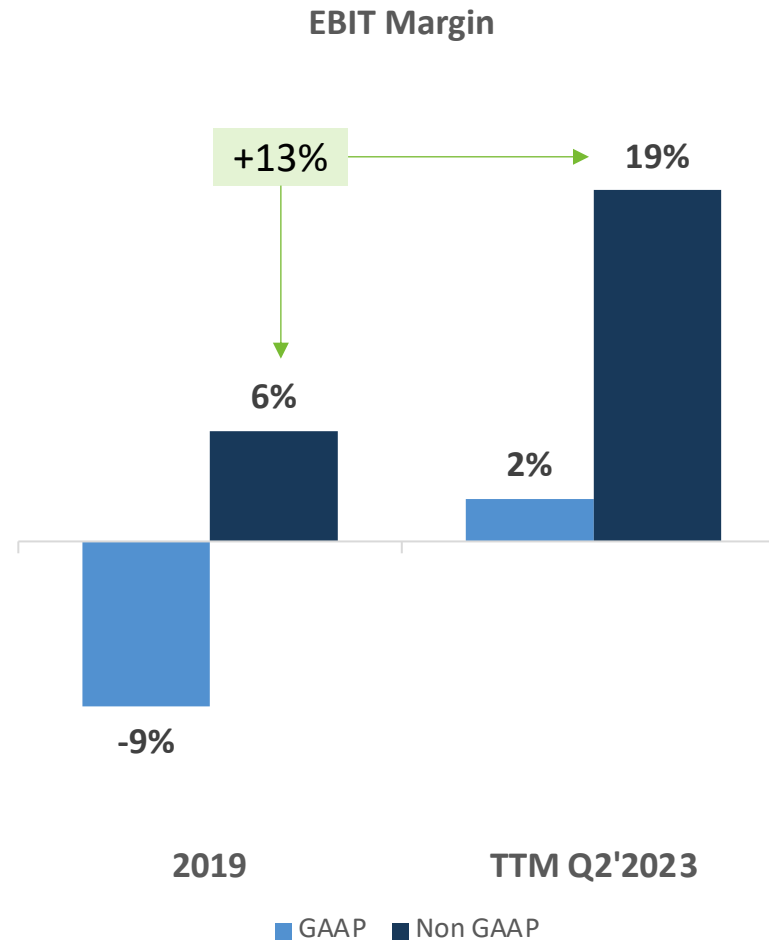
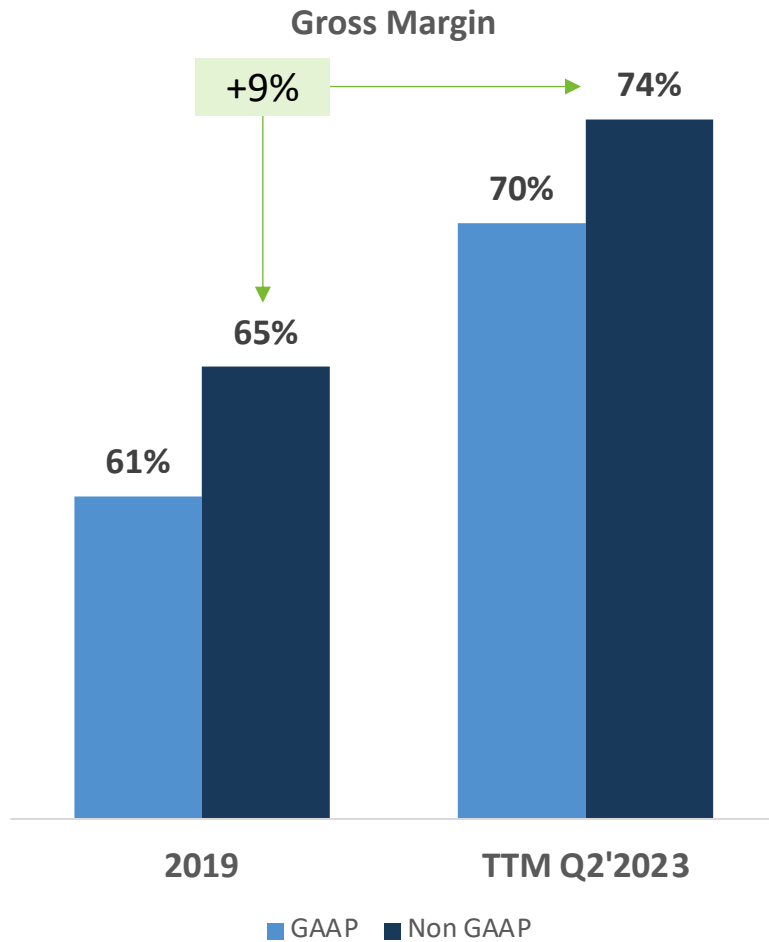
# Revenue – Demonstrating Continued Shift To Analytics



