# Portfolio Construction Process

## Introduction

### Problem

The evolution of technology has reset consumer expectations, forcing investment advisers to adapt. Services such as Amazon, Spotify, and Netflix offer increasingly personalized experiences through the use of machine learning and artificial intelligence (AI). This paradigm shift has made its way into wealth management, resulting in clients requesting the same level of individualization from their financial advisers.

Unfortunately, independent advisers find it difficult to meet evolving client demands. According to eMoney, 60% of consumers are dissatisfied with advice that is too generic for their situation[1]. In hopes of solving this problem, investment advisers turn to various solutions that cause additional problems:

- Allocating to 3rd party managers that cause firms to suffer compressed margins due to an added layer of expenses
- Adopting disjointed software products that only address bits and pieces of an adviser's workflow therefore failing to reduce operational complexity or save time
- Attempting to handle client personalization on their own, taking much needed time away from prospecting and landing new clients

In all cases, advisers are left struggling to grow their bottom line.

Existing solutions are built using antiquated systems that increase reliance on large Wall Street firms. It is time for a new era of self-reliance ushered in by modern technology. To truly meet the needs of today's clients, investment advisers must embrace tools that harness cutting-edge machine learning and AI, or they will fall behind other industries and, therefore, lag behind client needs.

### Solution

Pave Finance, Inc. offers a modern software-as-a-service (SaaS) platform that uses AI to automate institutional-quality portfolio construction and management. Rather than relying on outdated systems or

[1] What Do Clients Want from Their Financial Advisor? | eMoney | July 18, 2023

one-size-fits-all approaches, Pave enables advisers to deliver truly personalized portfolios to every client without adding operational burden or eroding margins.

The foundation of Pave's approach is its proprietary AI infrastructure, built specifically for wealth management. Unlike large language models (LLMs), which regulators do not permit for portfolio generation, Pave combines the most effective techniques from across the broader field of AI. Machine learning and regression models drive asset scoring, gradient descent powers the optimization engine, and LLMs are carefully applied to explain trades and enhance reporting. This thoughtful integration ensures portfolios are optimized with rigor while advisers and clients benefit from greater clarity and autonomy.

For advisers, this means portfolios that are as unique as their clients. Pave integrates seamlessly with custodians, requiring no asset transfers, and supports unlimited customization across securities, sectors, and tax considerations. As market conditions shift, Pave automatically generates recommendations and, if desired, executes trades, giving advisers the choice between a fully automated or hands-on experience.

By saving advisers up to 18 hours a week, Pave restores time to focus on growth and client relationships. Most importantly, it empowers advisers to harness cutting-edge AI not to replace their expertise, but to amplify it, creating independence, scalability, and better outcomes for clients.

# Portfolio Construction Technology

## Optimization Engine

Most publicly available optimization engines are expensive, cumbersome, and designed for institutions rather than independent advisers. These systems often require significant manual input for each portfolio, making them slow and difficult to scale. Costs typically range from $60,000 per year for basic access to $250,000 for a single license, with each license limited to one user and one portfolio at a time.

Pave built its own proprietary optimization engine to overcome these barriers. The system evaluates every publicly traded stock worldwide and updates weekly to reflect market and index changes. Each security is analyzed across more than 150 factors, enabling precise replication of any index while allowing deep customization. Unlike most direct indexing tools, which often require 300 to 350 securities to mirror a benchmark, Pave can recreate the same risk and return profile with only 30 to 50 securities.

For example, an adviser could exclude the entire energy sector and still produce a portfolio that carries the essential return and risk characteristics of energy exposure without owning any energy stocks. Similarly, advisers could exclude a major single name like NVIDIA, which makes up more than 7% of the S&P 500, and still deliver a portfolio with virtually identical risk, return, and long-tail exposure as the benchmark.

Currently, advisers can optimize portfolios to 17 major global equity indexes (including the S&P 500, Russell 2000, EAFE, and NASDAQ 100) and to 7 multi-asset allocation benchmarks ranging from 95% equity / 5% fixed income to the inverse. The engine also incorporates over 1,000 of the largest U.S. ETFs by analyzing their underlying holdings, ensuring seamless inclusion in optimization.

This proprietary approach delivers institutional-grade optimization at scale, without the cost or operational friction of legacy providers. It ensures advisers can build tailored portfolios for every client with the precision once reserved for large institutions.

