

The slide features a white background with a blue border. At the top left is the ETH logo with the text 'ETH Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zürich'. At the top right is the 'Informatikdienste' logo with a sun-like icon. The main title is 'The Political Implications of having Fun (while Programming Open Source)' in blue. Below it, the event details 'Europython 2011' and 'June 23' are listed. The bottom half of the slide shows a blue-tinted photograph of a large, circular, modern architectural structure, possibly a dome or a large hall. At the bottom left of the image, it says '© ETH Zürich | Benno Luthiger' and at the bottom right, 'Datum'.

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This talk is not a technical talk. I'd never dare to hold such a talk on e.g. a Java conference.

But I've got the impression that the Python community is very open minded, I submitted this talk about "The Political Implications of having Fun (while Programming Open Source)". The talk got your votes and, thus, it got it into this year's conference program.

I've enjoyed Anna Ravenscroft's talk about diversity a lot. I see this talk as a completion to hers talk in many aspects.

Some of you may have attended Andrew Mleczo's presentation about "building complex web applications having fun". Obviously, *fun* is an issue in the Python community and, however on a different level, my presentation adds to Andrew's talk.

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Programming is fun!

- What kind of fun?

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(Movie insert „angry man destroys computer“ from *youtube.com*)

Starting from oneself, from the experience one has made and the ideas one has developed, is always a good idea.

But then you have to pay attention not to generalize.

You may be exceptional, therefore, your experience is not shared by anybody else. Or you may be bloody normal and your experience is common to the whole world.

To find out, in a serious way, how much of your experience is shared by other people, you have to start some kind of research.

That's what I've made.

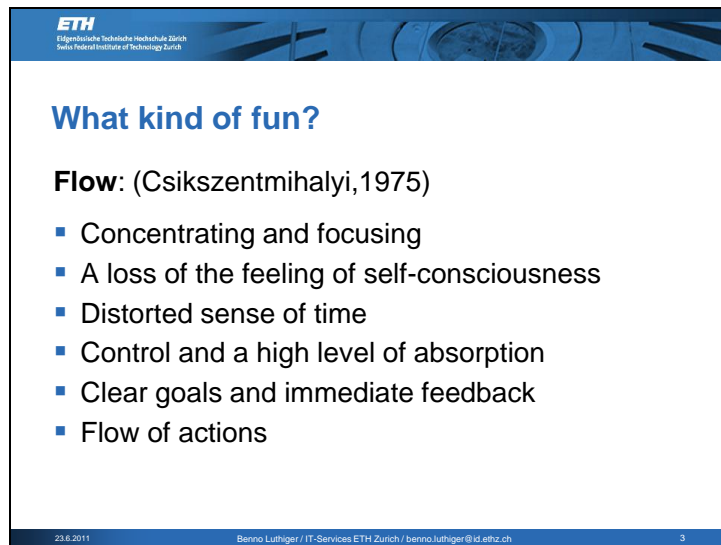
I've made the experience that I enjoy developing software most of the time and always again.

Therefore, I wondered whether this experience holds only for me or, on the contrary, is true for other people too.

That's why I started my Ph.D. research on the motivations of open source programmers.

My hypothesis was that fun is an important driver and may explain a lot of this interesting phenomenon.

So, what's the kind of fun we talk about? [Movie] is kind of funny, but it's a superficial kind of fun, but it's a rather malicious pleasure on the shoulders of that poor man. Thinking about this movie twice, I'd think even the programmer that produced the software that drove the man in the movie crazy, even this programmer didn't have much fun doing his work.



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What kind of fun?

Flow: (Csikszentmihalyi, 1975)

- Concentrating and focusing
- A loss of the feeling of self-consciousness
- Distorted sense of time
- Control and a high level of absorption
- Clear goals and immediate feedback
- Flow of actions

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What I have in mind when I talk about fun while programming is of different kind. It's a kind of fun the psychologist Csikszentmihalyi described as *flow*.


Flow is a special form of fun. The flow experience is characterized by the following elements:

- *Concentrating and focusing*: this means a high degree of concentration on a limited field of attention. A person engaged in the activity that creates the flow experience will have the opportunity to focus and to delve deeply into it.
- *A loss of the feeling of self-consciousness*: this means that action and awareness are merged when you're in the flow state.
- *Distorted sense of time*: the subjective experience of time is altered. You don't know how many hours passed while you've been in the flow state.
- *Control and a high level of absorption*: you have a sense of full personal control over the situation or activity.
- *Clear goals and immediate feedback*: you know what you have to do and when you have achieved. If you failed, you can adjust your behavior as needed and immediately for that you can be successful in the next iteration.
- *Flow of actions*: this means that each steps leads fluently to the next as if the events are lead by an inner logic.

