Why software product startups fail and what to do about it

Evolution of software product development in startup companies

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Abstract - **Many software product companies fail to achieve a worthwhile return on the investments of their financiers, founders and employees.**

Failures of execution in sales, marketing and delivery are commonly recognized, but failures in product development are less obvious. This paper explores the critical product development issues that can lead to company failure.

A model for the evolution of product development from startup to maturity is provided, consisting of three phases:

- **Startup**
- **Stabilization**
- **Growth**

Symptoms that can appear in each phase are discussed and the underlying issues analyzed. This enables stakeholders to benchmark their own product companies and avoid product-related company failure.

The paper will be of interest to investors funding startup product companies, executives leading them and product development managers.

1 INTRODUCTION

Software product companies are of interest to entrepreneurs and investors. Most markets for software are global in scope and become dominated by a handful of products, so there are significant opportunities for long term profits and growth for a company bringing the right product to market.

Many product companies fail before they have fulfilled their commercial potential, despite having a fundamentally sound proposition. Failures of execution in sales, marketing and operations are often responsible but will not be considered in this paper. Failures in product development are also frequently to blame but can be hard to diagnose for people who are not experienced product developers.

The evolution of the company from inception to maturity is split into three phases – *Startup, Stabilization and Growth*. For each phase the paper examines critical product development issues that can lead to company failure. The symptoms of each issue are described, analyzed and a solution proposed.

Stakeholders can use the paper to diagnose the issues in their own company and effect a cure if necessary.

2 STARTUP

The startup phase is defined here as the period between product conception and the first sale.

All software product companies start with an entrepreneur and a vision. They see a market opportunity and know how to exploit technology to satisfy it. They need to assemble a small executive team around them with the necessary skills, then start to build the product. This may require additional people to be recruited into development, but cash is usually in short supply.

Such entrepreneurs are often technically able and the product seems to spring from the minds of its visionaries directly into program code. The whole company typically sits in the same room. Communication is rapid, commitment and energy are high. Unless care is taken, working practices are established which cannot scale to a larger organization, and are hard to change. Some of the issues discussed below are local to the product development team, while others are matters of concern to executives.

2.1 DEVELOPERS ARE INEXPERIENCED

Symptoms Developers work heroically but product delivery schedules are rarely met. When the product is delivered, it doesn't meet the customer's requirements. It is unreliable and fails frequently in the field. Rectifying defects takes longer than expected and often creates further defects.

Analysis Lack of cash tempts the company to rely on clever, but inexperienced people. This leads to the problems described above, which can be hard to overcome.

Software engineering is an emerging discipline and many people working in the field are not familiar with all of its issues. Inexperienced developers neglect non-coding issues such as architecture, design, testing, configuration management, deployment and documentation.

Solution The principal developer for the company must be highly experienced, and familiar with all aspects of software engineering practice [1]. This person must also be an accomplished technical leader, as they will need to influence their less experienced colleagues. Some of the other early recruits to product

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development must be experienced team leaders to provide a solid foundation for subsequent growth.

2.2 *PRODUCT ISN'T REALLY A PRODUCT*

Symptoms The product may be customized for a client. No two customers have the same product version. It is expensive and time consuming to upgrade a customer to a new version.

Analysis This issue usually arises where the product originated as a custom solution. A product is an extreme version of software reuse. Components specifically designed for reuse can cost up to seven times as much as their one-use counterparts, due to the additional design, maintenance and documentation required. So a company wanting to evolve a product from a custom solution should expect to spend the same amount of cash as originally expended to develop it, several times over. It is commonly assumed that productizing a solution requires only incremental expenditure. Additional cash will be needed to transform the company from a service to a product organization, developing capabilities such as product support, professional services, marketing and sales.

Solution Budget for significant expenditure to productize a custom solution. Either set up a new venture to develop the product, or run a change program to transform the company into a product organization. Service companies are typically poor at being part-time product developers.

2.3 *PRODUCT HAS NO OWNER*

Symptoms No one knows who has authority to decide what features go into the product, or the authority rests with a committee that is dysfunctional.

