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Worker Cooperative Case Study: Isthmus Engineering & Manufacturing

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Executive Summary

While the U.S. manufacturing sector has shrunk over the past 30 years, the fully worker-owned Isthmus Engineering & Manufacturing (IEM) cooperative has thrived in the automated manufacturing industry. In a dynamic industry, the firm has grown and constantly adapted to diverse market demands. This case study illustrates the unique organizational structures and dynamic governance mechanisms that are possible in a worker cooperative, and the way that these structures shape decision-making in a demanding market context. In particular, the case shows how the distribution of production-related decision-making in this worker cooperative is more extensive than what has been identified in non-worker owned firms. Effective governance, at IEM, relies on a rigorous vetting process prior to an employee's inclusion in ownership and diverse opportunities for participation in governance. The case study concludes with a discussion of several current challenges facing IEM.

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Introduction

While the U.S. manufacturing sector has faced significant challenges in the past 40 years, the small U.S. firm, Isthmus Engineering & Manufacturing[1], has thrived. IEM competes in the customized automated manufacturing machinery industry, serving customers who need solutions to complex automation challenges. IEM's team of engineers and fabricators takes projects from concept development through proof of process to on-site installation. Their customers have included industry leaders in medical equipment, the automotive industry, and industrial manufacturing.

Although IEM began as a partnership of engineers, it is now organized as a worker-owned cooperative. Membership in the cooperative is open to all workers, regardless of their position in the company. IEM is currently owned by 29 employees.

The last three decades have witnessed a gradual decline of the manufacturing sector in the US. As the share of manufacturing output in total GDP (gross domestic product) dropped from 21% in 1980 to 13% in 2008 in total, its share in total employment also declined. Employment plummeted from 20.7% in 1980 to 9.1% in 2009.[2] In the Midwest alone, auto parts manufacturing lost 12.7% of its jobs between 1992 and 2006 (Collins, 2007)[3] . Employment in manufacturing declined by 26.7% in Wisconsin, 33.6% in Illinois, 48.5% in Michigan and 34% in Indiana between 2000 and 2009 (Dresser, 2010).[4] The changing landscape of the global economy with the integration of low cost developing countries and the consequent shift in the comparative advantage of US have led many to declare 'the demise' of the manufacturing sector in the US, notwithstanding the heterogeneity of this sector.

In contrast to this general pessimism, Isthmus Engineering stands out as a success and presents a story of survival. IEM, as a worker-owned cooperative, has not only been successful in surviving in a high-technology industry for over three decades, but it grown, recorded stable revenues, and has provided competitive incomes for its employees. This success raises several interesting questions. Through what mechanisms and processes has IEM survived in a high-technology industry? How have these mechanisms enabled or hindered IEM from meeting the challenges of cooperative governance and productive efficiency?

This paper is organized into nine sections. After the introduction, the second section discusses briefly the literature pertinent to our question and introduces the arguments that have motivated our research. The third section outlines our research methods, and the fourth section portrays the 'milestones' in IEM's history. The fifth section describes the organizational structure of the company, and investigates issues of empowerment in work process, autonomy and differential participation of workers and fluidity in roles. The subsequent section focuses on the governance of IEM, its

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[1] We will use IEM and Isthmus Engineering to refer to Isthmus Engineering & Manufacturing, following company practice.

[2] Strauss, William (2010). Is U.S. Manufacturing Disappearing?, *Federal Reserve Bank of Chicago*, August 19, 2010.

[3] Collins, Benjamin, Thomas McDonald, Jay A Mousa (2007). *Monthly Labor Review***.** Washington: 130 (10), p. 14.

[4] Dresser, Laura et al (2010). *The State of Working Wisconsin*, University of Wisconsin Center on Wisconsin Strategy.

management by the board, and the board and personnel decisions. This is followed by the seventh section that aims to understand the role of social ties and informal relationships in the workings of the company. The final section examines growth and expansion issues at IEM.

Relevant Literature

Two main pieces of literature represent the wider bodies of work in which our project is embedded. The first is about cooperatives specifically. The second is about worker empowerment although not focusing solely on cooperatives per se.

The body of literature on worker-owned cooperative firms is quite large. Scholars have, in general, been most interested in the question of why cooperative firms are so rare. One of the most important examinations of this question is Harry Hansmann's work, *The Ownership of Enterprise*. While we do not necessarily follow this approach, it is a useful reference point for our purposes since it represents the dominant institutionalist theory of industrial organization. Hansmann, in the institutional economics tradition, argues that those firms that are more efficient in transaction cost reduction are more successful. Hansmann explains that although maintaining labor discipline should be less difficult and costly in worker-owned firms, cooperatives constitute a very small percentage of firms in the economy.

This being the case, there must be high transaction costs in some other aspect of the firm which makes worker ownership inefficient and therefore uncommon. Hansmann reasons that the source of high potential transaction costs in worker cooperatives is in the governance process of the firm. In a typical firm, when the firm's owners are not workers but simply supply capital, it is comparatively inexpensive, in transaction cost terms, to govern the firm. This is in part because the owners of capital have the same preference, to create profit. Worker-owners are likely to have a much more heterogeneous set of preferences, which become more problematic as the size of the group grows. Hansmann argues that because of these difficulties, workers' cooperatives are rare in industries characterized by complex production processes necessitating different skill sets. Instead, he argues, worker-owned firms are more likely to succeed in industries characterized by little division of labor and a relatively small number of employees in a given firm. Where cooperative firms are successful, it will be either to the extent that they homogenize the set of worker-owners, or else delegate decision-making to some narrower group. Isthmus Engineering, which is governed by a set of worker-owners with diverse educational backgrounds and skill-sets, stands as a potentially problematic case for Hansmann's theory.

A second piece was central to our thought process around workers' empowerment, specifically in post-Fordist, "lean" production settings. Many advocates and scholars of lean production suggest that this shift in human resource practices constitutes an end to the alienating Taylorist practices of the Fordist era, supplanted instead by a work process characterized by varied work activities, creative problem-solving, interactive team work, and worker empowerment. In his 2007 work,

Vidal[5] directly investigates the extent of workers' empowerment in lean production firms. He makes a useful distinction between nominal empowerment and substantive empowerment. Nominal empowerment means that workers' input is sought and they may be delegated new responsibilities, but generally without the extension of effective authority or a role in problem-solving. Substantive empowerment includes this problem-solving role, as well as formal authority and effective engagement in the decision-making processes around production. He finds that the process of lean production itself does not necessitate a significant increase in substantive empowerment. The analytical distinction between types of empowerment, and his findings concerning private, high-tech, lean firms serve as a useful backdrop to our own investigation. Specifically, it allows for some degree of comparison between the extent of empowerment in a traditional, capital-owned lean firm and a cooperative lean firm; this way it is possible to make some preliminary statements about the independent effects of the cooperative form in this type of production.

Research Methodology

This study was conducted through interviews, direct observation and document review. After presenting the research proposal to the IEM Board of Directors and obtaining permission, 25 interviews were conducted with employees who volunteered. Interviewees included long term and new members, members and non-members, engineers, assemblers, machinists, and electricians. The semi-structured interviews enabled investigation into the day-to-day workings of IEM, attitudes toward work processes, perceptions of prior workplaces, and the governance, management and history of the company.

The second method of data collection was direct observation. Field visits to the company, in order to conduct interviews, provided opportunities to observe the company and its workforce. We were given an extensive tour of the company, and observed one of the weekly lunch meetings, which bring all IEM employees together to review the status of current projects.

IEM also shared important corporate documents, including bylaws, an employee handbook, and an owner's manual. These documents helped corroborate and verify some of the data we gathered from interviews (Yin, 1994, p.81)[6]. As there is no prior study on IEM, secondary data was not available.