Source: PDF Solutions Management

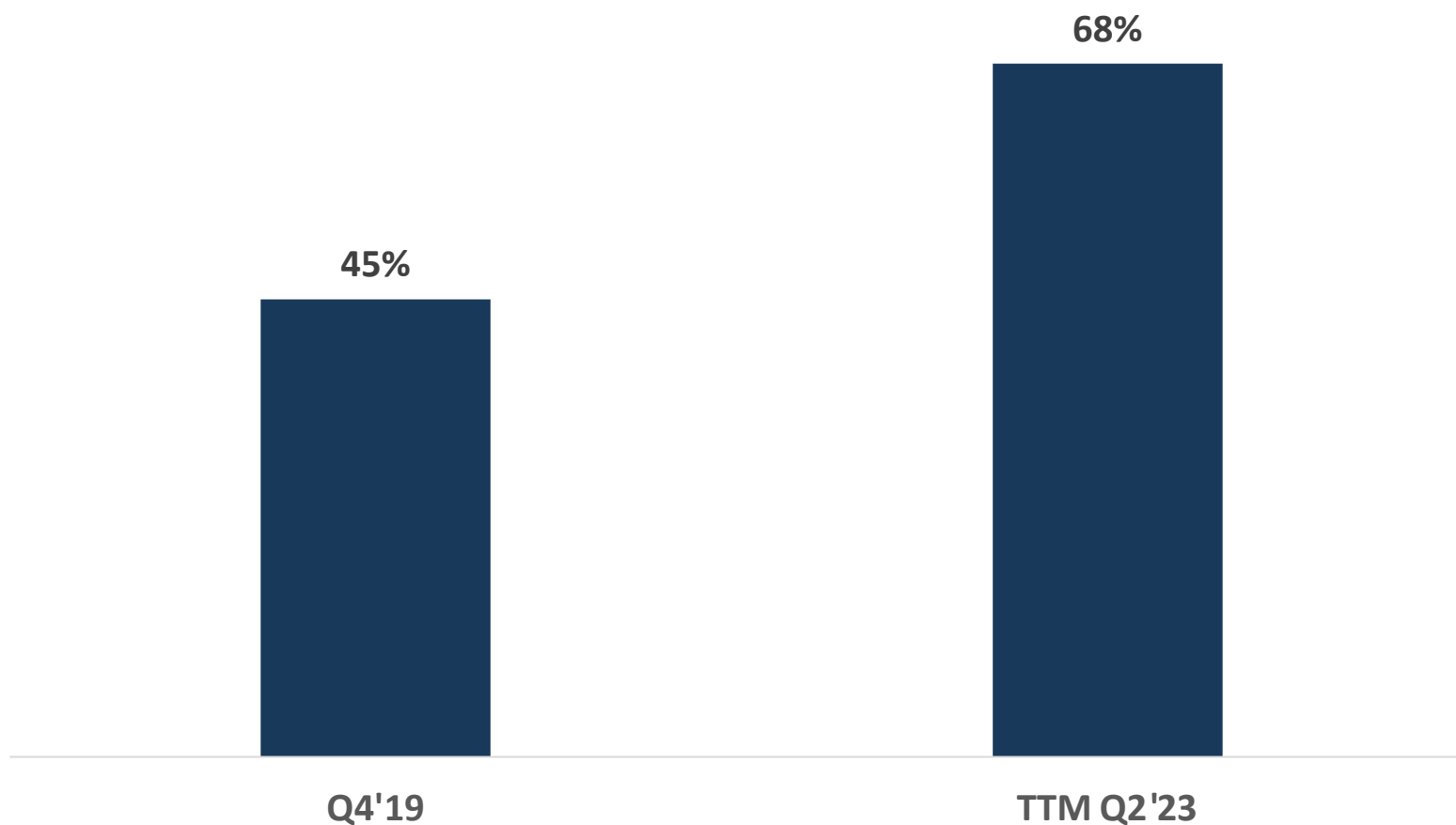
- **Strong revenue growth driven by:**
  - Conversion of pilot programs
  - Move to cloud
  - Increasing number of multiple module customers
  - Shift to subscription
- **Analytics Revenue now 87% vs. 58%**
  - TTM Q2'23 vs. 2019