Analysis An elephant is a mouse designed by a committee. Fred Brooks discusses the impossibility of building an outstanding product unless its evolution is controlled by an individual or small group of like-minded people [2]. Initially the product is often specified by a group of developers working closely with a visionary entrepreneur. This breaks down as the company grows and as others outside product development become involved in feature selection.

Solution Avoid building an elephant by giving ownership of the product to an individual or small like-minded group from the outset. Others in the company can lobby for features but this product owner decides. The owner may be a market-oriented engineer or a development-oriented marketer who is responsible for communicating between development, sales and marketing.

Customers are sometimes poor judges of how new technology can best address their business problems. They think in evolutionary terms and miss opportunities for revolution. Listen closely to customers and incorporate their ideas into products, but do not rely on them for vision. The product owner must develop this themselves through constant contact with customers and the market place.

2.4 *NO STRATEGIC PLAN FOR PRODUCT DEVELOPMENT*

Symptoms The company's business plan does not establish objectives and goals for product development. The product owner makes important decisions on an ad-hoc basis, without being able to connect them to a greater strategic plan.

Analysis Product development is a long game which takes significant time to produce returns to the business. It is a team-oriented activity where new people can take months to become productive. Failure to relate product development to company strategic plans means that limited cash reserves are spent on the wrong things at the wrong time, producing little return.

Solution Ensure that there is a strategic plan [4] for the company, with clear objectives in the short and medium term [5]. Confirm that product developments are aligned with this plan and meet the company's financial goals. Be prepared to change these plans frequently as the company and market evolve.

2.5 *PRODUCT PLATFORM IS UNRECOGNISED*

Symptoms The importance of technologies and components which form part of the product is not understood, discussed and managed. Selection of these components is left entirely to product developers.

Analysis The product platform is the set of hardware and software components that underpin the product [3]. This platform is the key to new product opportunities as the skills and capabilities of the company are developed around it. It can contain intellectual property assets that can be reused in new products and create a barrier to market entry for competitors. A good product platform can support a family of products for different market segments.

Solution Review product platform components to confirm that their use does not produce conflicts with the strategic plan. Where components are provided by third parties, ensure that new versions are factored into product development schedules. Identify platform components that have reached the end of their lives and plan to swap them out in a timely fashion.

3 *STABILIZATION*

This phase begins when the first customer takes delivery of the product. It ends when the product is stable enough to be commissioned for a new customer

without causing any overhead on product development.

The product has been shipped to a number of customers. Each has a list of features that they insist must be added. Every new sale seems to require extensions to the product. At the same time, the base product may not yet be reliable.

By now the entrepreneur typically needs more cash and must approach external investors.

Unresolved issues from the startup phase will have a growing impact on the company, and become harder to deal with. At the same time, new issues can emerge.

3.1 FOUNDERS WON'T LET GO

Symptoms There is damaging conflict between new executives and the founders of the company who may also be major shareholders. People continue to look to the founders for product and thought leadership, although new leaders have been appointed to provide these.

Analysis A ship cannot have two captains. If a clear and accountable executive role cannot be identified for each founder, and they are unwilling to become subordinates, then they are likely to play a disruptive role as the company evolves. Product development is particularly at risk as founders often remain emotionally attached to this function. This issue can be precipitated by the appointment of a new CEO as a condition of a funding round.

Solution Founders must either assume a mainstream executive role, truly accept a subordinate position, or join the board as a non-executive director.

3.2 DEVELOPMENT TEAM FAILS TO GEL

Symptoms There is a divide between developers who join the company early and those who are recruited later. The early developers demand special treatment which is not justified by their experience and skills. Early developers mount significant resistance to organizational change.

Analysis This is a result of recruiting too many inexperienced developers during the startup phase. To compensate, experienced people will be brought into senior positions. This causes resentment among the early developers as they find themselves working for people who have only just joined. Inexperienced developers are often convinced of the uniqueness of the company, its product and their working methods. More experienced people will be familiar with these excuses for not following good software engineering practice.

