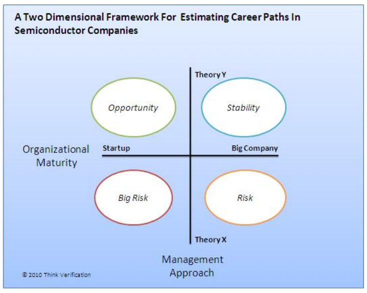
Are you looking for a job in verification? Are you pursuing a career in verification? Congratulations! There a few things you might want to consider about your prospective employer before you sign the contract. In today's important article we'll try to analyze semiconductor companies using a two dimensional framework. If you find enough information about your potential employers in advance, you'll be able to position them correctly on both axes thus helping you make a better decision regarding your future career.

The first axis represents Organizational Maturity, ranging from Startup to Big Company. The other axis represents the underlying Management Approach, ranging from Theory X to Theory Y, which we'll talk about in a minute.



The horizontal axis - Organizational Maturity - is really a mixture of company age and size, which usually correlate. This variable tells how well-established the organization is in terms of workflows, procedures, cumulative experience, etc. As far as verification is concerned, there are several noticeable differences between the two extremes. In startups, verification projects will often start from scratch. This means, for example, that you would rarely be maintaining someone else's code (which happens all too often in big companies), and you would be able to enjoy a great deal of freedom when choosing a methodology or customizing one to your liking. In big companies, reuse and legacy are the name of the game. Big companies think in "product lines". Your current project may well be 90% identical to your previous project. This is rarely the situation in small startups where you can smell the freshness of the RTL from a distance.

In big companies project managers and other stakeholders have come to understand that verification is no magic. They have enough experience with previous projects to realize that verification is a project in its own right and should be treated as such by management. They know, for example, that no design task can be even remotely considered "done" unless its respective verification task has been completed. They also know that a 2:1 ratio between verifiers and designers is a key to success and not just a vague recommendation. In smaller companies and startups, executives do not always understand the essence of verification which is a real problem. Verification should really be considered as a core competency rather than a burden. When management fails to understand that, you - the verifier - must realize that another feature on your job description has just shown up (whether you like it or not). You must be an educator too. You must take on the quite heavy responsibility for showing your managers where they are wrong and why re-inventing the wheel in verification is a mistake. There's a name for this phenomenon in Organizational Studies - it's called Organizational Learning. Problem is - you're the educator... But this could also be an opportunity, depending on Management Approach, as we'll see in a bit.

Another big difference between small startups and big companies is the stability issue. In big companies you'll find that predictability is a very important element. The entire management hierarchy is well trained in handling complex projects from inception through tapeout in an amazingly predictable way. I once heard a CEO of a well established semiconductor company explain how his company was able to tape out a chip in a two month time frame (from Spec release). This is rarely the case with startups. The only predictable thing in startups is that unpredictable things happen all the time - features are regularly being added or removed, RTL is never really frozen in time, available engineering resources fluctuate in level and quality - just to name a few. If you seek stability in your work, a startup should probably not be your first choice.

The vertical axis, one you should be paying special attention to, is Management Approach. In Organizational Behavior, companies (and organizations in general) can be categorized into two groups: X and Y. According to a well-known theory by Douglas McGregor (Theory X and Theory Y), managers from group X believe that the average person dislikes work and will avoid it if possible. They believe that salary is their employees' only concern and that they need to be forced into working against organizational objectives. Managers from group Y, on the other hand, realize that their employees are first and foremost humans who need as much attention to their psychological and social needs as to any other tangible ones. They try to encourage team work, creativity, participation, openness, and a sense of responsibility and pride among their employees.

The verification process is an ultra-complex effort, unbounded in nature and suffers from a great deal of uncertainty in terms of schedule. Companies from Theory X will often try to force unrealistic objectives on their verification teams, which leads to frustration and eventually inevitable delay in schedule. The correct approach to managing verification teams would be Theory Y. Generating motivation among verification engineers is not easy, taking into account the heavy pressure they're in to begin with, and the implicit amount of responsibility they have for product quality. Moreover, many verification tasks require deep concentration and focus for an extended period of time, extra pressure doesn't help much.

When tasks seem to take longer than expected, managers from Theory X are conditioned to apply more pressure as a first remedy. They are wrong though. Managers from Theory Y would tell them that the first thing to do would be to open up their ears and listen. Listen to their team leaders, listen to their engineers, learn about what's holding them back from completing the job on time, and how management can help. All too often, verification lags behind due to bottlenecks in the overall program.

Theory X managers believe that bonuses and a raise in salary create extra motivation. Once again, escaping to the convenient realm of time and money does not always do the trick in verification. Studies have proven that tangible elements can only account for eliminating dissatisfaction among employees. True satisfaction and motivation originate elsewhere - challenge, recognition, responsibility, etc. (See Herzberg's two factor theory). This is very true in verification. Verifiers seek challenge and recognition. The most successful verifiers I've met were never motivated by salary nor pressure. It's the technical challenge, the sense of responsibility, and the feeling that their managers will always back them up that really made them outperform. Theory X managers fail to understand that.

Once you set your mind on a certain company, try to talk to people who work or have worked there. Try to gather the information necessary to accurately position your prospective employer on the diagram.

If the company turns out to be an X company, you should be aware of the risks described above. In small companies and startups the risk is even bigger as management actions have bigger impact on the day-to-day work. In big companies, hierarchy and bureaucracy serve as a damping force for that matter, hence the smaller risk. If the company turns out to be a Y company, you're likely to enjoy stability and predictability in your work. In smaller companies and startups, this turns into a real opportunity to enjoy an accelerated career path, professional development and personal growth. Good luck!