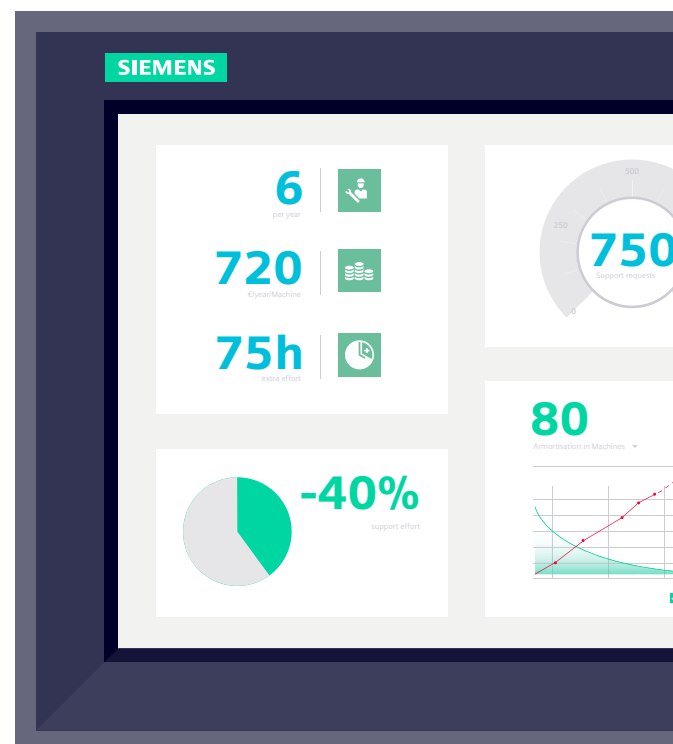**SIEMENS**

Smart
UX design
pays for itself

Increased profitability, thanks to
user-centricity in machine building
siemens.com/ux-design-machine-building

How a few seconds
a day can bring a
lot of added value
in the year.

Why budget
for a good HMI
is a **lucrative
investment**.

How good error
messages save money
and **strengthen
the brand**.

⌐Why your HMI influences your marketing power **reflecting the quality** of your machine.

+ 200.000 €

+ 160.000 €

200

⌐How co-creation with your customer **shortens development time**.

Intro

Global machine engineering is changing. New contenders have been catching up to known top dogs in the market.

Others push into new sectors as their key customer sectors are shrinking in relevance and demand. Within this environment

of intense competition, strategies for differentiation and arguments in marketing are the talk of the day. Thus, we created this report as a sequel to our HMI Design Initiative.

Two years ago, we started out by addressing increasing interests of machine engineers in HMI design. Back then, we

focused on essential interface design concepts, their benefits and how to integrate them into the development process.

Now, this report will focus on UX design in machine building. Tapping into 5 exemplary cases, we will demonstrate how to calculate the ROI for UX design improvements and how to translate those into convincing arguments for your sales and marketing.

Masterclass
www.siemens.com/hmi-design-masterclass

Workbook

www.siemens.com/hmi-design-workbook

Our math, your maths

Needless to say, the world of industrial production and interaction is as broad as can be. When calculating the ROI we use core metrics such as a machine's added value per hour, the number of shifts, working hours, etc. All of these vary from business to business – some of them drastically.