Managing the integration of new people will consume valuable management time. Some engineers who claim to be uninterested in 'politics' will prove machiavellian when resisting changes that they do not like.

Solution Promote early developers who show technical **and** leadership potential. Rapidly eliminate any weak links or other hiring mistakes. Encourage outstanding performance by building on people's strengths rather than trying to eliminate their weaknesses [6]. Recruit as necessary to address the weaknesses of the development team as a group.

3.3 PRODUCT IS UNRELIABLE

Symptoms Complex defects causing critical customer issues are continually being reported and only the best developers can solve them. Development of new features is slowed or halted.

Analysis This is usually caused either by inexperienced developers or a product that is released too soon. Inexperienced developers introduce more defects into the product and fix them more slowly, if at all. It can be tempting to release a product before it is ready, but the gains from doing this are rarely worth the potentially fatal damage to product reputation.

Solution There is no easy answer. Fixing a large number of critical defects is hard work and requires careful management. If the team is inexperienced then skilled people must be brought in to assist, perhaps on a contract basis.

3.4 REQUIREMENTS BECOME UNMANAGEABLE

Symptoms More new features are requested than product development can deliver and there is no satisfactory way of deciding between them. At the same time, stakeholders are frustrated by the difficulty of contributing new features and tracking them through the development lifecycle.

Analysis Diverse product requirements will emerge as the sales team sells almost anything to almost anyone to keep the company afloat. The product owner needs to support them while controlling new features carefully to maintain the conceptual integrity of the product [2] and not overwhelm the development team. Executives must understand the need for tough decisions between features, based on the allocation of scarce product development resources.

Solution A business process is required to capture new requirements, prioritize them, then assess their feasibility and value. They will either be added into the development schedule, postponed or declined with an explanation. This process is managed by the product owner.

3.5 *PRODUCT EXPECTATIONS ARE TOO HIGH*

Symptoms The product is unreliable in the field. At the same time development is urged to add new features and make the product available on more platforms. The company makes promises of new product development to customers that cannot be delivered. The product roadmap changes constantly, but timescales are rarely met. Investors believe that they are spending on product enhancement, but see little progress.

Analysis When raising money, the company has a vested interest in overselling the reliability and sophistication of the product. Potential investors may understand this, but assume that it doesn't matter since software is easy to change and any problems can be fixed. This depends on the skill and size of the development team, and the time available to them. So it is important for investors to check the experience and capability of the development team before committing their money to an incomplete product.

Solution The executive team must understand the true state of the product and make their plans for the company accordingly. This understanding must include product features and non-functional requirements such as security, reliability, scalability and performance. An audit of people, product and processes is useful to establish a baseline for future development.

3.6 *SERVICE PROVISION DELAYS DEVELOPMENT*

Symptoms Product developers spend time providing services to the rest of the organization, instead of completing new features and bug fixes. Selling and commissioning the product requires skills only available in the development team.

Analysis The development team often provides product-related services while the company is small. Such services include technical presales, implementation, product integration and customer support. As the company grows, some services may remain a part of product development whilst the rest must be handed over to other parts of the company.

Solution Consider the full range of services that product development is expected to provide and ensure that sufficient time is allowed in the development schedule. Agree which services will be retained and plan the migration of the rest into other parts of the organization.

4 *GROWTH*

This phase begins when the product can be commissioned for a new customer without creating any overhead on the development team. It ends when market size, share and growth rate have been established and all business processes necessary to support product development and sales are in place.

At this time the company attracts more attention and the market will expect to see a roadmap for future product development. If a trade sale or IPO is to take place then it generally happens during this phase.

The following issues can significantly affect the product development capability of the company and hence its likely valuation.

4.1 *SKILLS SHORTAGE DELAYS DEVELOPMENT*

Symptoms Product development depends on a small number of skilled individuals who become a bottleneck in all activities. Their skills and knowledge are not available in the market place. There is no plan to develop these skills in new recruits.