History and Milestones

Isthmus Engineering started in 1980 as a partnership of three mechanical engineers who had worked together in a family owned business, plus a book-keeper. Initially, they worked out of home of one of the partners, doing contract engineering work for nearby firms. When they moved out of the house and into a leased space, they added a machine shop. This allowed them to extend the design process from concept and

[5] Vidal, Matt. (2007) Manufacturing Empowerment: 'Employee Involvement' in the labour process after Fordism. *Socio-economic Review*, 5, 197-232

[6] Yin, R. (1994). *Case Study Research: Design and Methods* (2 ed.). Beverly Hills, CA: Sage.

blueprints to actually building machines. As they brought in partners with additional skills and acquired machining equipment, they needed to find a business model that would limit the partners' liability and allow for the efficient entry and exit of new members. Two of the partners heard about worker cooperatives at a conference,, and learned about the success of the Mondragon Cooperative in Spain. With the help of attorneys and other advisors, eight of the nine partners (including two machinists) incorporated the business as a cooperative in 1982. Membership was open to all employees, regardless of position or skill level in the cooperative, and every member had a board seat.

Isthmus Engineering grew quickly after incorporation. During the early 1980s, it had two major customers, and worked largely in the automotive industry. IEM's location gave it access to a large customer base, a skilled labor force, and a competitive supply chain for work that was contracted out. A major milestone in the late 1980s was the decision to build their own building. The decision required significant individual financial risk for the members, since they had to personally co-sign the bank loan. However, owning a building allowed them to grow significantly. As members reflected on this decision, they were very positive, regardless of the personal risks:

> After we built the building, customers saw us in a new light. It improved the size and caliber of the equipment that we were able to build because customers trusted us to do it.

> It was a really good decision. We all shared immensely in what we did there. I wired all the computers, and I'm doing it at night, wiring all the phones. We put it in, we built our place and it was all real good.

IEM grew from the initial 8 partners to 50 people in about 12 years. People were hired and became members fairly quickly. Although the financial requirement for membership was described as the price of a small car, the membership application process was fairly undemanding.

During the 1990s, the board went through a protracted and difficult process of terminating some memberships. A rigorous membership process was put in place during the 2000s. Cooperative membership is open to every IEM employee, but the member approval process gives the board significant flexibility in considering applications.

IEM moved to their current building in 2004. This time, the debt was financed solely by the cooperative. Members did not need to co-sign the note. The new building gave them more space, allowed them to do take on larger jobs, and gave them additional credibility with customers. Although this was a major decision, involving significant investments, one member said that consensus came fairly quickly:

> It came to a point where the other building was so full. We were losing potential customers. We didn't have room to build the equipment. Everybody knew it. We did some research. We started talking at the board level. After an hour discussion, OK, let's investigate building a four million dollar building.

Another member reflected on his reservations, largely based on his age and retirement horizon:

> When we first started talking about it [the move to this building], I looked at the whole aspect of what it would mean financially, now that everything's paid. We were debt

> free… I would look at that and say how much time before I retire, and what does that mean, compared to what we've already done?

Isthmus Engineering has seen huge changes in their market. At its inception, 90% of its work was within a 5-mile radius of the shop. IEM benefited from a skilled labor force and a regional, competitive supply chain. Fifteen years ago, 75% of IEM's business was with automotive machining centers. Even then, it was a volatile industry. As manufacturing downsized in the United States, and particularly in the Upper Midwest, IEM made the decision to proactively expand their customer base. It moved into new industries, like consumer products, solar, and medical equipment; developing relationships with large and innovative companies. One member described this decision in terms of firm survival:

> We started doing assembly machines for consumer products or medical assembly machines. That was a very good decision. If we hadn't done that, we would probably have gone by the wayside. Two or three years ago we decided to delve into solar a little bit, because of the federal and state programs that were enacted. We got into it first by putting solar panels on our roof, and that was a conscious decision by the board.

Many of IEM's regional competitors have downsized or been bought out by firms that have significantly restructured the firms they bought. This has given IEM access to a highly skilled and experienced labor force. A worker described this change in the business environment in the context of his decisions to move to IEM:

> I worked in the same line of work previously. It was a public company. At one time there were about 500 people that worked there…but they got purchased by a German company and things really started to change…I could see the writing on the wall… I didn't mind the work but I didn't like how they were pushing our management and the financials.

Currently IEM competes in the highest end of the automation manufacturing industry. According to another long-time member, this puts them into a narrow spectrum of the market:

> We sell higher end products to higher end customers. And prices are higher. I think we still sell an extremely good value, but we don't know how to sell cheap stuff. Our stuff is high class. That's our niche now.

Global work presents challenges, since their business model includes installation and service of the machines that they design. In the past few years, they've had several international projects, and more global customers are on the horizon.

Organization Structure

IEM has approximately 50 employees, divided into administrative staff and five disciplines: sales, controls (electrical) engineering, mechanical engineering, controls (electrical) assembly, mechanical assembly and machining. The limited administrative staff includes a human resource manager, sales staff, a purchasing agent, a scheduling manger and a general manager.

There are 29 worker-owners, who form the board of directors. With some exceptions depending on the pace of business, the board meets bi-weekly to govern the organization.

Core Organizational Unit: Project Teams

Although not usually emphasized in literature on worker-owned cooperatives, one of the important implications for the cooperative organizational form is the way in which empowerment for workers is a consequence of the production process itself, rather than solely a product of the governance process of the firm. We will make the distinction between substantive and nominal empowerment used by Vidal (2007), the latter following the distinction between substantive and consultative participation originally proposed by Levine and Tyson.[7]

Production at Isthmus Engineering is primarily organized around project teams, as is typical of firms in the custom automation field. A cursory description of the process – as it is formally presented in the company's flowchart – follows. Although the description, like the flowchart, is linear, many of the steps are interactive or iterative.

Project Sequence

The initiation phase in a project's process is the domain of the sales department and management, the former led by the sales manager and the latter usually being represented in the person of the general manager. Primarily, they are responsible for discussing with the customer what needs to be done, the feasibility of the project, and making a price quote. Members of the sales team are engineers, conceptualize a solution to the customer's problem, clarify machine specifications, get an understanding for the price range of a particular project, and know whether or not the project is of appropriate scope for the company. When an order is accepted, the general manager and production manager assign a project manager and a controls manager.

The project then enters the planning phase. The project manager further reviews the project in order to determine its feasibility and the extent to which it matches the quote. If there are any problems at this stage, the project manager consults with the general manager and sales manager to determine a course of action. If there are no problems, the project manager creates a milestone schedule, which is used to communicate with the customer and set a payment schedule. The members of the design team are then assigned by the general manager, with input from the project and controls' managers. They also decide upon an allocation of resources based on the milestone schedule. If required, design reviewers are assigned to the project. A kick-off meeting for the project is held, including nearly everyone who will be on the project: sales, management, the project manager, the controls manager, and the design team. After this meeting, the project plan is then finalized by the project and controls managers, the design team, and the fabrication and assembly team. After project manager approval, the

[7] Levine, David I., and Laura D'Andrea Tyson. 1990. "Participation, Productivity, and the Firm's Environment." in *Paying for Productivity: A Look at the Evidence*, edited by Alan S. Blinder. Washington, D.C.: Brookings Institution

project plan is broken down into its necessary stations and jobs. If it is not approved, the plan is reviewed and options discussed until a new plan is created.

The planning phase is followed by the design phase. The design phase starts with a concept review meeting, including sales, the project and controls managers, the design team, and the fabrication and assembly team. After this meeting, the engineers of the design team actually begin the work of designing the machine. Weekly design review meetings are held, including all engineers on the design team, to ensure all involved in the design process are properly updated on the project. Updates on the project are given to everyone in the firm, who may respond with suggestions for the design team. Primary responsibility for communication with the customer is passed off to the project manager, who will maintain a close relationship with the customer throughout the remainder of the project. Based on communication with the customer, the sales team, and the general manager, the project manager will take corrective actions if any part of the project has not gone as planned. The project manager holds a final design review with the customer, and obtains final approval from the design team for releasing the design to fabrication and assembly.