For that flow can happen, we need two important prerequisites that govern the situation:

- *Attention focusing*: the attention has to be focused on a limited field of stimulus. (No danger of distraction.)
- *Balance between ability level and challenge*: The perceived requirements have to be in balance with the person's ability level, whereas both requirements and the person's

abilities have to be over average (in the actor's view). Both too high challenges (anxiety) or too low challenges (boredom) will kill the flow experience and lead to frustration.



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Study design

- Dependent variable:
engagement: hours per week
- Independent variables:
fun (measured as flow)
available time (e.g. spare time)

In 2004:

Questionnaire in open source community:
response rate: 1330

Questionnaire in open in 6 commercial firms:
response rate: 114

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Based on this understanding of fun I've designed my study. I developed an online questionnaire with which I've been able to measure the software developers engagement in open source projects depending upon their available time and depending upon the fun they have while programming. The idea of this approach is to look at the variance of the dependent variable, in my case the engagement in the open source projects, and look how much this variance correlates with the variance of the independent variables. The statistical method to achieve this is regression analysis.

I posted the questionnaire to the open source community in 2004 where I got a response rate of 1330 filled forms.

I did an analogous questionnaire within 6 software companies in Switzerland and yielded a response rate of 114 forms.

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Study results

$$E = c + a_1F - a_2F^2 + b_1T - b_2T^2$$

Flow/Fun	(a ₁)	1.210***
available Time	(b ₁)	6.127***
available Time ²	(b ₂)	-1.468***

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Here's the mathematical formulation of my hypothesis I tried to test. Engagement in open source projects as function of the programmers fun and his available time.

I've modeled with quadratic terms having negative sign to express the diminishing marginal effect of additional units.


With the model, I can explain between 27 and 32 percent of the variance in the dependent variable.

This means that my explanation is relevant, but it lets room for additional explanations of the open source phenomenon.

An additional insight I got:

Fun doesn't wear off: we don't have a quadratic term with negative sign, an additional unit of fun is linearly transformed into engagement.

So much for the basic result of my study.



Hackers and Professionals

Differences:	OSS	commercial	correlation
project vision	✓	?	.358***
optimal challenge	✓	?	.270***
deadlines	✗	✓	.256**
formal authority	✗	✓	.115
monetary incentives	✗	✓	

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I've been able to create more insights looking at different subsamples. In my sample, I could identify a significant difference between Hackers and professionals.

Hackers: developers who do open source programming mostly during spare time
 Professionals: developers who do open source programming mostly at work (e.g. are paid)

The difference I've identified: Hackers have more fun while programming. If the activity is the same, what makes the difference?

I've identified five traits where open source and commercial projects differ. When I talk about open source software here, I assume that the contributors have freely chosen to contribute to the project and that he does his contributions in his spare time.

That given, such oss projects usually have a project vision because that's the basis upon which the programmer can decide to contribute to the project or not. An oss project provides optimal challenge because the programmer contributes exactly what he's able to do and what he finds interesting. Because unless he's not a masochist, he will not do something he finds boring.

Such oss projects usually have no deadlines because you can't impose deadlines on projects where the contributors work for the project during their spare time. Such oss projects don't have a formal authority, instead, authority is based on professional qualification. The projects don't offer monetary incentives that could constitute formal authority.

When you're paid as software programmer, for open or closed source projects, the projects you're in might or might not have a vision. The same holds for the optimal challenge they provide. You participate in the software project because you're paid to do so, the formal authority commands you to do so.