For our sample calculations we are using rather conventional numbers based on our project experience within the industry. Our calculated results serve as an indicator – most important of all, we like to encourage you to run our ROI calculations with your own numbers.
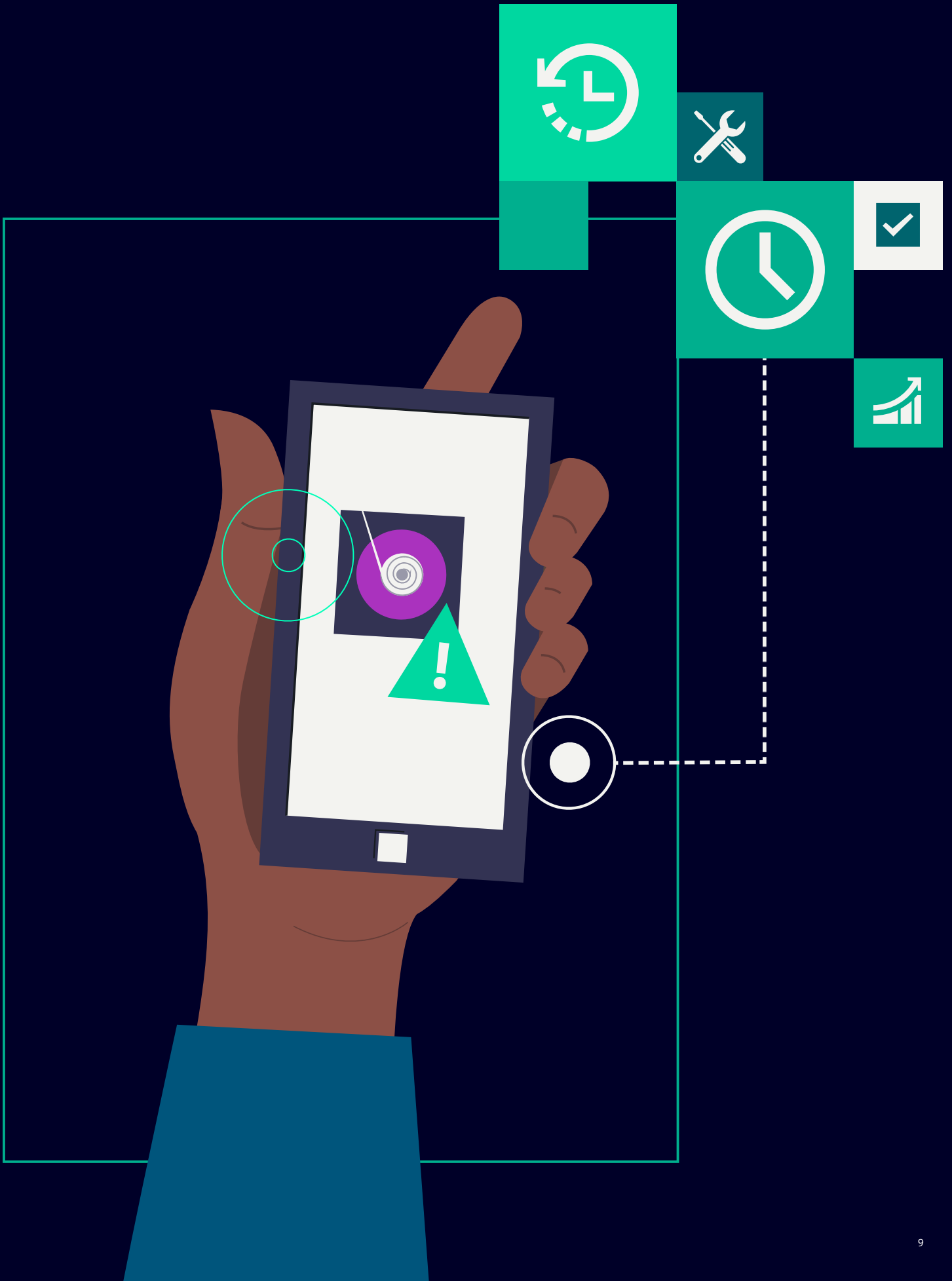
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001
Evaluate the potential of smaller features

At first sight, sending refill alerts to mobile devices sounds like a nice feature to have, but no big deal. On second thought: Over the course of a year, saving a few seconds every refill will add up to notable amount of time and a potential saving worth talking about.

Refill alerts have become an established feature. Some machines use a flashing light on the machine itself, others inform the operator via the user interface. Either way, it's still common practice to trigger the refill alarm when the machine is out of materials.

As the operator walks to the refill station valuable production time is lost. The further away he or she is, the longer the downtime. What is more, the necessity to stay close limits the operator's possibilities to engage in other helpful tasks between refills.

Together with our team, we looked at prediction-based concepts from other industries and came to the conclusion:

If airplane engineers can predict an engine's maintenance needs remotely, predicting the refill time for our packaging machine shouldn't be a problem. It wasn't. In addition, we developed a solution to send our new "refill forecasts" directly to the operator's mobile device.