Design is followed by the building phase. The engineers release the fabrication and purchasing requirements to the shop scheduling manager and the purchaser, who then outsource certain components to other machine shops, purchase other necessary components, and assign the manufacturing of other components to in-house machinists. Weekly project meetings continue as the production and assembly process is executed. A manufacturing scheduler assigns machinists and assemblers to the project by their availability. The project manager maintains communication with the customer in this phase as well, initiating corrective actions if necessary. After assembly, the machine goes through a debugging process. Fault recovery testing and verification of safety methods are carried out by the project and controls managers, along with the fabrication and assembly team.

At this point the project enters into its acceptance phase. A factory acceptance test is performed with the customer in order to ensure that the machine fits their needs. If customer acceptance is obtained, the machine is shipped and installed, with a second acceptance test performed if necessary. The project and controls manager provide the customer with informational manuals for the machines, including suggested spare parts lists, etc.

Finally, the project enters the closing phase. This phase consists of follow-ups with the customer by sales and management within two weeks of the installation of the machine. A project close-out meeting is held and the project is finished.

Motivation

The organization of project work outlined above is a highly formalized routine where roles are more or less clearly defined. However, there is a great deal that takes place in the production process that is not captured by this formal model of the process, and there is variance in the degree to which the model is followed by a given project leader. This is important for understanding how workers are oriented toward the production process in practice and for understanding the differences between IEM and other similar firms. IEM, as a high-tech, lean firm, has much in common with its more

traditionally operated private counterparts in the custom automation industry. According to worker testimony, most custom automation work is performed by teams, with quality assurance processes that include design review mechanisms. Yet IEM does differ from more typical firms in fundamental ways. Crucially, this difference is not only true for the manufacturing workers, who would be expected to enjoy little decision-making authority in a typical firm. Engineers also reported significant differences between IEM and other privately owned firms.

One of the most important distinctions was their source of motivation to work. It cannot be overstated that the cooperative structure of the firm has a major impact on how employees experience their work. They consistently pointed out absence of hierarchy. There is no particular person within the firm to whom they must answer, who is continually compelling them to work, and who has the last word on project designs. Instead, they pointed to self-motivation and mutual monitoring as the most important incentives to work, as opposed to being "under the thumb" of management.

> The key difference [at IEM]...is that you really have to be self-motivated to survive here....Nearly everyone who stays and does well here does not need a lot of direction, does not need someone managing them. We don't do a good job of managing people. We do a good job of managing projects. But as far as saying, hey you should have been here at 8, at IEM, we just can't tolerate HR-type stuff. We just don't have a system for identifying it or policing it or doing anything to correct that type of behavior.

Although self-motivation is important, mutual monitoring is also very powerful:

> ...you know, I was for eight years previous, in two separate organizations, I was under thumbs. I was under great big thumbs....that pressure, that managerial pressure, you always feel. It's like a weight on your shoulders. Coming here, that weight is lifted because it's diffused through the entire place. And that can be disorienting to people...if that pressure is coming down from the top, you know which way is up. I mean, literally, you don't know which way is up here, to start with. Eventually you start realizing that that managerial pressure, the peer environment of the co-op, comes from all around.

This fundamental absence of the manager/employee relationship is also not lost on non-owning employees of the firm. Says one employee of IEM:

> It's liberal here, there aren't a lot of rules. It's much more relaxed. There's no boss staring at you, no us versus them. You have to have some rules, but people don't push the limits here. Some people want to push the limits. If you do, you're gone.

And another:

> They say that you don't have a boss, so there's nobody you have to report to, but in a way, and I say this as an employee, you really have to report to everybody. But you don't very often have people coming in and telling you how to do your job, as long as you get your stuff done and you get it done well and you know how to do things. As long as you don't give anybody a reason, you can just do your work.

This experience of the firm was widely held among all workers in the firm. No workers presented IEM as a highly-stratified and disciplinary organization, with member-owners having inordinate power over non-owners or some other highly asymmetrical

relationship. Rather than being motivated by managerial pressure from above, workers are generally self-motivated, and the self-motivation is ensured by monitoring from their peers; a process to which they are subject, but in which owners also take part.

Differential Participation in Design Decisions

One of the notable features of IEM is the extent of the division of labor. Projects are divided quite clearly into design and fabrication/assembly phases. This has the potential to place significant constraints on the opportunities for workers to participate in all aspects of their projects. Workers in the building phase may have few opportunities to make substantive suggestions or decisions, and designers may be separated from the fabrication phase, in addition to having little choice about their project assignments. A crucial risk for a firm like IEM – a cooperative with an unusual degree of division of labor and heterogeneous skill-sets – is that one group of worker-owners will have disproportionate control over the production process as a result of a separation into "conceivers" and "executors."

In fact, fabrication/assembly employees have remarkable decision-making authority at IEM, not only in determining their own way of machining or assembling what is on the blueprints they receive, but in giving feedback on the design itself. One machinist – an employee – describes this contrast:

> That...is one of the cool things about working here, in that when I have a question on a part, I can go talk directly to the person that designed it, versus when you work in a design shop, when you get a stack of prints, you have no idea what the end product is. And ultimately, you don't really care. You make the part to the print, even if you think...that seems kind of ridiculous or unusual....At the end of the day, if you make the part to the print, you're in the clear. Whereas here, it's kinda cool to be able to go up and interact with the person who actually made it. I've always kind of thought of myself as something of a proof-checker of these prints...you know, a designer makes it and details it and moves on to the next one. It's not uncommon for them to miss something or omit some information. So I guess I feel like, as a machinist, I'm part of the process as opposed to just the guy who's gonna make a part and at the end of the day I don't care if it works or not.

Another machinist, a member, makes a similar point:

> As far as making parts, we're responsible...we decide how we want to make a part. But if we look at a part and say, "well, if you did this, that part could be made faster and it would probably work better for your use." And they look at it, and most of the time, they'll change it.

It was also repeatedly mentioned that, if a small change is needed that doesn't affect the scope of the project, shop floor workers have the ability to enact the change themselves without first going to the designers of machine.

The control over the production process and the extent of input to design should not be exaggerated; ultimately, it is the realm of the design team to design, and all workers are under deadlines and priorities which are determined largely by the customer. Still, there is an apparent marked increase of substantive empowerment for both members and employees involved in the building stage of the project, in that they have

opportunities for input in the design phase of the project, rather than just "making the part to the print."

Although the expectation for engineers, as stated above (and suggested in Vidal 2007), is that they will have a high degree of substantive empowerment vis-a-vis shop floor workers, there is potential for them to have little to no say over their assignment to projects. Although they do not have ultimate control over this process, engineers certainly have a degree of influence here as well, despite the fact that it is mostly dictated by scheduling constraints (i.e., who is available when):

> The customer relations committee decides what projects people get on. I think if I had a problem with it, they would work around that....They look at peoples' schedules and say, "okay, this person is freed up. We think they would do good on this project"....In our reviews, they say, "is there a type of project that you like to work on, or something that you enjoy working on?" And they try to factor that in....I said that I wanted to do smaller products with more intricate machines. It's more interesting to me. And they just put me on a project where I do that.

The member/non-member division is also a possible space of differential empowerment in the production process. While there are obvious differences between members and non-members (participation on the board, for example), it was emphasized that this difference at the governance level did not translate to the day-to-day work experience. One member in particular made this point strongly:

> One of the most refreshing things about IEM is in all the self-regulation going on, never ever, ever, ever, huge faux pas, unspoken rule...when we're working in a team, out on a project, there is no member/employee separation. When that's happened, when a member has tried to put that gold star on and say, "you gotta do it because I'm a member," they have been slapped hard. Employees, on the other hand, that say, "I'm just an employee," get slapped equally hard. There is no, absolutely no room for that here....when we get out on a machine, and we're working in a team environment, there is no business side to it. It's all about that job.