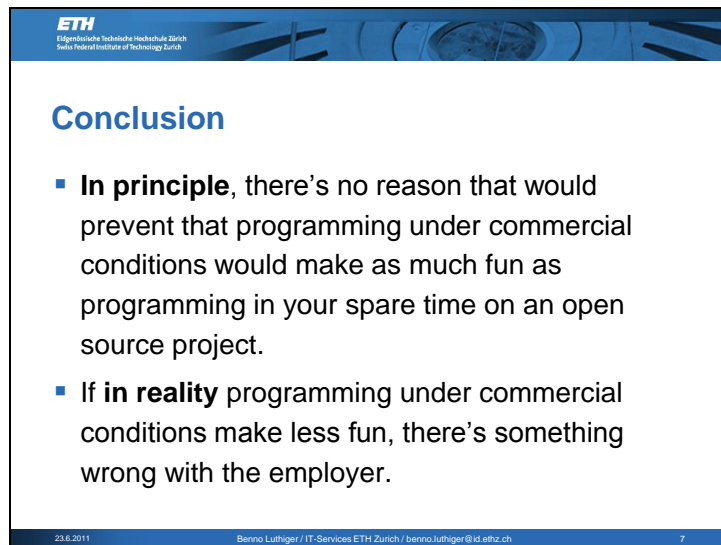
My data allowed me to calculate correlations between the fun the programmers experience and the first four criterias. I could not calculate the effects of monetary incentives on fun.

The results of the correlation analysis I've made yielded an interesting result. I calculated highly significant correlations between 'project vision', 'optimal challenge', 'deadlines' on the one side and fun on the other side. The existence or absence of formal authority didn't affect the fun experience.

Looking at the deadlines, we see an unexpected sign.

I've expected a negative impact of deadlines. But according to my results, the contrary is true. The more deadlines the commercial project have, the more fun the programmers experience in these projects.

Therefore, deadlines are no fun killer.



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Conclusion

- **In principle**, there's no reason that would prevent that programming under commercial conditions would make as much fun as programming in your spare time on an open source project.
- If **in reality** programming under commercial conditions make less fun, there's something wrong with the employer.

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Deadlines are no fun killer and good project visions can be worked out under commercial conditions too.

The same holds for optimal challenge: if you as an employer know both the project and the abilities of your employees, you can provide optimal challenges. But you have to do it, it doesn't come for free.

Thus, I've proved that having fun while programming is not an experience only open source developers make during their spare time, but is true for software developing in general. Programming can and should make fun irrespective whether this activity is done in an open source context or under professional conditions in a commercial project.

If you in real life as professional software developer experience less or no fun, there's something wrong with the employer:

He doesn't have any excuse, at least on no theoretical grounds. He's just not good enough.



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Conclusions

- Professional software developers (in a good firm) have double rewards:
 1. The work as such is rewarding.
 2. The work is paid.

- What does it imply if work is rewarding twice?

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Therefore, the experience of fun while programming is an experience that can be generalized for the activity ‘programming’.

Thus, we can conclude: Professional software developers have double rewards. The work as such is rewarding, because we enjoy fun, plus, the work is paid, which is pleasant too.

That leads to the following question:

Are software developers privileged because they’re rewarded twice?

Or are there other work areas where people are rewarded both monetary and intrinsically, because they enjoy the work they do?

If the latter is true, this raises an interesting question: What does it imply if work is rewarding twice in general? (for a variety of work areas)

Let’s focus on this question for a while.

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Work: two concepts

1. Work is compulsion
2. Work is rewarding

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When we look at how work is perceived, we can recognize two distinct and contradicting concepts.

- Work is compulsion, we must be set free from work, wage is the compensation for the suffering we experience at work.
- Work is rewarding, because work is making fun.

When we look at the political discussions in modern societies, the first interpretation is the dominant concept.

There are parties in all modern societies and strong trade unions that do hard work to set us free from work.

Concerning the other attitude: There's no party I know that is committed to improve the quality of work we do.

During the last 100 years it was the main goal of leftist parties to support the improvement of the working condition of the workers in the industry and of the employees in general.

They were very successful, but during that time, the focus of this support shifted.

This shift can be shown when we look at the mutation of the idea of the provisions for old age.

One of the biggest success of the leftist parties was the introduction of a system of provisions for old age, of old-age pension schemes.

The original idea behind such schemas was to provide an income for the old in times when they're not more employable, when they're too weak to work.

The basic idea is one of insurance and this, of course, makes sense.


But in the meantime, the insurance idea was abolished and we have pure pension schemes: you go into pension because you're old enough and not because you're not more able to work.

Such a system makes perfect sense if you hate the work you do!

But how is it when you love the work?

What does it tell about a society if one of the most important fights of important players in the political arena is to set you free from work as soon as possible?

Of course, such an understanding of the work had its reasons. At the industrial times of the modern societies (around one century ago), the work in the factories was between hard and horrible. Working in the factories meant being exploited for most of the time. The commitment of the labor unions and the leftist parties for the workers was important and beneficial.