# Strong Margin Progression Over Time



- **Continued focus on revenue growth and cost optimization strategies**
  - Non-GAAP Margins up 9% (Gross) and 13% (EBIT)
- **Compared to long-term model communicated in 2019, exceeding Gross Margin target and approaching EBIT margin target**

# Recurring Revenue Contribution To Analytics Revenue

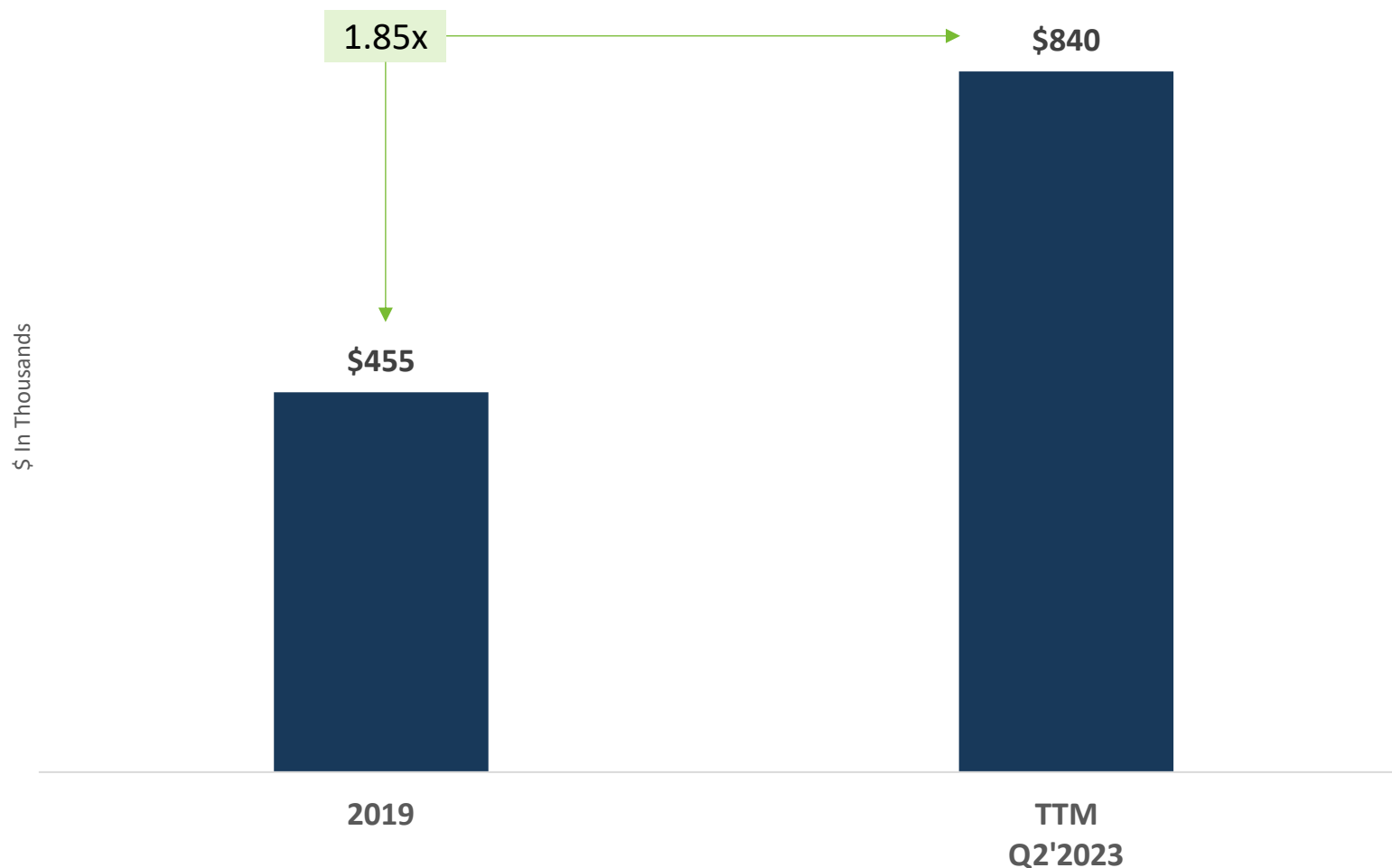


Source: Recurring revenue includes Cloud, non-upfront portion of TBLs, M&S, and longer-term enterprise contracts

- Recurring Analytics revenue has expanded to nearly 70% based on the growth of SaaS, TBL and ratable solutions
- Perpetual, TBL upfront (e.g., ASC 606), and services, continues to grow and contribute to the balance of Analytics revenue