According to this member, a strong negative social sanction is imposed on anyone who attempts to invoke membership status as a salient quality in the team relationship.

Autonomy and Role Fluidity

This section discusses worker autonomy: the degree to which workers are able to control how they will organize and perform their tasks.

The most commonly reported example of autonomy at IEM is worker control over their time. This is as much the case for members as it is for non-members. The ability to make decisions about when to come in, when to leave, and how long to stay is very important for workers across disciplines and membership status. IEM has a convention that is called 'core hours'. One member explains this convention as one of the most important differences between IEM and other workplaces:

> I was amazed at the freedom. It was a huge change. You don't need to get here at a certain time. At my old job, being three minutes late was a major problem. There's trust. Our core hours are 9 to 3, but you can come in early or stay late. I can choose my own hours. I'm sort of old fashioned and like to get to work early and have evenings at home.

This sentiment was very common. All workers (with the occasional exception of sales workers, whose time spent with customers of course does not follow the core hours model) have the same access to this ability to have some control over work life.

Regarding control over the actual methods applied in the production process, there does appear to be some differential. For instance, a project manager has a very high degree of autonomy. One engineer who was commonly a project manager said the following when asked about what he likes most about working at IEM:

> The lack of red tape. I'm empowered to make decisions. If I need to make a decision to meet a customer need, I can just do it. I like having the power over the project. At a board level, people say at IEM I doing my job or not doing my job. But there are no tiers. I don't have to get approval from anyone to do my job, and I really like that. And that's true for just about anyone managing projects.

However, he was forthcoming about the case for other types of workers:

> ...It's not as true for the people who are assemblers. They can make smaller decisions. But for bigger decisions, they are not going to be tasked with that.

This, of course, isn't particularly surprising. In a firm where the primary activity is custom automation design, it is to be expected that those with the relevant educational and professional backgrounds will tend to occupy roles with more accountability over that process. It's important to note that there is no permanent stratum of engineers who are always project managers; many manage projects frequently, others do it occasionally, and some do not like the work of project management. There are no engineers who are invariably project managers on the projects they work on. Still, all workers, including those on shop floor, have much free reign over their work. This was shown to some extent above in the discussion on workers' motivation. One long-time member reiterates the point:

> ...the general freedom that no one really has a boss here. ...When you're given a job, you're in charge of your job. You set the pace, I mean other than the schedule, and you choose a way to do it, so you don't have people telling you how everything should be done. It's just nice to have that...where you can make all your own decisions, basically...

Another important aspect of autonomy alluded to in the above section on differential participation is the opportunities workers have for role fluidity. What we mean by role fluidity, is some blurring of the division of labor which occurs when workers, despite working under specific titles, are performing functions outside the specific bounds of those titles. It bears mention that what matters from the perspective of autonomy is the *opportunity* to step outside the bounds of your official title and increase the variety of your work; it is as much an autonomous choice to partake in the opportunity as it is not to. One member describes this as follows throughout his interview:

> ...At IEM, you're given a lot of rope. And what you do with that rope, whether you hang yourself, whether you start a macramé class, whatever you want to do with that rope, it's really up to you.

> And it's interesting how you, working through a day, how many hats you put on and take off, just constantly. From one project to another, if you're working on multiple projects, in some cases you're leading, then you have to follow, and then technically [in terms of the technical nature of a project] you have to go out here, [etc]....Some people are very good at a lot of those hats, other people just sort of gravitate towards the things they do better. And we have members here who stay out on the shop floor as much as they can. Now, is that necessarily a bad thing? You could say..., "well, he's not holding his own," but really he is, because if he's gravitating towards his affinity, collectively speaking, he's making the most effective contribution to what we're doing here....and that's where that rope comment comes in. You give the right people the rope. The people that are confident with their rope, and exercise good judgment, are most successful here. And even if you get a whole bunch of rope and you only choose to use a little bit of it, but you're using the best part of the rope, you're on board.

Workers at IEM appear to take these opportunities to use more of their rope, as it were, quite often. Even before acknowledging firm-level governance activities, this fluidity goes in many directions: with fabrication/assembly workers acting as proof-checkers for designs with fresh perspectives informed by their own education and experience; engineers spending time on the shop floor; sales workers taking part in project conception; and so on. This suggests that the division of labor – and crucially, the division of labor as it stands between conception and execution phases of production – is blurrier than it appears at first glance.

Conclusion

Workers at IEM enjoy a very high level of substantive empowerment, especially when compared with similar firms with more typical ownership and management structures. Although the levels of substantive empowerment are not absolutely equal among all workers, they appear to be very high across the entire firm without regard to official title or membership status. This substantive empowerment comes directly from IEM's particular structure, characterized by a very flat production management scheme which encourages mutual monitoring and discourages routinization of tasks and roles.

Governance and the Board of Directors

In seeking to understand how IEM has thrived in a highly volatile business environment, the Board of Directors is of central importance. The Board constitutes both the ownership of the business and its governing body. Those skeptical of the productivity of worker owned firms have focused on the difficulty of a large contingent of diverse owners effectively monitoring each other and their employees (Hansmann 1996). This section explores two general issues. First, while we are unable to rigorously evaluate the effectiveness of IEM decision-making, our interviews did provide rich descriptions of workers' perceptions of the quality of decision-making. Second, this section explores the mechanisms and practices that facilitate high-quality decision-making, according to the IEM workers. We first briefly describe the formal rules and processes of membership and Board decision-making. We then discuss the key management functions and decisions taken by the Board, and the perceived quality of these decisions by owners and non-

owners. Thirdly, we will discuss how decisions are made, and whose voices are most prominent around what decisions.

Board and Membership Structure

The Board of Directors consists of all IEM worker owners and is responsible for managing the business and affairs of the co-operative, including the establishment of rules and regulations, the guidance of executive officers, the management of personnel, and ultimate oversight of management. All owners must be workers, all owners serve on the Board, and all workers are eligible for ownership, with the exception of the manager and sales staff. The Board is organized around a number of permanent and ad hoc committees, including an executive committee, which organizes and administers Board activity. Members are not required to serve on committees, but can volunteer each year for single-year terms with oversight from the full Board. The list of permanent committees is listed in Table 1. Members of the Executive Committee are elected by the full Board and committee chairs are chosen by committee members. Ad hoc committees can be established by charter proposal, which must be approved by the Board, for particular purposes or tasks. The full Board has a standard bi-weekly evening meeting, which includes a section open to members and employees, and a closed section for members only, in which financial and personnel issues are discussed. Committees meet and work outside of the Board, and are paid their regular wage for these hours, but report at the full membership meetings.

IEM Permanent Committees
Executive
Personnel
Customer Relations
Office Tools and Technology
Shop Tools and Technology
Building and Maintenance
Social
Finance
Safety
Standards
Co-op Affairs
Marketing

Table 1 **IEM Permanent Committees**

To become an owner, and thus join the Board, any full-time employee that has worked at IEM for two years can submit an application. This is the first stage of the application process. Unless an employee's application is rejected by 2/3^{rds} of the membership, the applicant interviews with the Board and must attend both open and closed sessions of Board meetings. Applicants are also encouraged to serve on select Board committees during the application phase. Only one applicant can be under consideration at a time and, after a maximum three month review period, they receive an offer of membership if they receive no more than 3 to 5 'no' votes, varying with the size of membership. In the final stage, an applicant must purchase stock in the cooperative, currently priced under $20,000.