Modern society: sectoral distribution

	Agriculture	Industry	Services
France	1.8%	19.2%	79.0%
Germany	0.8%	27.9%	71.3%
Italy	1.8%	24.9%	73.3%
Spain	2.9%	25.5%	71.6%
Switzerland	1.3%	27.5%	71.2%
UK	0.9%	22.1%	77.1%
USA	1.2%	22.2%	76.7%
World	5.8%	30.8%	63.4%

Source: www.cia.gov

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But times changed.

If we look at the sectoral distribution of the GNP, we see that the industrial sector only contributes a quarter.

The most important sector, both if we look at the contribution to the GNP and the number of persons working in, is the service sector.

This shift of importance concerning the sectors was accompanied by a shift of importance of education: education became more and more important.



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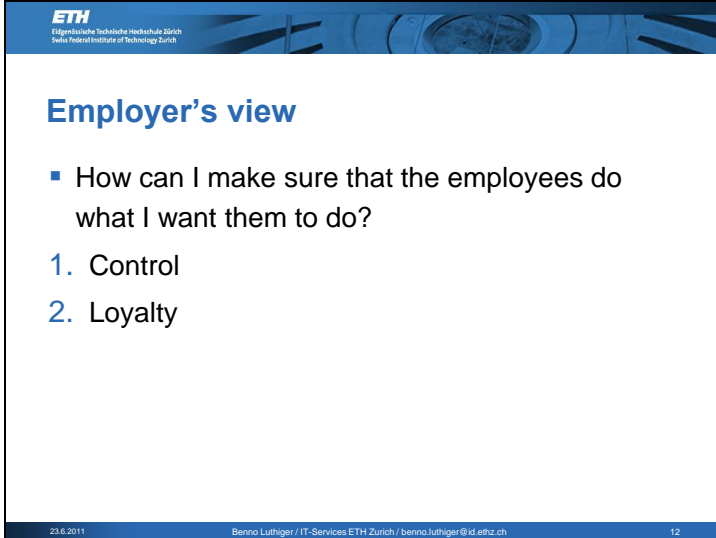
Modern society: knowledge society

- Knowledge economy:
“The concept that supports creation of knowledge by organizational employees and helps and encourages them to transfer and better utilize their knowledge that is in line with company/organization goals”

Source: en.wikipedia.org/wiki/Knowledge_economy

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The importance of both the third sector and education has gone up. In the industrial times, the manual worker was the prototypical person in society. In the modern societies, it's the knowledge worker that has taken this place. We speak of a knowledge or information society to express this fact. I've copied the wikipedia definition of the term 'knowledge economy'. According to this definition, knowledge economy is a concept, that supports the creation of knowledge by the employees in a company. The aspect that the knowledge created by the employees has to be in line with the company's goals is very important.



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Employer's view

- How can I make sure that the employees do what I want them to do?
 1. Control
 2. Loyalty

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Let's approach the fact that we live in a knowledge society and work in a knowledge economy by putting us into the view of an employer.

What does this fact mean for an employer?

We assume a rational employer: at the end of the day he wants to have a profit. In a correctly institutionalized economy, he does this by selling products or services to customers.

Because he can't do this all alone, he needs employees.

As soon as he has some employees, he runs into a problem economists call the 'principal-agent-problem':

The owner and his employees have different goals. The company is successful only if it manages to bring the employees' goals in line with the company's goals.


Basically the employer can exert two different concepts to achieve this: *control* or *loyalty*.

This is true for all societies with division of labor.

During the high times of industrialization, when most of the employees worked in factories and at assembly lines, *control* was the obvious choice.

At the assembly line, you almost automatically in line with the company's goals.

But where are the assembly lines in the knowledge economy?



Peter Drucker (1909 – 2005)

- “Develop your people. Focus on their strengths. Then make high demands based on a person’s strengths. Finally, periodically view their performance.”
- "I'm always asked how I know what kind of organisation to accept as a client. When you walk through the door, you know in two minutes whether they enjoy it. And if they don't enjoy it, then I'd rather not work for them. But if they like it and they feel tomorrow is going to be better – that creates a totally different climate."