Now, our operators arrive at the refill station just in time – reducing the average downtime by more than 30 seconds. Furthermore, they could wander off in between without constantly having to keep an eye on their refill station.
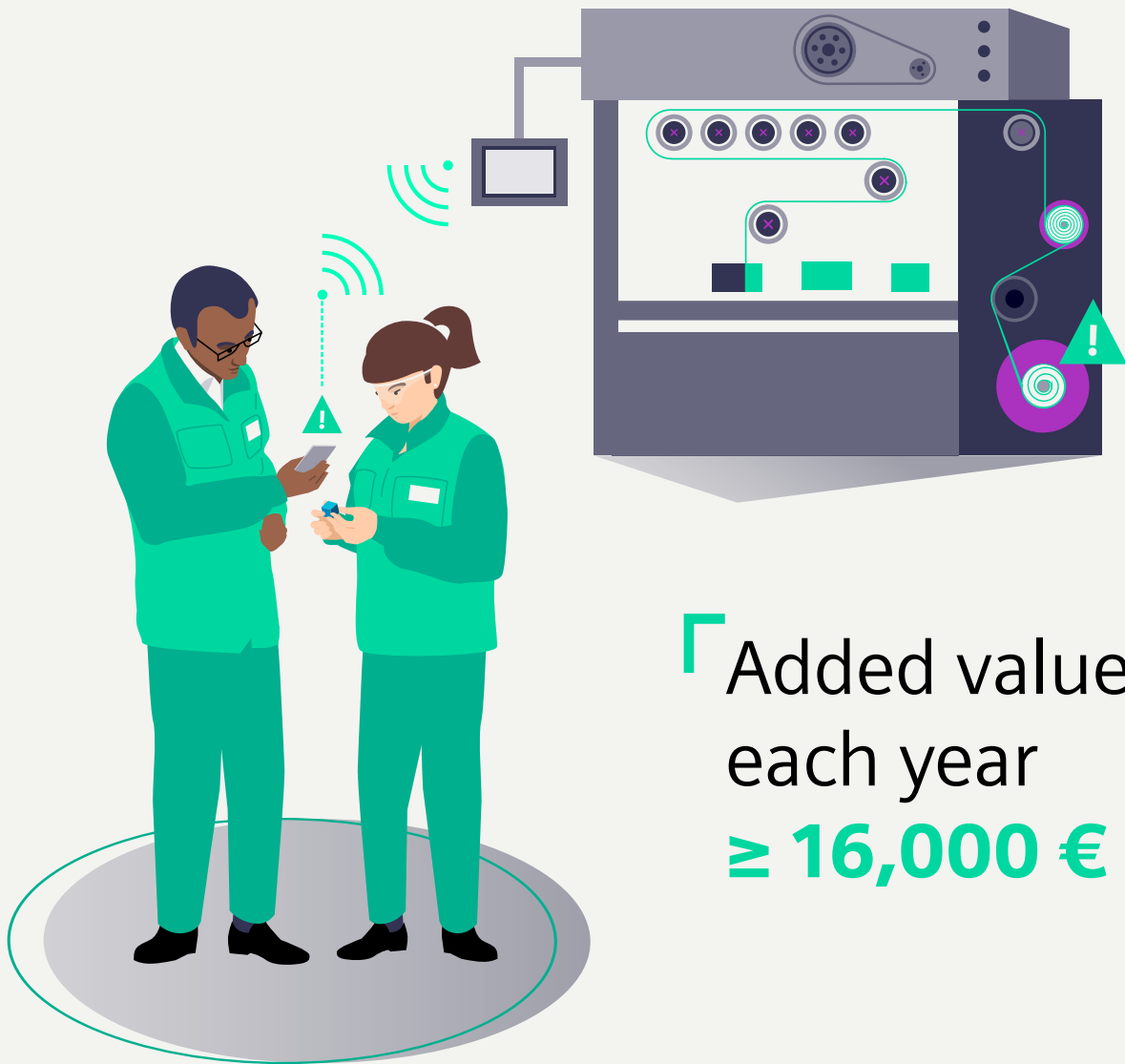
"

We used to have someone close to the refill station to minimize downtimes. Now, our refillers are supporting their colleagues in between."

Let's do the maths

Calculating the benefits of the additional spare time to wander off is difficult – thus, let's focus on the tangible 30 seconds of downtime reduction produced by mobile refill forecasts.

Our packaging machine wraps products in foil, requiring a refill every 24 minutes. On a workday with two shifts of 8 hours, that's 40 refills a day. Multiplied with 30 seconds per refill, we are saving 20 minutes per day. Assuming a year has 200 workdays, that's 4,000 minutes. As our machine produces an added value of 4 euro per minute, we end up with 16,000 euros each year.

Needless to say, our exemplary packaging machine has a rather low added value per minute. If, for instance, an entire production chain is being delayed due to a "traditional" refill alarm, the production time lost adds up to an astounding sum.

Added value
each year
≥ 16,000 €

Keep in mind for your marketing

✓ **Assess the potential effects of new and existing features –**
something nice to have may have relevant impacts if the corresponding
task is done frequently.

✓ **Take a closer look at frequent operator tasks.**
Which easy to implement feature could make a notable difference
over the course of an entire year?

✓ **Throw some spotlight on small, yet high-potential features.**
Make sure to address their impacts – e. g. "Our mobile refill forecasts
increase your production by 4%."

002
Avoid scaling traps when prioritizing budgets

Settling with a "hands-on" interface and cutting down development costs reduces the buying price of a machine. The actual price for buying and using the machine however increases as training times, operating issues and customer support go up – a lose-lose situation for everyone involved.