All workers at IEM receive an hourly wage, with the exception of two unique salaried employees; the sales manager and general manager. Wages are set along a 'laddered' scale when a worker is first hired. When becoming an owner, the worker's hourly wage is maintained at the same level as when they were employees, but they no longer have access to a benefits package. The more fundamental difference, however, is that owners are not guaranteed their wages but receive them only if the company is profitable. This wage is assessed annually as part of the worker evaluation and may move up or down the scale. At the end of each year, owners pay a certain percentage of their total earnings into common equity and receive a certain share as dividends. In the early years of ownership, a larger portion of members' earnings goes into common equity. If an owner leaves IEM, their stock and common equity is re-purchased from the member by the co-operative.

General Management Quality and Effectiveness

Members and employees generally agreed about the quality of decision-making and efficiency of management at IEM. While some lamented the time-intensive and sometimes stressful nature of decision-making, no interviewees suggested that the company was poorly managed. In fact, the quality of decision-making and attention to detail was consistently highlighted as an added value of the cooperative structure. One member described the cooperative's management decision-making as a bell curve; at the tails were outstanding and poor decisions, but the gross majority of decisions were somewhere in the middle. This implication is that the cooperative structure helps IEM to avoid bad strategic decisions and overwhelmingly make effective, though not 'high risk, high reward' decisions. This was explained in a number of ways.

First, each decision at IEM is scrutinized by a wide range of actors within the business. However, in addition to scrutiny from others, workers monitor themselves. The quote on page 10 about the disorienting effects of a work environment in which authority is widely distributed speaks to the distinctive quality of decision-making at IEM. This individual expresses how the pressure is both self-enforced and enforced by pressure from other members, however indirect. This blend of internal and external pressure was consistently noted, though the mix of influences varied by worker. Owners mentioned the importance of being both a "self-starter" and the importance of keeping "eyes open to your surroundings".

Second, new employees remarked on the distinctiveness of a lack of formal management positions at IEM, and explained how competitor firms were larger and had layers of middle and upper management. In addition to the responsibilities taken by owners on committees and in informal oversight, one owner highlighted a distinct characteristic of the organizational structure. This mechanical engineer owner explained:

> Here, the project manager has more over-all responsibility. At my previous employer, you had a larger contract administration department, you had production planners and all those departments and resources to pull from. Here, we essentially don't have that. We're doing all of the interface with the customer. Depending on the project, you might be the mechanical lead designer so you're directing all the efforts yourself, as well as designing. You're asking for resources, manipulating the project schedule, and conducting all the communication with the customers and suppliers.

Team-based project management is an increasingly common organizational feature in manufacturing industries, but the IEM structure is distinct because managerial and administrative roles blend into production roles. In other firms, customer communications, scheduling, or purchasing may have been wholly handled by an administrator or manager. At IEM, these responsibilities are shared by workers and limited administrative staff, or they are the sole responsibility of workers.

A third explanation of the effective management at IEM centered on the project basis of work. As a mechanical engineer owner explained:

> It's pretty rare that we make a bad decision because if someone was steering us in a totally wrong path, usually there's going to be someone in the room that the light bulb goes off… but again, we're not having to be innovative in the sense of the products we put out there. I mean we are innovative and we come up with crazy machines, it's a highly technical thing, but I would almost equate it more to a construction company where they do the same thing every time… and we don't have to worry about this product and how well it is purchased in the market.

As others noted, IEM has always been a 'cash-based' and 'conservative' business. The business was founded by two engineers taking contract work from local manufacturers and has always been demand driven. Their business model is such that their level of work fluctuates with the flow of projects that they receive. Though a marketing committee was recently created, the company commits no resources to prospective research and development. While IEM has traditionally entered into new markets when opportunities have been present, and has generally responded to existing demand rather than seeking it out, in recent years, the cooperative has begun to invest in booths at trade shows and increased marketing capacity. Over time, IEM has moved into emerging markets like solar and medical, but these shifts have been described as conservative and gradual. Organizationally, IEM also emphasizes flexibility, in that they maintain the capacity to produce custom automated manufacturing machinery for a range of industries. At the same time, IEM avoids low-value production by customizing their products to customer needs and branding themselves as a custom manufacturer. IEM competes in a high-value, low volume niche, in which its margins are achieved through product sophistication and low overhead.

Lastly, numerous interviewees emphasized that one role the Board does not play is that of motivator. As one member explained, "if someone's doing a good job, we never talk about them". While much of the motivation that drives the cooperative's success is due to monitoring, self-censure, and structured management roles, a fundamental source of IEM's effective governance and overall success can be attributed to its choice of personnel.

Personnel Management

The importance of personnel in IEM's success is well-recognized by owners and employees. As is written in the cooperative's owner manual, "Today Isthmus Engineering is a well-established name in the automation industry with a strong reputation and a long track record. The Board feels the best way to maintain this level of success is to be careful and thorough when selecting new members to join the Board."

(p.11)[8] Prior to entering the Board, however, workers are filtered through a number of stages, as outlined in Table 2.

1. Employee Hiring	2. Employee Probationary Period	3. Application for Membership	4. Annual Reviews of Members

Table 2: The Stages of Personnel Review

The first stage is the hiring process, largely handled by the Personnel Committee and the Human Resources manager, who is part of that committee. IEM emphasizes professional skills and experience in their hiring criteria and this is primarily attributed to a desire to hire high-skill workers. One long-time member explained that the firm cannot afford to pay an entry-level worker the going rate, unless they bring skills along with them. Few workers enter the cooperative with an idea of what a cooperative structure entails and this does not seem a priority. Another machinist member offered a different interpretation of the experience criteria:

> I think a person coming directly out of say, like a community college, would have a difficult...maybe not difficult time. But they would have a skewed opinion on the world and life and on the way things work if they were to come directly to IEM. I think because there are things that go on here that obviously don't go on in the real world, part of the reason you're sitting in here asking me questions right now. But, so, to come from an environment like that and then to come here, where everyday is a new challenge. I mean, it's unusual for me to make the same part twice.

This quote suggests that, in their hiring criteria, IEM is looking for self-starting employees who are prepared to take some leadership or initiative. The overwhelming sentiment, however, is that IEM is most concerned with hiring the smartest and most qualified applicants available.

Once hired, the first six months serve as a probationary period in which the new employee and the members get to know each other. When asked whether it takes long for employees to acclimate to the IEM environment, most respondents gave similar responses. As one member explained:

> It seems like most of the people who we have hired have worked in pretty quickly. If they don't they're gone pretty quickly, whether it's through their own choice or whether it's because we have to let them go.

Upon arrival, employees quickly recognize that the management structure at IEM is extremely different from their previous firms. More than any other response, interviewees remarked that the biggest difference between IEM and their previous firm is the flexible hours. Employees are largely free to re-arrange their schedules, administrative or bureaucratic minutiae are minimal, and explicit monitoring by owners is actually discouraged. Monitoring occurs through employee reviews, conducted by peers and overseen by the Personnel Committee. Thus, whether an employee is self-motivated and whether they enjoy the highly unstructured work environment is readily apparent.

[8] IEM & Manufacturing Owners' Manual (2010)

The application for membership constitutes possibly the most important weeding stage. On one hand, membership is formally open to all employees and new employees are able to, if not encouraged, to attend the open parts of Board meetings. In the recent past, employees have begun to serve on selected committees. Non-member employees have not always been able to sit on the Board.

At the same time, employee applicants are not always accepted. A long-time member emphasized how members seek out particularly motivated employees and or self-starters and use membership to commit them to IEM. He explained:

> Through the years, we have made some really good decisions finding people out there. Paying them for what they're worth. Making them a member. Really tying them in to this place and keeping them around. It really helps… I would say about 1 out of 4 or 3 people, that's what we'll find, out of the 4 people that we hire. We find one and that's the catch. That's the one you want. The other three, they are good people, they do good work, but they don't have that little extra edge.