Source: Practice of Management (1955)

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In the knowledge economy, the determining factor is not what the employee achieves compared to predefined plans. In the knowledge economy, there are hardly plans whose fulfillment can be measured by quantitative means. Predefined work can be handled by machines, by robots. They are much better suited to do such work, because they are much more efficient to do such work. When it comes to human work, it's much better when we let humans work in a flexible, in an uncontrolled context, where the fulfillment of the task depends upon the employees' creativity and ingenuity. The employee's ability to act and react in unplanned and unfamiliar situations is a central success factor, especially if the company acts in highly competitive areas. These are the employees which contribute to the company's advance and make it distinguishable from the competitors.

It was Peter Drucker who first introduced the term knowledge economy. The Wall Street Journal labeled him as “The dean of US business and management philosophers”.

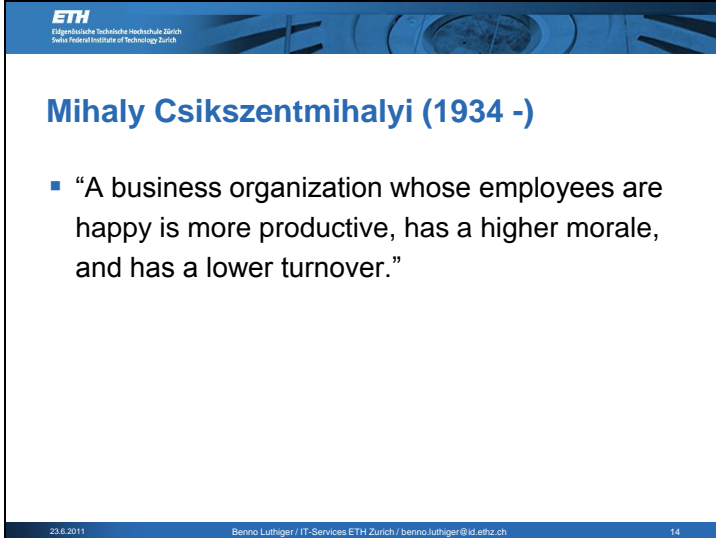
If you look through the management literature he wrote, you won't find anything about how to control the employees.

Instead, you will find lots of thorough insights about how to motivate the employees, how to leverage their potential.

The quotes I've taken from him prove that he was perfectly aware of the importance of challenge and fun to motivate employees.

In the first quote, Drucker describes what we found out about the importance of challenge for the employee's motivation.

The second quote is about the fun and its effects on the climate within the company. Drucker didn't work for companies whose employees don't enjoy the work. He simply couldn't get somewhere with such companies.



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Mihaly Csikszentmihalyi (1934 -)

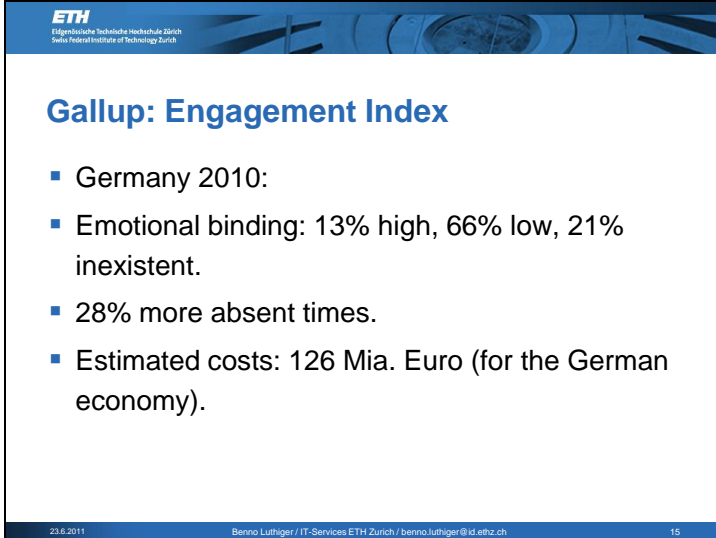
- “A business organization whose employees are happy is more productive, has a higher morale, and has a lower turnover.”

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Here's another fine quote.

It's from another psychologist with spill over into management literature, it's from Csikszentmihalyi.

He who has discovered the flow phenomenon is aware that fun and happiness is not only a matter of scientific research, but of economic and social practice too. Unfortunately, these finding didn't make it really into the managers' heads.



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Gallup: Engagement Index

- Germany 2010:
- Emotional binding: 13% high, 66% low, 21% inexistent.
- 28% more absent times.
- Estimated costs: 126 Mia. Euro (for the German economy).

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How else could we explain the disastrous findings of the yearly Engagement Index by Gallup?