Almost 400 years ago, French philosopher Blaise Pascal pointed out a key aspect of modern day UX. In one of his letters he wrote: "I have only made this letter longer because I have not had the time to make it shorter." He apologized as he realized:

Because he didn't spend the time to put down his thoughts on paper concisely, his recipient now had to take more time to read a longer version of what could have essentially been the same message.

In contemporary HMI design, we are looking at a similar situation: If engineers don't spend the time to create an easy to understand interface, their customers will need more time to train their operators – wherein, needless to say, time is money.

It's important to note the difference though: In Pascal's case, one writer saves time, one reader uses more time. In HMI design, one engineering team saves time, all their customers/operators use more time. The required effort is not only trans-ferred but also multiplied, scaling up with every machine sold.

//

The most efficient and sustainable customer support is building a quality HMI and thus reducing support needs in the first place."
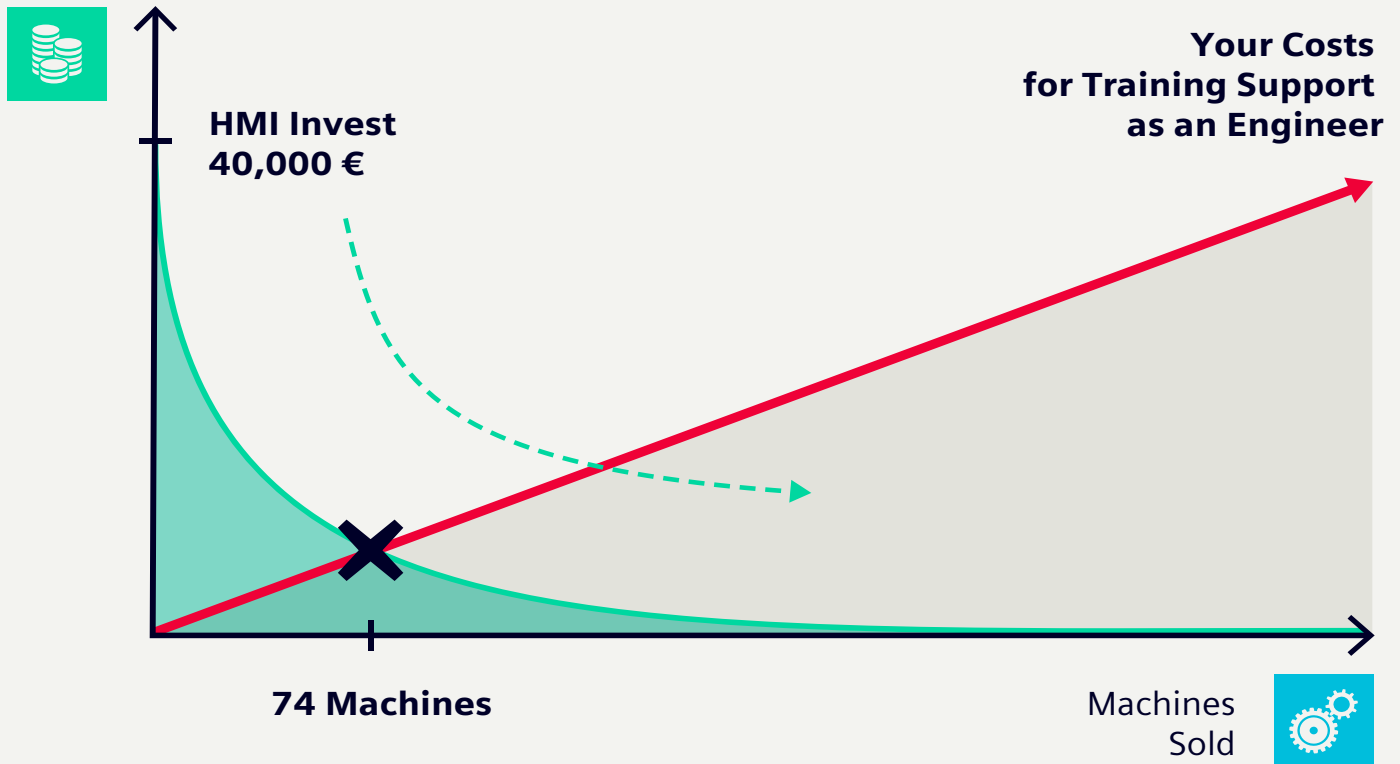
Let's do the maths

Most companies help their customers with setting up their new machinery, training their operators, providing a customer hotline, etc. Obviously a good idea, but it's important to note: this ramp-up support isn't for free. Either it's charged as an extra service or it's included in the purchase price. The actual amount depends on many parameters – but, let's estimate 400 euros per machine.