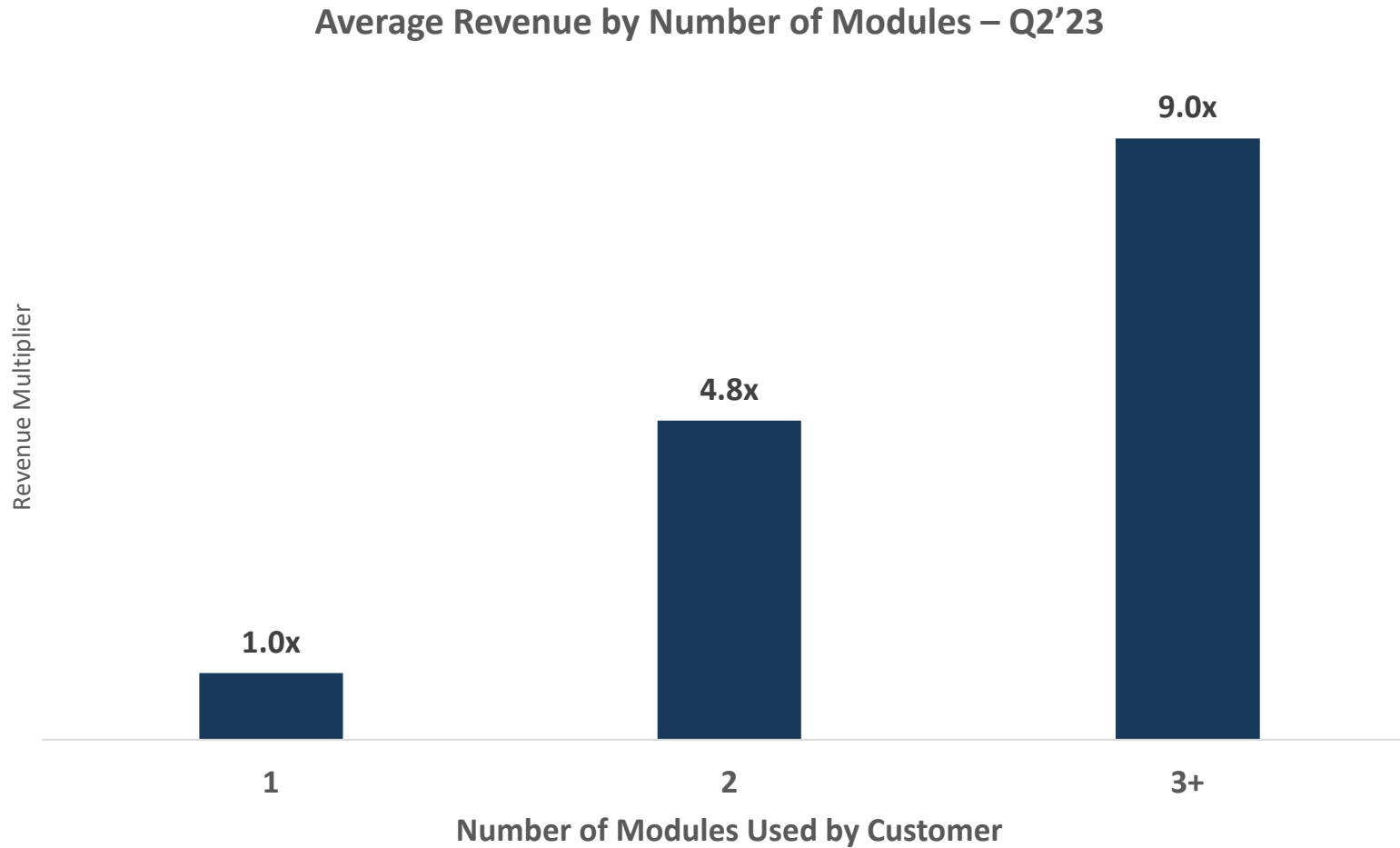
# Growing Analytics Revenue Per Customer

(Excluding CCG)



- **Average Analytics revenue per customer, excluding Cimetrix, of \$840K in TTM Q2'23 – up 1.85x vs 2019**
- **Drivers include:**
  - Transition to Cloud
  - Ratable solutions
  - Multi-element deals