The evaluation of the data 2010 for Germany yielded the following results:

Only 13% of the employees have high emotional binding to the company.

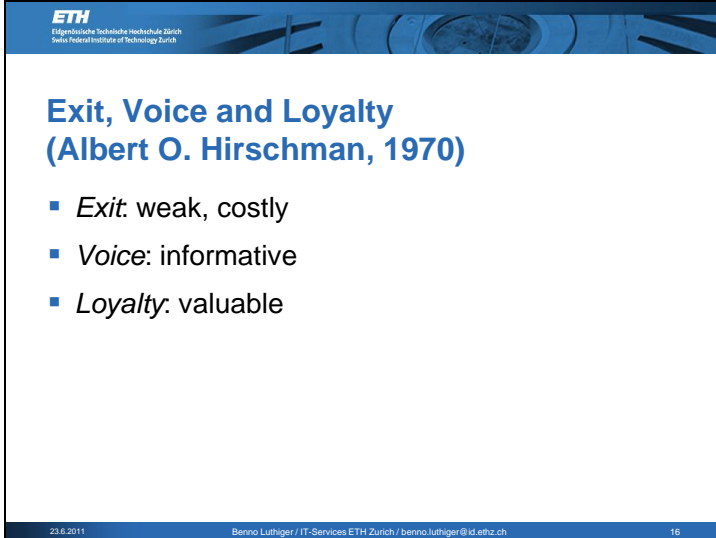
21% have no bindings and behave destructive at the work place, they show no personal engagement, instead, they do work to rule.

The absent time of such employees is 28% higher than those of their colleagues.

They don't contribute any ideas to the company and 59% of them plan to leave the company within a year.

Most frequent substantiation: missing attention and recognition by the superiors. The employees don't find themselves sufficiently promoted and the employee's opinion is not appreciated. This is exactly the contrary of what Drucker and Csikszentmihalyi promoted.

Poorly motivated employees cause significant costs. For Germany, the Gallup institute estimated costs of 126 billions of Euro per year.



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Exit, Voice and Loyalty (Albert O. Hirschman, 1970)

- *Exit*: weak, costly
- *Voice*: informative
- *Loyalty*: valuable

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Lets dig deeper into the concept of ‘loyalty’.

To fully understand the meaning of the term ‘loyalty’, it’s worth to look at the alternatives.

In 1970, the economist Albert Hirschman came up with a very influential concept that he explained using the three terms ‘Exit, Voice and Loyalty’.

These three terms describe on the most generic level the basic interactions of an individual vis-à-vis the organization or company he’s in.

If the organization is a company, the individuals may be customers or employees. In the political area, the individuals are citizens or inhabitants.

The terms describe different interaction channels that transmit information of possibly different kind and of different strength.

An organization that has to orient on the needs of the individuals will seek for the signals sent through these channels.

The more dynamic an organization is, the better it is in deciphering these signals and the sooner it is able to adapt.

Exit is the channel through which the weakest signal are sent but at the same time, exit is the method causing the biggest costs.

If a company loses customers, the company has to find new customers and this is costly. If an undemocratic state loses citizens, it has to pull up walls on the borders and this causes heavy costs on various levels.

Beside of the obvious, the physical exit, there’s the exit in the inner emigration too. Employees with no emotional binding to the company will either leave the company or do work to rule and will be absent whenever possible.

An organization that is aware of the exit option will try to make the *voice* option as easy and attractive as possible. If an unsatisfied customer complains instead of exiting silently, he provides valuable information to the company. An attentive company will adapt as soon as possible thus preventing the silent loss of many customers. The same holds for the critical employee.

The *loyal* individual is providing the most value for the organization. He is in line with the goals of the organization, without control.

The employer can't command loyalty and he can't buy loyalty only by giving the salary.

Salary is related to the contractual level. Work force is exchanged for salary. You work and you get paid.

But when it comes to loyalty, it's more than contractual, it's a different level.

It's an exchange too: the employee gives his loyalty if the employer gives him the possibility to evolve his potential.

For that the employer can evolve the employee's potential, he has to be aware of this potential, he has to offer the challenges and the direction.

These are exactly the conditions that make that the employee enjoys the work he does. At least according to my study about the motivations of open source programmers.

And at the same time, these are the means to bring the employee in line with the organization's goals.

Of course, all these considerations make sense only for individuals and organizations in a knowledge economy and society.