Furthermore, every ramp-up phase is a downtime. The more time operators need to get familiar with the new machine, the more production time and value is lost. Again, actual numbers vary – let's work with our packaging machine and its rather low production value of 240 euro per hour. If we estimate about four hours for a typical training session, our start-up costs, including the 400 euros of extra services, amount to 1,360 euros.

Now, let's invest 40,000 euro to get an HMI designer on board, helping us to build an opera-tor-friendly HMI. Across projects, we typically observe that good HMI design reduces support needs by about 40% – in our case, that's about 500 euro.

Thus, once we sell 74 machines, we break even with our investment of 40,000 euro. At that point, using resources on the HMI design instead of further support becomes the better overall option.

Additional effort
for HMI optimization

**HMI Invest
40,000 €**

**Your Costs
for Training Support
as an Engineer**

74 Machines

Machines
Sold

Keep in mind for your marketing

✓ **Think of budgeting for a good HMI not as a luxury but as an invest-ment,** generating customer benefits for your marketing and reducing the pressure on your customer hotline.

✓ **Address your user-friendly HMI with tangible customer benefits** such as shorter trainings and downtimes. Calculate the respective numbers with your customers.

✓ **Expose your competitor's extensive ramp-up support** as merely the result of a sloppily designed product in the first place.

003
Save your brand from bad customer experiences

We all know them: frustrating error messages that don't help to solve the problem. If you settle with sloppily written messages, they continuously damage your brand's image and increase your customer support expenses.

Error messages are a highly underestimated aspect of good HMI design. Sales experts don't include them in their product presentations and customers don't ask about them. Still, bad error messages (BEM) rank among the top 3 most annoying aspects of software, apps and interfaces.

The problem with BEM is this: They merely mention the occurrence of an error, but don't tell the operator the actual problem nor what to do about it. As a result, solving the problem takes longer than necessary.

In contrast, well written error messages specify the problem and tell the user what to do – either how to fix it on their own or who to contact to do it. They derive from a design approach called "assistive UI".

Thinking of sports, BEM is like that friend who passes the ball to the middle of nowhere. You need to run over there, pick it up, and get back on track. Good error messages are like your other friend, passing the ball accurately so you can move on quickly and score a goal.

It's important to notice that error messages are shaping a brand's image more than expected – good error messages soften the negative experience whereas BEM amplifies it, causing operators to develop a lasting antipathy for your product and brand. What is more: As BEM prolongs downtimes, they cause tangible production losses to your customers.

"

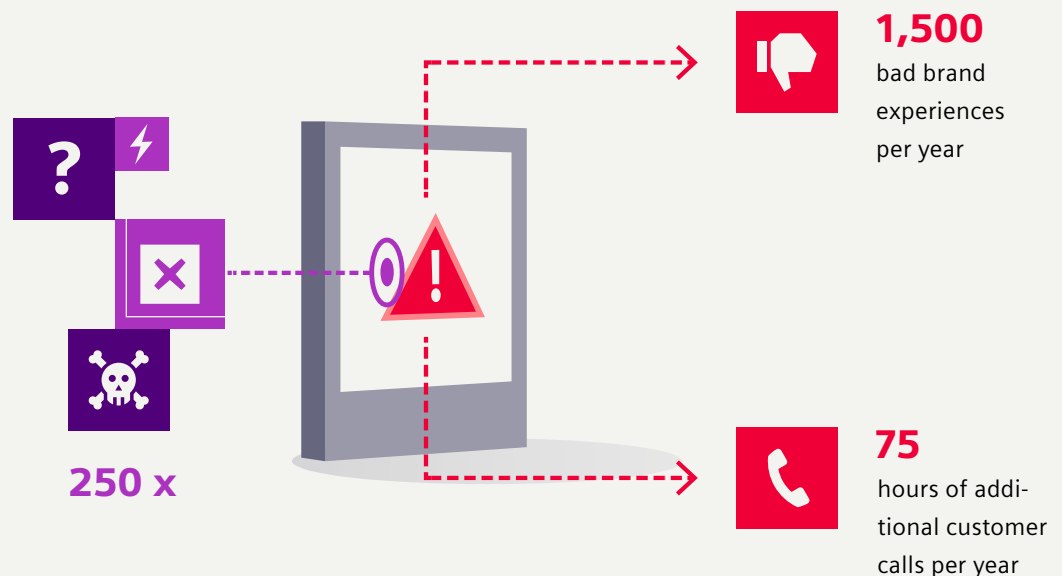Surprisingly, error messages are rarely part of sales and marketing – despite their impact."