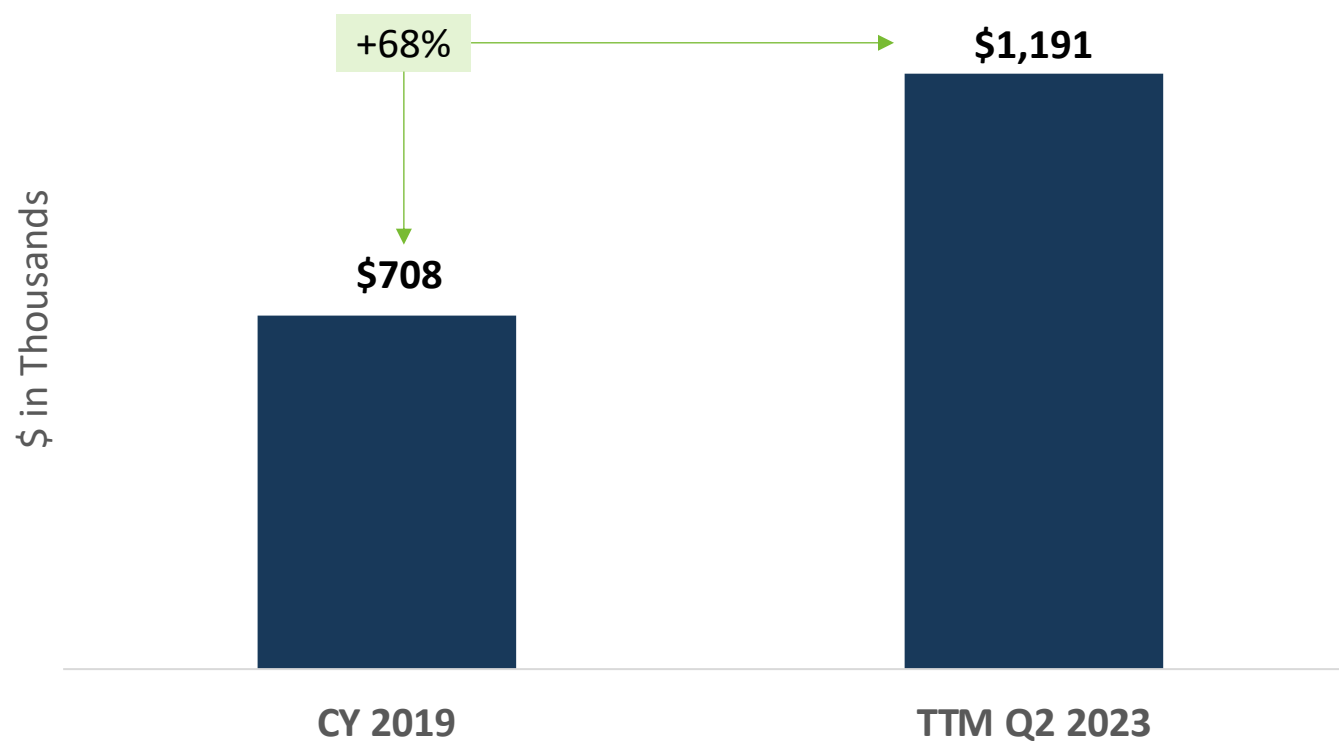
# Wallet Share Expands With Increased Exensio Module Count



- **Multi-module adoption by Exensio customers greatly increases wallet share**
- **Exensio Modules include:**
  - Manufacturing Analytics
  - Process Control
  - Test Operations
  - Assembly Operations