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The Magic of Knowledge Economy

- Division of labor
- Knowledge economy
- Need for innovation


↓

- Fun in exchange for loyalty

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So I've finished my reflections and I can recapitulate:
Because of division of labor and because of the knowledge economy, the employer has to bring the employees in line with the organization's goals. The employer can either control or he can trust in the employee's loyalty. When you control, you get what you see, but that's probably not what you want. In particular you don't get anything surprising or innovative. But in the knowledge economy, companies have to be innovative. Therefore, companies do better if they seek for the employees' loyalty. The employees are willing to give their loyalty in exchange for the employers' willingness to evolve their potential. An employer can evolve the potential the employee presents if he's aware of the strengths of the employee, if he esteems the work the employee does, if he provides a vision of the company the employee works for and if he provides challenging objectives the employee has to achieve. Under such conditions, the employee is both in line with the company's goals and he has fun doing the work he does. With his work, he creates valuable goods and thus, he provides to the employer's profit.

Thus I've proved that fun is by no means a privilege of open source programmers nor of software developers in general, but it's a common feature of work in the knowledge society.



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Political implications

- *'To get freedom at work'* instead of *'To get rid of work'*.
- Work creates value and wealth, and work creates work.
- Work doesn't run out.
- Education is the key factor.

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What are the political implications of the fact that work can and should be fun for all?

One is obvious: the leftist battle cry 'Let's get rid of work' has become obsolete. What really matters now is 'To get freedom at work'.

We should ask for political organizations that commit to the quality of work.

If we care for the quality of work, on the same time we have to insist on the value that is created through work, and we have to appreciate the value that is created through work.

Consumption is ok, but creation is better. If we scorn the values created by work, we hardly can't appreciate work as such.

Some people claim that because of technological advances, work will run out.

Why bother about the quality of work if there's no work left over?

I don't agree with such ideas.

We don't have to worry that the work could run out. The services sector's potential to create work is unlimited.


Many companies still didn't get the lesson and they provide poor work and poor work places for their employees. This is what the yearly Gallup studies show.

What can we do to achieve an economy that provides work that is fun to do, for all employees?

I'm convinced that bad companies can't survive in the long term because, as Drucker pointed out, bad companies produce mean quality. Sooner or later they're driven out of market.

Therefore, stiff competition in the market is good, because it drives the bad companies out of the market as soon as possible. Only the good shall survive. The bad companies should be replaced by companies providing good work places the sooner the better.

However, there's an important social prerequisite: we have to make all individuals fit for the knowledge economy. Education becomes a key factor in this consideration.



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- If a society succeeds to make work enjoyable for all, it will be more dynamic and capable of solving the upcoming social problems.

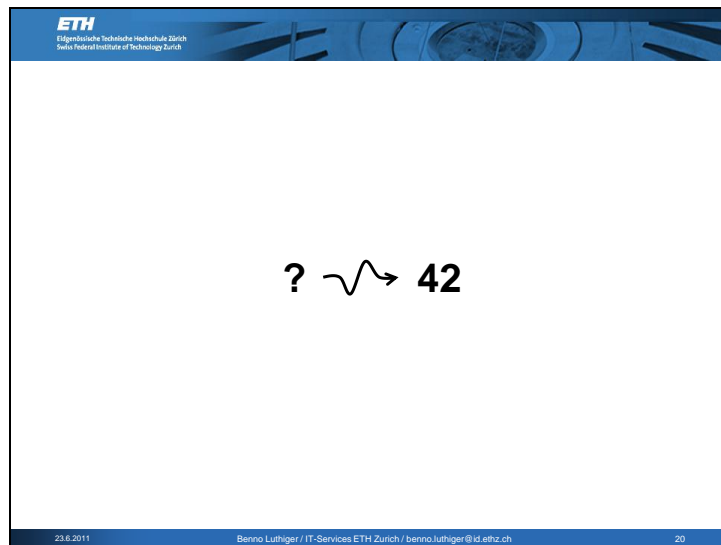
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I'm convinced that having fun while working is not only good for the individual and it's by no means an end in itself.

In contrary, it's good for the society as a whole, because *If a society succeeds to make work enjoyable for all, it will be more dynamic and capable of solving the upcoming social problems.*

And there are plenty of them, at any time.

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I hope you agree with me and share this view.

Note:

You can find the findings of my study about the importance of fun to motivate open source programmers on firstmonday.org:

Pervasive Fun

<http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1422>