## Asset Intelligence Layer

To complement optimization, Pave developed its Asset Intelligence Layer, a machine learning system that generates forward-looking risk and return scores for every global stock. Updated weekly, it adapts to company fundamentals, market technicals, industry dynamics, and broader economic conditions. Here are some examples of factors considered by category:

*Company Specific*

- Earnings
- Earnings vs Expectations
- Earnings Growth
- Price to Earnings Ratio
- Price to Earnings Growth
- Debt
- Net Debt
- Short Term Debt to Cash

*Industry Dynamic*

- Industry Growth
- Asset Flows
- Earnings
- Expected Earnings
- Overall Growth

*Economic*

- Inflation
- GDP
- Employment
- Money Supply
- Producer Price Index
- Consumer Price Index
- Consumer Debt
- Inflation Expectations

Pave's Asset Intelligence Layer avoids static biases such as "growth" or "value." Instead, it systematically evaluates 58 return factors and applies machine learning to determine which factors are driving performance at any given time. This allows the system to score each asset on its expected return based on how strongly it expresses the characteristics the market is currently rewarding. For example, if cash flow strength is among the attributes favored by markets, Pave identifies the securities most aligned with that trait. In practice, the drivers of return are rarely so simple. Performance typically reflects a blend of factors, often in subtle or shifting combinations, and Pave's system is designed to capture that complexity rather than rely on binary judgments.

On the risk side, Pave produces a volatility score for every asset by constructing a covariance matrix of roughly 10,000 global securities. This is paired with analysis of 88 distinct risk factors within each stock, ranging from company fundamentals to sector exposures and macroeconomic sensitivities. The result is a detailed map of both surface-level and underlying risks. By understanding not just the amount of risk but also its sources, Pave's Asset Intelligence Layer enables the optimization engine to generate portfolios that smooth out asymmetric exposures and better control volatility while still positioning for return.

Together, the optimization engine and the Asset Intelligence Layer form a comprehensive system: one that balances return potential with risk control, adapts continuously to market conditions, and makes it possible for advisers to deliver portfolios that are both personalized and institutionally rigorous.

## Tax Management

Traditional tax-loss harvesting often means selling one stock that has declined and replacing it with a "similar" one, such as selling Coca-Cola and buying Pepsi. On the surface, this may satisfy tax rules, but it rarely produces the best portfolio outcomes. The two companies have different fundamentals, and a simple one-for-one swap can distort overall exposures.

Pave's approach is more comprehensive. The system automatically flags when a position has experienced a significant loss and evaluates whether the tax benefit of selling outweighs the asset's forward-looking return potential. If a sale is optimal, the optimization engine and Asset Intelligence Layer work together to identify replacements that best serve the client's overall portfolio.

Replacement candidates are not chosen just because they look similar. They are selected based on how well they fit client preferences, market conditions, and portfolio objectives while maintaining balance across risk and return. This may lead to a replacement in the same sector, but just as often it produces a basket of securities in entirely different industries that together preserve the portfolio's desired profile.

By embedding tax management directly into the portfolio construction process, Pave allows advisers to realize tax benefits without sacrificing long-term performance or portfolio integrity.

## Implementation

Once a portfolio is designed, Pave makes implementation straightforward. Advisers can account for client holdings, tax situations, investment preferences, and restrictions such as employer stock or sector exclusions. Using the optimization engine together with the Asset Intelligence Layer, Pave then generates a fully customized portfolio in seconds.

Pave connects directly to custodians via API or SFTP feeds, so accounts can be linked without moving assets. Advisers can choose to activate Autopilot, which authorizes Pave Investment Advisers, LLC to automatically update portfolios and execute trades when needed. For those who prefer more control, Pave produces a trade file that can be executed manually at the brokerage of choice.

The system also supports manual accounts, which let advisers track restricted holdings or test strategies in a sandbox environment without affecting live portfolios. Additionally, advisers can adjust how the optimization engine and Asset Intelligence Layer interact by applying factor tilts, such as tracking error targets, growth or value orientation, volatility preferences, or sensitivity to macroeconomic drivers like interest rates and currency exposure.

This flexibility allows advisers to serve any number of client relationships and accounts, embedding their own views while relying on Pave's technology to manage the complexity. The result is a scalable implementation process that delivers individualized portfolios efficiently and consistently.

## Compliance

Pave embeds compliance directly into its platform, ensuring advisers and firms maintain the necessary oversight and record-keeping. All user inputs and outputs are retained on a rolling six-year basis. This includes onboarding information, portfolio recommendations, and any updates to preferences, risk tolerances, or investment objectives.

Every recommendation the system generates is tracked, and each security is monitored weekly. If a brokerage account is connected, Pave can also compare actual client holdings with the recommended portfolio to highlight differences.

This oversight ensures advisers and institutions have a full audit trail: what was recommended, how it was implemented, and the context behind every security in a portfolio. It provides transparency to clients, safeguards against regulatory issues, and allows for deeper analysis of portfolio construction decisions over time.

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