# Exensio Multi-Module Customer Spend Has Grown

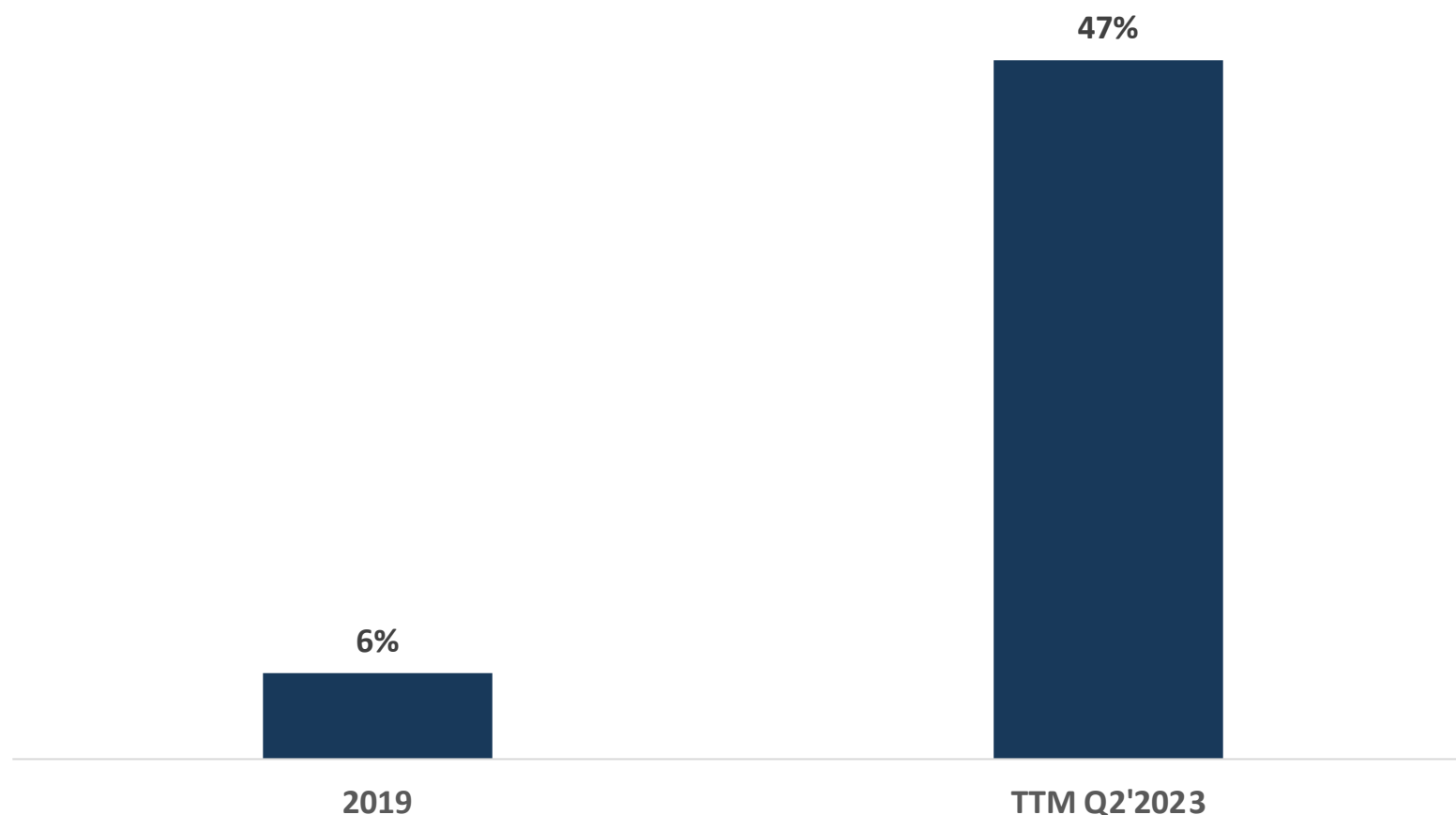
Sum of the Quarterly Average of Multi-Module Customer Revenue



- Over 20% of Exensio module customers utilize 2 or more Exensio modules
- PDF has grown revenues from multi-module contracts as customers buy more of our platform