The Board consists exclusively of members, but invitations to attend open sections of Board meetings and to participate on committees serve as opportunities for potential members to demonstrate their potential contribution to the membership. Explaining his personal criteria for evaluating a potential employee, one member explained:

> If someone's a good worker and they aren't high maintenance, and they're not a difficult person to work with. You don't have to be best friends with everybody to work here, but if somebody is difficult to work with, a little of that you can overlook because that's just the way people are, but if they cause a ruckus on a regular basis, you just see that. And that's some of my personal things.

Lastly, evaluation does not end once an employee becomes an owner. All owners are subject to annual internal evaluation. Each year, each member of the Board is evaluated by her peers with a positive, negative, or neutral vote. If an owner receives four or more negative votes, the issue is discussed before the full Board. The Board must have a vote of 90% in order to remove a member, but this has happened in the company's history.

In sum, the membership selection process involves explicit efforts to recruit a particular type of member, who is self-motivated, affable, and can contribute as an active Board member. At this stage of research, it is difficult to identify whether the ability to contribute is largely overshadowed by an applicant's educational background.

Differential Participation and Influence

Beyond formal access to decision-making, we were interested to learn about the diversity of participation in decision-making. Ultimately, we found that members participate to varying degrees, along varying lines, and in varying contexts.

First, as is an over-arching theme at IEM, those who are the most effective or active are those who initiate participation. Participation varies significantly across the membership and it is not a cause for expulsion from the membership.

Some also suggested that owners only participate in discussions that are relevant to their interests. On a decision regarding the purchase of a shop machine, for example, engineers stated that they would likely defer to the judgment of machinists and assemblers. However, even when an issue is important to a member, certain constraints limit their ability to participate. Some workers suggested that seniority matters. Newer members reported feeling less comfortable asserting themselves in Board meetings. As one young engineer member explained:

> I don't know all the history and the precedents that have led up to, okay here's why we're making this decision right now, so, I don't feel as comfortable diving in, saying no no no, we don't need to do it, we should be doing it this way, because I don't know the history, I don't know what's been tried, I don't know how things have been done leading up to this. So at the board level, I'm less likely to dive into a big discussion.

While some Board members may participate more regularly or vocally in general meetings, committees serve as an environment in which less outspoken members can participate. They increase the quantity of management issues that the Board can undertake and they allow members to gain exposure to new areas of the business. Once per year, during a Board meeting, members volunteer to serve on committees by writing their names under headings on a chalk board. The Board then deliberates and can move members around to different committees. Some committees, like Finance or Customer Relations, serve extremely important roles in the management of the business. For example, the Customer Relations committee oversees the assignment of project teams and the selection of projects. Such decisions shape the pace and the character of work for employees. Members from a range of disciplines (machinists, assemblers, and engineers) do serve on such key committees. Some members report remaining with the same committees over time, while others report regularly switching committees.

Social Structure: Informal Social Ties and Relationships

This section will investigate social structure at Isthmus Engineering, informal social ties and relationships among its workers, and hint at the possible effects of these existing relationships on the governance and decision-making process.

"How did you hear about Isthmus Engineering?"

IEM operates in a highly competitive, high-technology sector. Similar to its competitors, it hires its workers on the basis of skill and talent without any attention paid to whether they have any prior knowledge about its cooperative structure. As many members at IEM emphasized, IEM is a business and, in some aspects, no different than other businesses. Keeping their comparative advantage in their niche market requires hiring talent into the company, which underlines one of its commonalities with other privately-owned companies. However, due to IEM's worker-owned cooperative structure, the hiring process is of great importance. Existing members are especially invaluable: they are able to provide information about the candidate's personality and work ethic, as well about his/her skills, that is perceived with less bias than an external reference might. This strongly aligns with the cooperative culture of IEM, where the new

employee is expected to fit into the existing culture, to be able to work and get along with everyone else. Because firing decisions are not easy, they have a strong tendency to choose the "most suitable" person from the beginning. In some cases, current members were introduced to the company through their previous contributions during busy periods.

As has been mentioned above, IEM has a flat management structure, which is epitomized in the notion of "having no bosses". This becomes especially explicit in the work process, i.e. the management and execution of projects where there is an equal treatment of everybody: employees and members, engineers and "shop floor people". One member highlighted it succinctly:

> There's no boss staring at you, there is no us versus them… But in the old job you didn't have a chance. Here you explain problems, bring up solutions, talk to the project manager. At the old job, the project people would say "you're a shop guy". At Isthmus … they welcome ideas. There's a mutual respect, a mutual respect for everyone's skill, we're working towards some ultimate goal, which is obviously about money but also about family. Well not exactly family, but everyone's part of the big wheel.

Also, friendship networks are important in sharing ideas and at times backing up certain difficult decisions through what one member defined as "canvassing". At times, this enabled a friend to voice the issue shared by the network:

> Testing the water… There are some people that, again, because of how they question their credibility as a presenter, they want to make sure they've got a little back up before they bring something up in the board. So, I gotta believe that it does happen. And I've done that, I've bounced ideas off other people and say, "hey I'm thinking about this, what do you think? Before I go and pitch this thing to everyone, what do you think? Am I crazy here, you know, am I seeing the same thing?

Overall, people at IEM enjoyed working there and were aware of the necessity to carry the company forward despite everyday difficulties and temporary disagreements. As one member put it, at the end of the day, "everyone has to still work together, sit down on the board to make another decision."

Growth and expansion issues at IEM

As IEM has grown since its start in 1981, it has faced issues that illustrate important aspects of their challenges and successes as a worker-owned cooperative in a high-tech, highly competitive industry. Globalization and structural changes in the economy have had major impacts. IEM has needed to be extremely flexible and productive, while attracting and maintaining a highly skilled workforce. They have invested in sales and marketing, in technology, and in their facility. At the same time, they have needed to explore and invent responses to expansion and change that are consistent with the vision of their 25 – 30 cooperative owners.

IEM started as an engineering design firm, in a manufacturing environment that was heavily dominated by the automotive industry. As the automotive industry declined, IEM developed specializations that were independent of a particular sector. In a highly-competitive and rapidly-changing environment, they increased their value through innovation. They have taken advantage of their small size, a highly-skilled workforce

and low overhead. Very importantly, their cooperative structure encourages long-term strategies. They don't have the pressure of showing consistent short-term profits, or a single owner demanding significant return on investment. When asked how IEM succeeds in a highly competitive sector, workers talked about the talked about IEM's flexibility, talent, and incentives to succeed:

> Not having management and all these rules and procedures that sometimes you have to go through, makes us very quick. In this market, that's necessary… We have that nimbleness that I think works well, given the products we make, because we build weird things.

> We can do anything. We have some geniuses working here. It's so the creative the way they do it. ..We can move quickly and make exceptions. We're not an aircraft carrier that takes so long to get things in line.

> The fact that we have only have 2-3 managers is amazing to me. When I was at xx company, which was twice the size, we had like 20. (At IEM) we say let's be lean and mean and we'll divvy up the spoils at the end of the year. So there really is an incentive to be efficient that isn't there in another firms.

IEM has maintained the same-sized workforce for 15 years, while the value of the firm has grown. This section examines how IEM has responded to the challenges of expansion and growth, within the structure of a worker-owned cooperative. This is how one long-time member summarized the owners' goals, as they look to the future:

> Most companies would correlate profit margins with the size of the company. That's the last thing we do. Before profit, the first thing is sustainability. Can we sustain this and then maximize the profit margin over the long term? That's our goal.

Investments in Workforce Training and Technology

As customer requirements have changed, IEM has invested heavily in the tools needed to do the work successfully and efficiently. These investments have helped them take on increasingly complex work, while enhancing the productivity of their workforce. IEM has two standing committees that research and make recommendations on technology purchases. In a technology-intensive environment, during an economic downturn, we might have expected to hear some concerns about continuing investments in tools and training. Instead, we heard positive comments from both employees and members, on both the shop floor and in the engineering cubicles. This is an example, from a machinist:

> IEM is good about staying up with the technology… they're not afraid to spend money for my aspect, tooling, software and then training. I think that IEM gets the fact that an educated and well-equipped workforce is happier and more productive and in the long run makes more money for everybody.