Analysis Individuals who have survived in the company from the early days develop a wide range of skills on an ad-hoc basis. If these individuals are experienced and become team leaders as development grows, then they will tend to develop the necessary skills in new recruits. Otherwise only the most determined and socially adept new recruits will be able to rapidly acquire the necessary skills to become productive.

Solution Identify important skills and the people who possesses them. Spread these skills across the team using approaches such as shadowing, documentation, buddy programming and lunchtime seminars. Ensure that time for skills transfer is built into the development schedule. Recognize those who teach and those who learn.

4.2 *PLATFORM CREEP DELAYS DEVELOPMENT*

Symptoms The product is demanded on many different platform combinations without clear cost justification. Manpower and equipment expenditure escalates in product development without increasing productivity of features and bug fixes. Other areas of the company seem unprepared to support the new platform combinations.

Analysis Offering a product on additional platform combinations increases the number of permutations that require testing, in some cases by a factor of ten or more. The potential returns for each new platform combination supported must be offset against additional costs in product development, the rest of the company and its partners.

Solution Establish a business case for additional platform components before including them in the development plan. Ensure that all costs are budgeted for and the necessary resources inside and outside the development will be available.

4.3 *PRODUCT PIPELINE IS EMPTY*

Symptoms The company cannot meet demand for information on future product developments. It offers instead mundane and uninteresting announcements on minor product enhancements. There are many ideas for new products, but no effective way to decide between them and assign resources.

Analysis Few product startups are able to transcend their first success and generate a stream of new products. To achieve this the company must invent new product ideas aligned with its strategic plans and which can be realized from the existing product platform and skills base. Whilst there is no substitute for inspiration here, this must be combined with a robust process to capture product ideas, develop them and choose between competing ideas. A convincing product roadmap is a key driver of business value in an IPO or trade sale.

Solution Commit resources to the invention and development of new products. Proposals should include projected revenues and costs for product development and introduction. Each part of the company should contribute its section to the product proposal, including revenues, costs, issues and risks. Development resources may be needed to solve important technology issues before the company commits to full product development.

4.4 *NO PROCESS FOR PRODUCT INTRODUCTION*

Symptoms Introducing new products takes longer than expected. Activities take place serially rather than in parallel and coordination between different parts of the company is poor. Each team tries to postpone its involvement for as long as possible. Teams fail to assign people to work on new product introduction.

Analysis As the company grows, new product introduction requires a coordinated program of activities across functional areas including product development, professional services, support, sales and marketing. This program should be run by the product owner, supported if necessary by a program manager.

Solution Create a repeatable process for new product introduction. Run a change program to embed it in the company. Involve all stakeholders fully to ensure that activities are carried out in parallel and resources are made available in a timely fashion.

5 *MATURITY*

The company has evolved from a startup into a mature organization. Market size, share and growth rate have been established. All processes necessary to support product development and sales are in place.

Product development contains a diverse team of multi-skilled individuals, perhaps including specialists in design, development, testing, configuration management, quality assurance, documentation and user interface design. Each person understands how their activities support the company's strategy and has personal objectives connected to that strategy.

The company has a successful product in the market which meets a useful set of customer needs and evolves through its life to track those needs. The product is based on a technology platform which is robust and can be used to originate other products in similar or unrelated markets. Timely investment in new product research has resulted in new products which attract further investment and increase the value of the business as a whole.

Product development is robust and predictable with proven processes for new product invention, development and introduction. A diverse range of clients are using the product and can provide input to its future development. Processes are sufficient to meet ISO9000 quality standards even if certification is not pursued. Approaches such as the Capability Maturity Model can be used to incrementally improve processes further [7].

6 *CONCLUSION*

Early recognition and management of critical issues such as those identified in this paper can increase the chances of success for a software product startup.

Successful development of new software products is a key value driver for many startup companies. A company which can show that it has produced one or more successful products in a marketplace, and has the vision, road map and capability to produce more can expect a trade sale at a good valuation. IPO may be possible if other factors are right.

The author is keen to hear from others with startup experiences to share. The catalog of issues discussed here is not exhaustive and would benefit from extension and elaboration.

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