Let's do the maths

Our test group is reported to encounter about 3 BEMs per year. On average, they estimated to have lost an extra 30 minutes each time, because the error message didn't include any useful information.

Assuming two shifts and operators, we are looking at 3 hours lost per machine and year. Calculating with the 240 euro per hour rate from our packaging machine, that's 720 euro per machine. If you have ten of them, that's 7,200 euros lost per year on your customer's side. If BEM dis-turbs an entire production chain, losses increase notably.

And on the engineering side? Let's assume that 3 out of 6 errors could be solved by the operator if the error message included useful advice. If we sold 250 machines, that's 750 unnecessary customer requests per year due to BEM. The average customer call takes 6 minutes, leaving us with 75 hours of extra work every year – enough time to write better error messages.

Only 250 machines sold generate **a lot of trouble for you**

250 x

1,500
bad brand experiences per year

75
hours of additional customer calls per year

Keep in mind for your marketing

✓ **Pay attention to customer/operator experiences –** a fancy brochure and website make a good start, but great brands are built on daily experiences.

✓ **Connect your support team with your engineers.** They can help to write better error messages and integrate customer support into the machine.

✓ **Turn error messages into a talking point.** It's obviously not the core argument for your product, but it's a noteworthy feature, reducing production losses.

004
Stop vandalizing your marketing efforts

A professional website, glossy brochures, fancy exhibition stands. Substantial sums are spent on marketing, but having a sloppy looking HMI is like having spaghetti sauce on your suit. It ruins the first impression.

In his experiment about visual influence on in-store buying decisions, Jesper Clement from the Copenhagen Business School noticed how packaging design influences the decision process in several phases. One might say that this is typical B2C customer behavior – surely, B2B customers are more rational. However, we witnessed similar effects in machine marketing.

In 2018, we worked with an engineering team to re-design their HMI. About one and a half year laters, they contacted us with good news. It's not just that they closed more sales pitches than before, they also noticed a general increase in leads and pitches of more than 20%. The new and user-centric design of the HMI helped to convince more customers – and, in addition, caught the attention of more customers in the first place.

Once you think about it, it's really no surprise. Unless you are actively hiding your machine's HMI, it's likely to appear in various places: on your website, your exhibition stand and your brochures. And here, it's important to notice that this "visual influence" is not just a matter of style and taste. The core question is: Does it look easy to understand and easy to work with? Does it look impactful? The HMI serves as a tangible representative of your machine. A good looking interface promises a professional machine – and vice versa.

Let's do the maths

Suppose we expect to sell about 250 ma-chines with a gross margin of 4,000 euro each, getting us to an overall revenue of 1 million euro. Now, let's apply the 20% more leads mentioned above. It's reasonable to expect a similar increase in revenue – that's 200k euro.
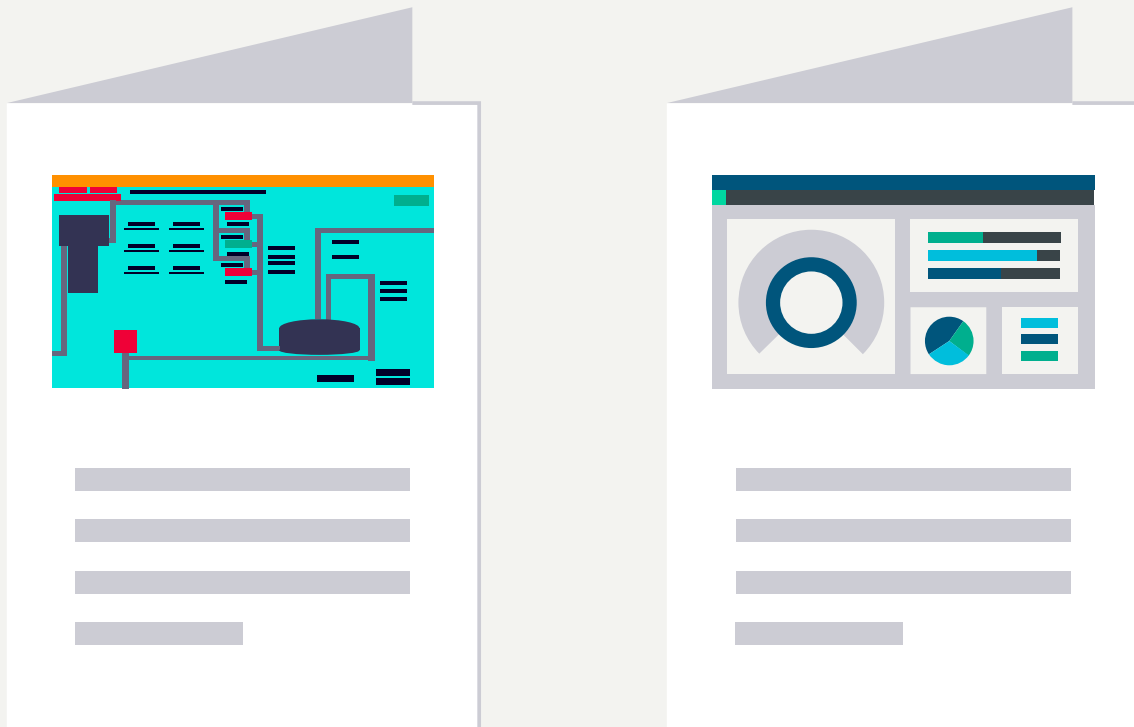
If we don't have an HMI design expert on our team, we can hire an external partner. A budget of 40k should be sufficient to get us from an "ordinary" to an "impactful" HMI. Thus, we still have 160k euro left – a worthy ROI – and what is more: So far, we have only calculated the increased leads effect. Our client also experienced a high closure rate as a result.