Workers from IEM present their approaches to investments in training and technology as preemptive and strategic, as evidenced by these comments:

> I think we're reactive to the market. We try to be proactive in the sense that if we see an opening, where we're needed, we want to get someone up to speed before taking on the work.

> 10 years ago we decided to go from a 2-D Autocad style of software development for the mechanical engineers to a 3-D modeling type. Making that move, which doesn't sound like a lot, but it was an investment of over $100K, that freed up enough engineering time that we didn't need to hire additional engineers and it made our prints better that we needed to hire fewer assemblers.

A Flexible Workforce

Project-based work means that IEM must be flexible and responsive to customer needs. Projects have a very specific framework, with a beginning and an end. When a project is on the shop floor, it may require a large team putting in many hours, but once it's left the floor, the hours diminish significantly. People reported working 80 hours some weeks, and 30 hours another. As IEM has grown, it has taken on larger jobs. These larger jobs exacerbate the volatility of labor needs, and are especially challenging in a highly-skilled, knowledge-based environment. IEM strives to offer steady work to its employees and members, and regularly use experienced contract workers to fill in gaps. As a cooperative, IEM has had to balance its need for flexibility with other needs and values.

IEM's workforce includes 29 members and about 20 employees. IEM has a clear interest in having a skilled and experienced workforce available. The board controls human resource decisions very closely, and these decisions are a critical factor in IEM's ability to respond to changes in their market. They limit hiring by using contract workers, especially in the most cyclical areas, like assembly, and they reduce work hours to avoid laying people off. Although there are some very distinct differences between employees and members at IEM, there is evidence that members and employees are treated similarly at times of economic stress, as stated earlier.

> Anytime anyone is laid off, or let go, or whatever, those are always real hard decisions. I would say we've whittled ourselves down to a group that we really like as far as, you know, everybody can do their jobs well, they're valued people, they're here to do the job when you want… And I think the employees like it around here, because they know that we're not just going to get rid of someone and just go hire someone else. So they feel pretty safe as far as their jobs go… We sit as a board, and go through all the different jobs and look at hours and maybe we'll decide not to lay somebody off, but we'll say, "alright, you three people, instead of working 40 hours we want you to work 30 or 25 and do that until business picks up.

> Typically, in the past, we've tried to share that load, or lack of work. And the reason we've done it is we've tried to migrate as we've had some turnover, we've been trying to keep the best people… And it's usually worked out that if both members and employees can reduce and share the load during those really lean times, then they're both able to sustain and get through the time and they can both come back... We try not to just use our resources and benefits as a way to cut money and cut costs. We try to look for other things that people can do. Like cleaning the mezzanine where all our junk is stored. Jobs you never get to when you're really busy. We try to do things like that and keep people busy during lean times.

IEM uses contract workers to achieve several goals. Contract workers allow IEM to take on larger jobs than the current workers could handle alone, and they help ease the peaks and valleys in workforce needs. Since they are not brought in as employees, they can be laid off as needed and they don't have the opportunity to become members. In fact, many of them are retired former IEM workers, who are highly skilled and understand their projects and culture. Two members commented on the benefits of this system:

> If we think we cannot dedicate enough manpower to hit that date, then we look at bringing contract help, which we have done several times in the past year… Generally speaking, contractors are expensive. But we have a few that are very good. They get us out of trouble, but they help us maintain a certain level of people employed here without having to hire extra people and lay them off when you aren't using them.

> There's sort of a list for assembly, because that's something that tends to go in larger waves. All of a sudden you need a ton of people and then two months later you're not going to need them anymore so you don't want to be hiring and laying people off… generally, it's people who have had some prior relationship with IEM.

Increased Specialization of the Workforce

Earlier sections of this paper describe IEM's departments, the role of the board, and the interactive nature of their project system. They have kept overhead costs low through a lightly managed environment where the workers, the board and committees accomplish many administrative and managerial tasks. IEM has had a general manager for many years, but in the last decade they've invested in additional sales and marketing capacity. Their current capture rate is about 10%, which drives sales expenditures up. To mitigate these expenses, they lower the costs of developing a project quote, relative to their competition.

> In the last few years, we've done more knocking on doors. We went the first 20 years without a salesman at all. It was just opportunities that came to us that we responded to. Now we've had a salesman for 10 – 12 years.

> IEM does a different level of detail on the quote…They don't have to nail the costs down the way we did [at a previous firm]. A lot less work goes into the quoting effort. .. I think IEM hits the mark. A lot of these clients are looking at the budgetary numbers.

They've added to the sales force this year by hiring a young engineer with some sales experience, as well as an experienced engineer who does both technical work and sales. This individual is located in a large city in the region, where many of their customers are located.

> I've worked with all their customers, and have former co-workers who are now working for Fortune 500 companies. So I had a lot of contacts in x city, which was one of the things they were looking for.

The sales group includes two members who do the initial design concept, the pricing and the proposal. Although the sales group has authority within their specialized area, if the

proposal is perceived as risky, the sales group will bring it to the board. The margin may be low, or the customer might be problematic:

> And sometimes there are ethical questions that come to the board. In our bylaws, we have it written that we will not build anything for the military. And sometimes we have had customers that we don't really like who they support politically. But they want us to build equipment for them. So we have to decide who we are going to do with business with.

Changes in the Meaning of Ownership

Because this study is based on information gathered during a single period, we can't say anything definitive about changing perceptions of ownership at IEM. It's clear that there have been significant changes in the process of adding new members, in the ratio of members to employees, and in the roles and requirements of members. At the same time, some of the most significant policies have remained the same. The board still consists of all members, and it meets often to discuss and approve all of the cooperative's important decisions. Membership is open to every employee, regardless of position. A portion of the profit distribution is based on hours worked, regardless of skill level. A weekly meeting, where financial and project scheduling information[9] is shared with all workers, has been a lunchtime tradition for many years.

When IEM converted from a partnership to a cooperative, everyone was a member. The original partners loaned money to the cooperative at the time of start-up, and were paid back in a few years. Since then, the investment requirement has stayed fairly consistent, with inflation, but the personal risk required from members has changed considerably. Although the cooperative corporation limited members' liability, in the early years the firm needed member's personal guarantees in order to obtain credit. These guarantees were a requirement of membership until about 1995. When the first building was built, members used their homes as collateral for the note. The IEM "Owners' Manual" makes an explicit connection between the current deliberate member evaluation process and personal risk:

> In the early days of the co-op, when membership carried considerable risks, applicants could become members with little or no evaluation period…Members joining the co-op today encounter almost no risk...There is little doubt that the capital contribution they are required to make will be returned as additional income in a short time…Today IEM is a well-established name in the automation industry with a strong reputation and long track record. The Board feels the best way to maintain this level of success is to be careful and thorough when selecting new members to join the board. (Owners' Manual)

As earlier stated, Board committees help to increase governance capacity, improve decision-making efficiency and increase member participation. Although many of the elements of governance have remained constant at IEM, the role of committees has changed.

> We're doing more by committee. Let the committee go create a charter, come back with a proposal for the board…Like one of the decisions is we're having a machinist retire at

[9] *Isthmus Engineering & Manufacturing Owners' Manual* (2010)

> the end of the year. So we're questioning, okay, do we want to replace this person? And we're off to a committee to do that.

Workers at IEM perceive additional functions for committees, including postponing the adoption of a representative board structure:

> Committees evolved and believe it or not it was a fight to get it through….There's always this thing lurking over us as we get bigger and have more members, will we go for an elected board, instead of all of us sitting there?