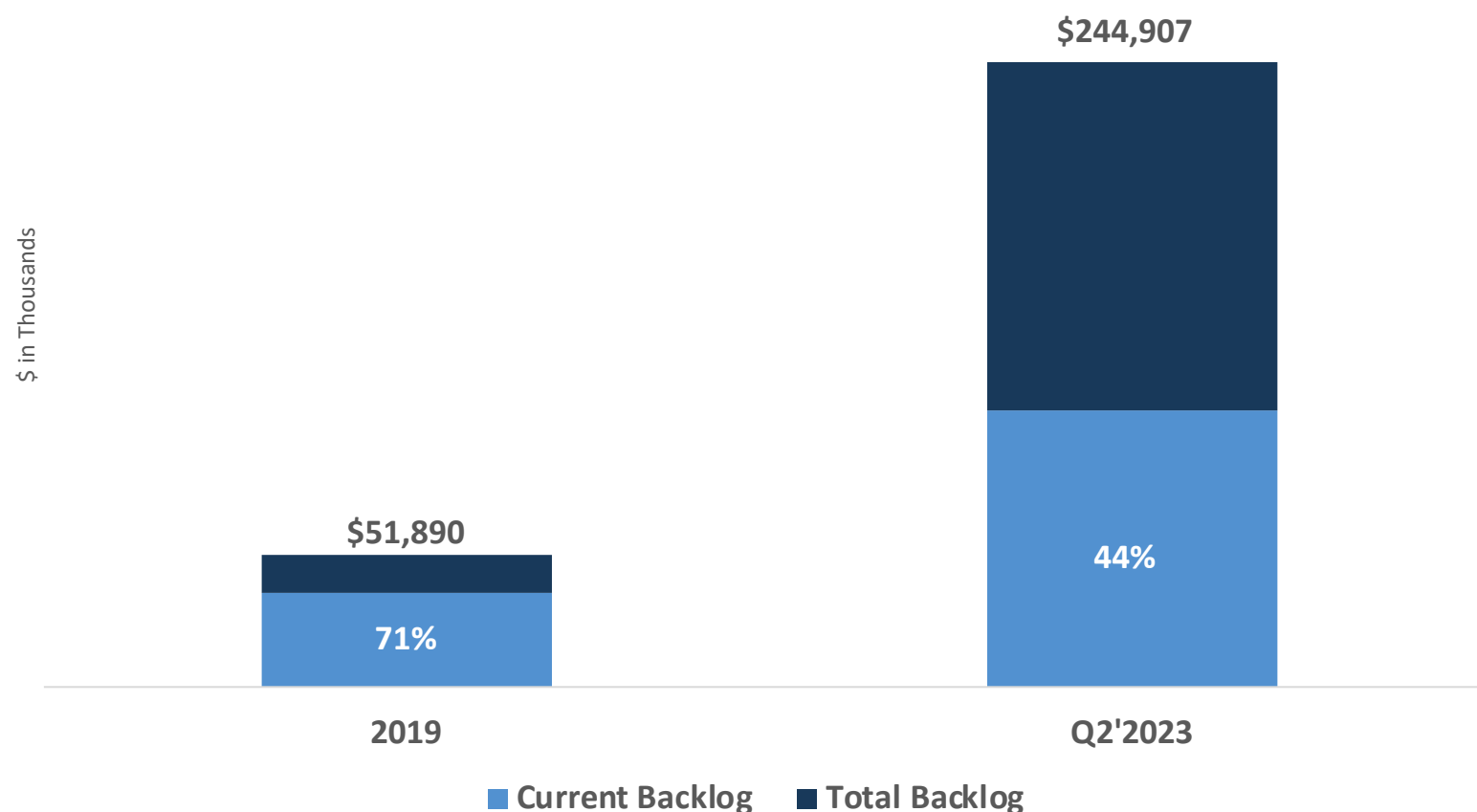
# PDF Has Scaled Revenues And Has Increased Profit Margins

YoY TTM Revenue Growth + LTM Non-GAAP EBIT



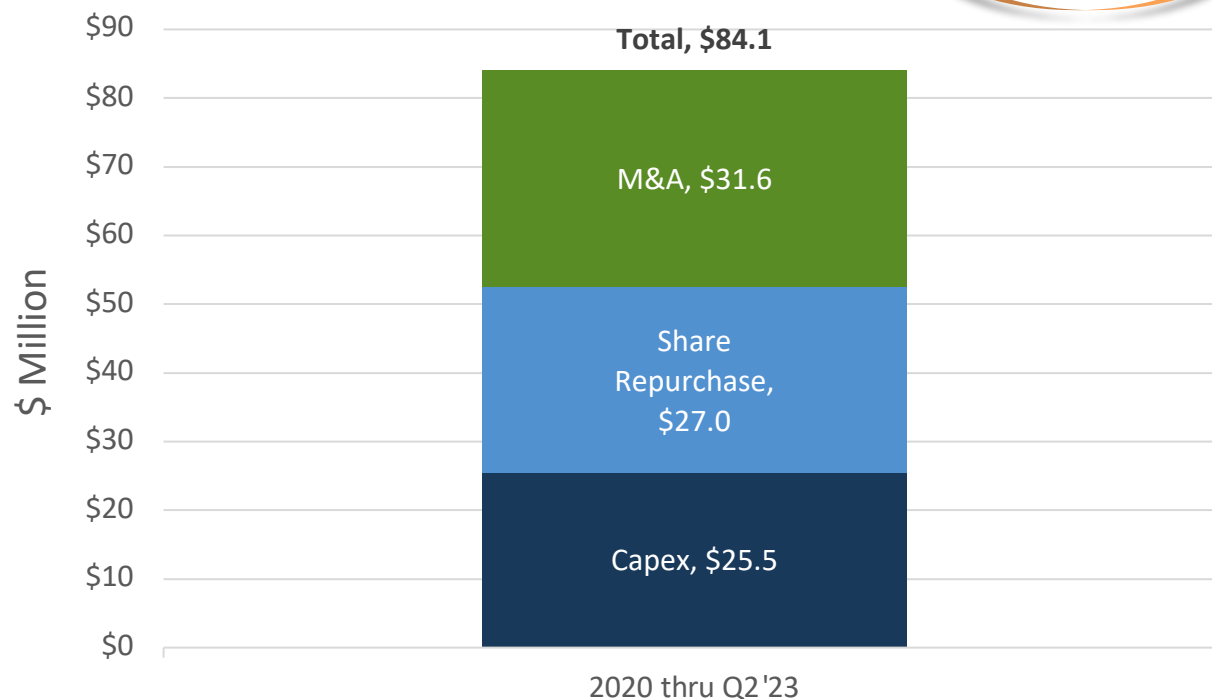
- Enterprise nature and cross selling of products allows us to both scale revenue and increase profitability
- Over the longer-term period we expect revenue growth + operating profit metric to be 40%+