In a nutshell, one can say: By settling with an "ordinary" HMI to save 40k euro during development, we are loosing more than 200k euro in overall revenue.

"
Our new HMI increased our
deals and leads noticeably."

Which machine would you like to **learn more about?**

Keep in mind for your marketing

✓ **Be aware of your HMI as a vital representative of your brand and product.** If you settle for an "ordinary" HMI, your entire machine will appear to be "ordinary" as well.

✓ **Utilize the marketing power of a impactful looking HMI instead** by turning your interface into the "face" of your presentations, exhibitions stands, etc.

✓ **Remember that a user-centric HMI increases sales and customer satisfaction** whereas classic marketing activities increase sales only.

005
Find practicable ways to develop with customers

Big international companies have established stylish innovation labs to which they invite customers to develop new products together. Good to know: Co-creation works on a smaller scale just as well.

Even though co-creation is often encountered within the context of big budgets, it's important to realize: You don't need a stylish innovation lab to work more closely with your customers. At its core, co-creation is a conceptual idea: Instead of creating products for your customers, create them with your customers. They way you do this is up to you and is dependent on the context.

Working with a client who likes to introduce himself as a "standard SME machine builder with customers in Europe and beyond", we were able to explore different ways of co-creation on an SME scale.

We started out with a series of single calls with select customers, asking for periodic feedback regarding our new HMI designs. This was achieved by means of screen-sharing or camera. As some of them showed more interest in being part of the development process, we started a bi-monthly group call to create and discuss first drafts and prototypes with them. During the second project, we organized an additional "concept day" early on, inviting customers within range to the office. Our bi-monthly group calls followed.Evaluating the success of the new collaborative process, our client reported several impacts: The overall dev. time was reduced by 2 months. Two of his customers had ordered machines before the official release – and in addition, they had several new leads asking for "this new machine". One year later, the overall revenue had increased by 16% compared to the previous model.

"