The small size and specialized functions of committees can provide a comfortable space for new members to discuss issues. A new member described the benefits of committees, given the challenges of participating actively in a large board:

> In committees it's a lot easier to have those conversations and ask a lot more questions…so in that sense, I'm more active in those roles in the committee as opposed to being at the board level… I'm not going to be giving direction to a group of 30 people on what they should be doing.

Some committees which deal with non-sensitive issues were recently opened to employees, which gives them a chance for input beyond their regular jobs. And new members are now required to join the cooperative affairs committee. A recently accepted member commented:

> As a new member you're required to be on the co-op affairs committee, so you have a better idea of what the U.S. Federation is doing and ongoing events. I was working on a project and we needed to have some safety stuff done in the company and so the committee said, "M, you should be part of this committee". I'm sure there are committees that you can't be on, like finance or customer relations or the HR committee.

Perceptions of Growth. What's in the future?

Although this study didn't explicitly focus on growth, the workers that we interviewed regularly reflected on future challenges and opportunities. Perhaps this is because the majority of workers are on the board, directly involved in day-to-day and strategic decision-making. Non-members receive weekly updates on all projects and financial targets, so all workers have a relatively high level of knowledge about the firm's situation. Our first interviewees mentioned issues related to growth when we asked about difficult decisions, or when we asked about firm milestones. In some of the subsequent interviews, we asked people to comment explicitly on expansion and growth. Their comments can be divided between internal and externally oriented strategies, although the two are certainly linked.

At its most fundamental level, growth in a worker cooperative is about adding workers. IEM has had 50 workers for 15 years, which means that 2/3 of our interviewees have always worked with this number. This longtime member commented favorably on IEM's strategy of staying small:

> 50 is some kind of magic number… we don't like crossing the 50 people threshold because then people start to become numbers. We would rather maximize what we have.

Another member worried about the effect of growth on their culture and governance:

> I am very opposed to expansion of the company. I think our cooperative structure and everything about the way we do things around here would break down, because not having management and all these rules and procedures makes us very quick

A third member focused on the positive impact of a stable workforce on productivity and profits:

> We've been right around 50 people for 15 or 16 years, and we've actually just tried to keep that number. Our idea or philosophy is that we just try to do things smarter and faster, and not just keep pulling in bodies. It helps our profit, helps everything.

The sentiment about workforce growth was not unanimous. A longtime member spoke in favor of gradual growth:

> I'm approaching retirement and I want to make some good money in the next 8-9 years…Many people don't want a jump, just manageable growth… I don't know how growing quickly would affect a worker co-op, it might fragment the structure too much. I can see that point of view but I would like to see for a long-term goal, 5% growth per year. We haven't done it in the past 4-5 years, we've had status quo or even stagnated.

A related issue is the question of increasing the absolute and relative number of members. Members consider this issue from several points of view: the effect on their personal finances, the strain it might put on the board and governance structure, and the benefits of acquiring additional talent and viewpoints. Several members referred to the "pie theory", which advocated that additional members increase the earning potential for the firm. This concept of growing the earnings pie was described by one of the founders:

> When you look at the co-op and the members of the co-op as a slice of a pie, when you bring in a new member, the pie gets bigger, and the slices of the pie do not necessarily get smaller. We used that theory for a long time.

Another member vehemently expressed an opposing opinion regarding the effect of new members on earnings, and the ratio of members to employees:

> A topic that we struggle with is the ratio between members and employees… We're at a disproportion right now. We have more members than employees. My income has been steadily going down.

Although IEM has added a number of members in the last few years, at least one employee was well aware of concerns about the division of earnings:

> Sometimes from an outsider's perspective, it can feel like they don't want you to become a member. I don't know if they want any additional members. Because, I mean, obviously every additional member takes another piece of the pie. So there are more ways that you have to split the pie up.

Although several people mentioned their personal income in relation to growth, there were more comments on the potential culture changes that growth might bring. Unlike many firms, IEM's leadership group (the board) includes a diverse age group,

with at least half of the members in their 20s, 30s or 40s. Although the two remaining founders are probably nearing retirement age, IEM is not facing the imminent departure of a large group of baby boomers. Nevertheless, one longtime member expressed concern about the potential disruption caused by new members:

> You bring in members that have been here a mere five years that don't understand traditions, don't understand why we do certain things, and all of the sudden they've got the vote. All of the sudden we're changing direction…I think we're at a little bit of a crossroads where we've kind of lost our vision…the vision for who we are, the co-op thing.

Aside from adding more workers, the only specific growth strategy that came up was buying another company. Although it is being discussed, it was only mentioned by a couple of workers, when asked about future plans. IEM has hired one employee who is not based locally, and perhaps they're testing the system. The employee commented on his status:

> I'm a little out of the IEM norm. I'm the only employee in XX city and I'm salaried…It makes sense for now, but it's a very different set up.

We didn't hear enough about these plans to declare that IEM is at a crossroads, but it is certain that purchasing another business would mean a radical change for the cooperative. In 30 years, IEM has grown from a cooperative of eight members to a firm owned cooperatively by 29 members, with about 20 employees. Important characteristics of the project work and governance structure have remained stable for many years. One of the founders characterized it as a "conservative" organization, and he talked about the strength of having many viewpoints when decisions are made. As IEM looks to the future, the 29 members of this cooperative firm will be considering opportunities like increased globalization or acquisition of another firm. Balancing these changes and their rich culture and governance institutions will speak to directly to the ability of worker owned businesses to operate in a dynamic global economy.

Conclusions

As stated at the outset, Isthmus Engineering and Manufacturing serves as a unique case because firms with worker ownership are expected to struggle in industries with diverse workforces and rapidly changing market contexts. Looking back to the claims originally presented by Hansmann, about the necessity of workforce homogeneity in worker-owned firms, the Isthmus case does not refute but refines his claims by specifying the types of homogeneity that are most important. There are various dimensions of homogeneity and some matter more than others. First, growth is conservative at IEM and additional workers are not added unless they are expected to both add value and maintain the participatory culture at Isthmus. The 50 employee mark serves as a loose boundary specifying the point at which worker-owners anticipate that the shared norms of participation and close bonds among workers will begin to diminish. Second, while there is some overlap in the division of labor, varied occupational categories remain. Workers from different occupational categories assist in other areas of production, workers are

actually encouraged to develop skill sets that are lacking within the business and would differentiate them from other workers. In the production process, worker heterogeneity is valued. In sum, while workforce heterogeneity remains in the occupational diversity of workers, there are efforts to homogenize the workforce around norms of participation in ownership and commitment to the sustainability of the firm.

In contrast to the firms studied by Vidal (2007), where lean production methods often led to substantive empowerment only given certain conditions, and then only for some subgroups of workers, we found that Isthmus Engineering extends a higher degree of substantive, rather than simply nominal, empowerment for its entire workforce. While it is clear that empowerment is not equal among workers for reasons related to division of labor and membership status, the extent to which IEM is able to maintain an egalitarian workplace despite these constraints is striking.

It should be emphasized that these are general impressions based on highly limited research results. We were only able to interview half of the people at the firm, and were not able to conduct follow-up interviews. And the first few interviews, it should be said, served to "work out the kinks" from our research questions. We had limited access to relevant documents, especially financial documents, at the firm. For this reason, we have very little of this type of data. Information about IEM's wage structure, for example, was not available. Indeed, interviews and only a very few documents (such as an employees' handbook, a project flowchart, membership applications, etc) are our only sources of data. Ideally, this project would have involved a full ethnographic study, including participant observation and extended visits. Finally, because a number of interviewees had some motivation to present their business structure as effective, the data must be approached with some scepticism.

These limitations notwithstanding, it is clear to us that IEM provides a significant opportunity for research on workers' cooperatives. IEM represents a highly democratic and participatory way of organizing production in a high-tech industry characterized by a marked division of labor. More research on this firm is necessary to better understand its constraints, its achievements, and the institutional possibilities that its model promises.