# Total And Current Backlog



- PDF focused on both growing backlog and creating a long-term revenue relationship with its customers
- Total backlog outpacing current backlog growth provides increased revenue visibility

# Disciplined Capital Allocation



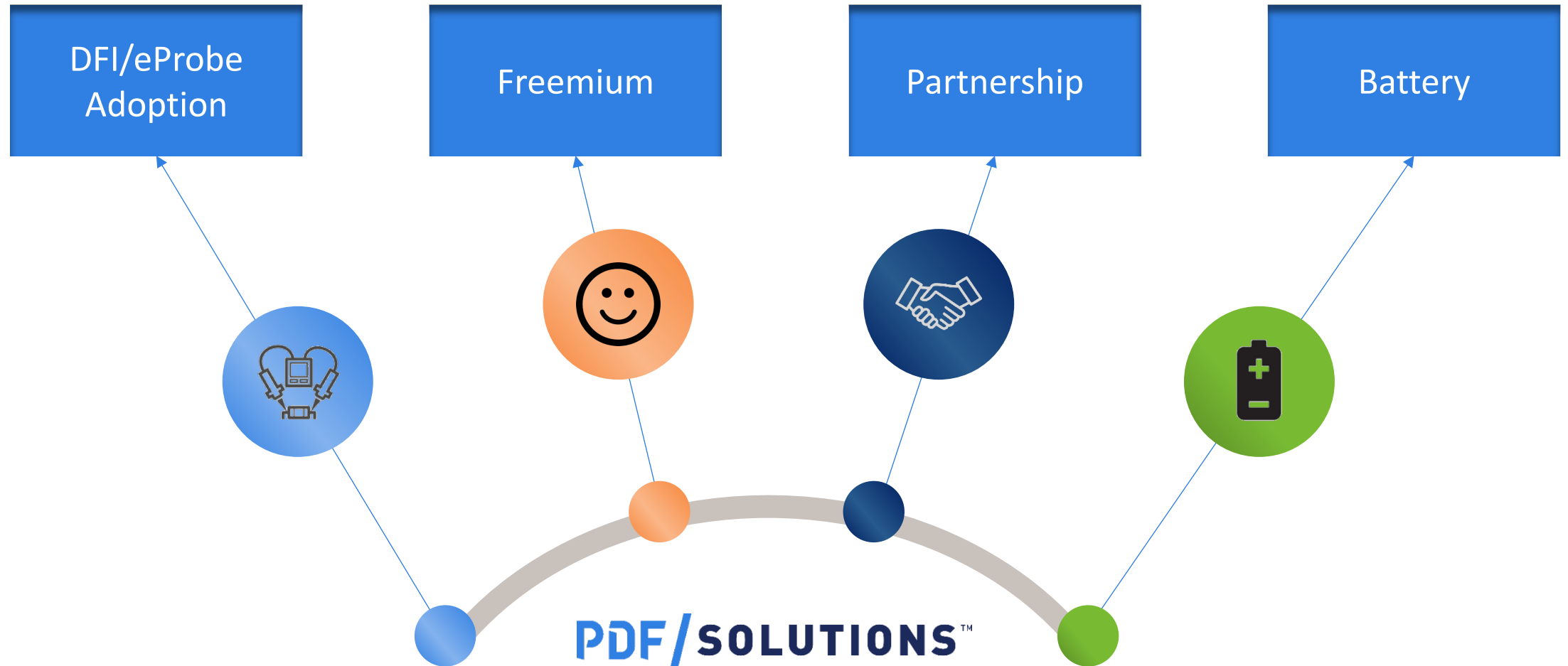
- Capex investments include DFI/eProbe, CVi, IP, DEX network, and infrastructure
- Cash balance has increased while PDF:
  - Invested in Capex
  - Returned capital to stockholders through stock buyback
  - Made acquisitions
  - Received strategic investment

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# Long-Term Target Financial Model

	As of 2019	As of 2023
Annual Analytics Revenue Growth	20%	-
Total Revenue Growth	-	>20%
Non-GAAP Gross Margins	>70%	>75%
Non-GAAP Operating Margin	20%	20%

# Additional Vectors Of PDF Growth



# Summary – PDF Solutions



# Thank You

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