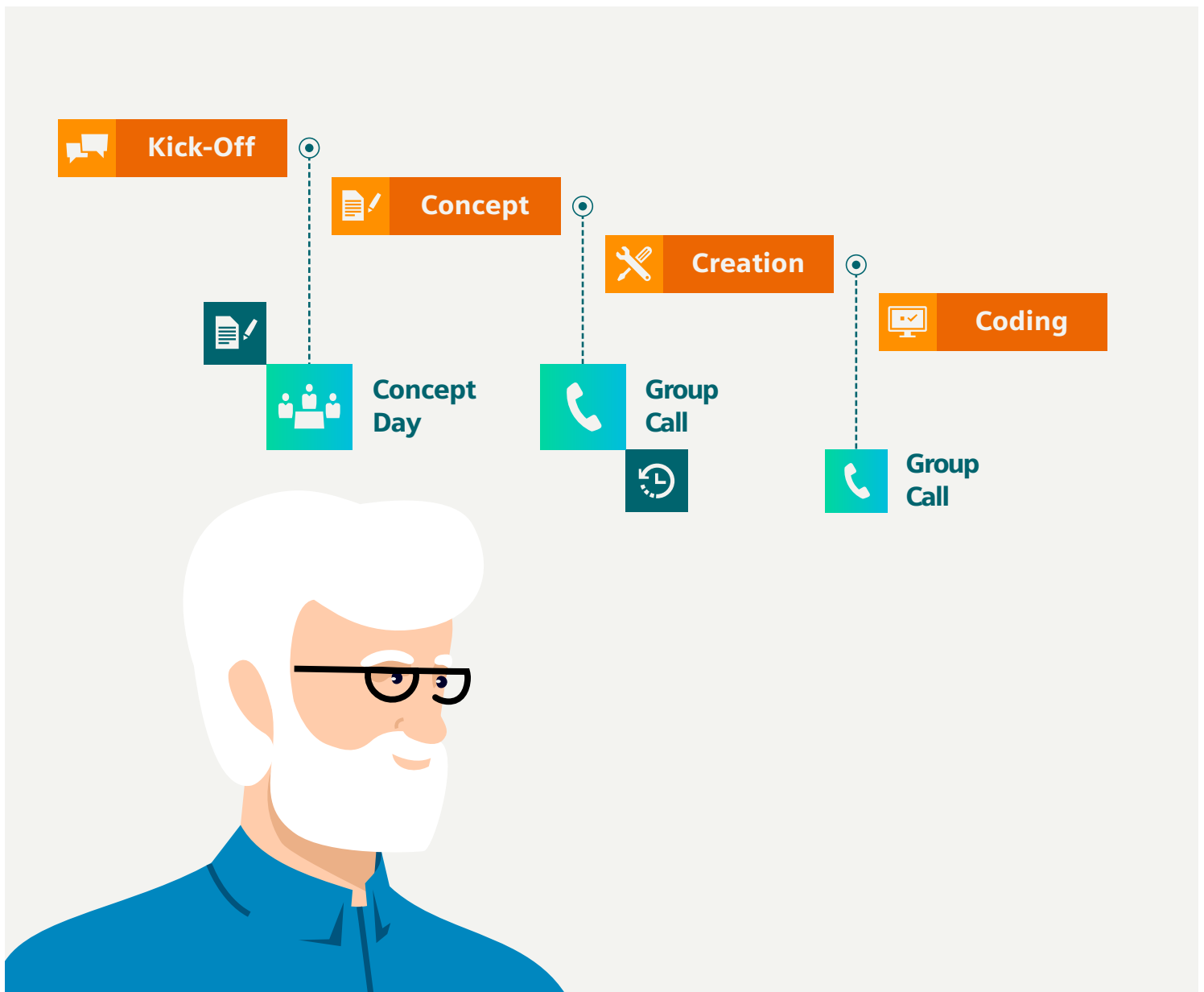## What do I like about co-creation? It's good for our development and marketing."

Let's do the maths

Getting a handle on this case is difficult – but let's look at some numbers.

Running a series of calls doesn't require any additional investment. All we need is someone to coordinate the schedule and 1-2 engineers to lead the call. For a series of 4-5 calls, that's about 2 days of work – translating into round about 800 euro in salaries.

Organizing a "concept day" takes about the same – two people, one day at the office, and some organisational work. In addition, we need a budget for catering, some extra equipment and for the travel expenses of our customers to come to our office. All in, we are looking at 2,000 to 3,000 euro.

To put these numbers in perspective, let's consider the numbers above: 2 months shortened dev. time and 16% revenue increase – that's a worthwhile investment.

Kick-Off

Concept

Creation

Coding

Concept Day

Group Call

Group Call

Keep in mind for your marketing

✓ **Start with some easy-to-try ideas to work more closely with selected customers –** move forward step by step as you discover what works best.

✓ **Make sure to keep your co-creation a co-creation.** Mixing in sales pitches and presentations is counter-productive. Co-creation is great for sales, because it is not sales.

✓ **Feel free to mention the co-creative process in your marketing.** Mention that your new model has been developed with operators and include their quotes to build trust.

A final thought

In each case, we could see how spending resources for an impactful and user-centric HMI is worth the investment. On the one hand, a good HMI generates direct benefits for the engineering team in the form of increased sales, reduced customer support expenses, etc.

On the other hand, it's the customer who benefits from a good HMI through shorter trainings, reduced downtimes, etc. Then it's up to the engineers to point out and utilize those customer benefits in sales and marketing.

Most important of all – even though we looked at each case separately, all of them are actually connected. After all, it comes down to one core decision:

Do we invest an extra 40,000 euro into an optimized HMI?

YES

If we answer this questions with yes, we can expect to generate the whole range of benefits portrayed in each of the cases:

- ☑ **More leads**

- ☑ **More closed deals**

- ☑ **New opportunities for markups**

- ☑ **Less customer support expenses**

- ☑ **Higher customer satisfaction**

NO

If our answer is no –
we can be sure to suffer losses
in revenue and customers.

Smart UX design pays for itself